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SECTION ACRONYMS/ABBREVIATIONS

ACRONYM/ ABBREVIATION	DEFINITION
AAQS	Ambient Air Quality Standard
AFC	Application for Certification
APCD	Air Pollution Control District
AQIA	Air Quality Impact Analysis
AQMP	Air Quality Management Plan
ATC	Authority to Construct
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CARB	California Air Resource Board
CEC	California Energy Commission
CEQA	California Environmental Quality Act of 1970
CFR	Code of Federal Regulations
CO	Carbon Monoxide
CTG	Combustion Turbine Generators
DOC	Determination of Compliance
EPA	Environmental Protection Agency
GHG	Greenhouse Gases
HAP	Hazardous Air Pollutant
H&SC	Health & Safety Code
HRA	Health Risk Assessment
LORS	Laws, Ordinances, Regulations and Standards
MW	Megawatt
NAAQS	National (Federal) Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
NSPS	New Source Performance Standards
NSR	New Source Review

ACRONYM/ ABBREVIATION	DEFINITION
O3	Ozone
OEHHA	Office of Environmental Health Hazard Assessment
OLM	Ozone Limiting Method
PAH	Polycyclic Aromatic Hydrocarbon
Pb	Lead
PM_{10}	Particulate Matter of 10 µm or Less in Diameter
$PM_{2.5}$	Particulate Matter of 2.5 µm or Less in Diameter
PPM	Parts Per Million
Project	Subject of this SPPE application, Orange Grove Project
PSD	Prevention of Significant Deterioration
RFO	Request for Offer
SCAQMD	South Coast Air Quality Management District
SCR	Selective Catalytic Reduction
SDG&E	San Diego Gas & Electric
SDAPCD	San Diego Air Pollution Control District
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SPPE	Small Power Plant Exemption
TAC	Toxic Air Contaminants, also called non-criteria pollutants
T-BACT	Best Available Control Technology for Toxics
TPY	Tons Per Year
USEPA	U.S. Environmental Protection Agency
VOC	Volatile Organic Compounds

6.2 AIR QUALITY

As described in Section 2.0, the proposed Project involves the installation and operation of a 96-megawatt (MW) simple-cycle power station on an 8.5-acre Site in a rural area of north San Diego County, California. The Project consists of two GE LM6000PC SPRINT natural gas fired combustion turbine generators (CTG). The CTG will be equipped with inlet air chiller coils, exhaust ducting, and flue gas treatment system to meet the required performance and proposed air emission limits.

Orange Grove Energy will develop, build, own and operate the facility. This project is being developed in response to a San Diego Gas & Electric (SDG&E) request for offer (RFO) to add integrity to this region to meet peak summer electrical demands.

The proposed Site is approximately 1.5 miles west of the Pala Casino, and approximately 2.0 miles west of the community center of Pala. There are no potential sensitive receptors identified within 3,000 meters (1.86 miles) of the Site. The nearest schools are: 1) Vivian Banks Charter School approximately 2.0 miles west of the Site, 2) Vallecitos Elementary approximately 3.6 miles north-west of the Site, 3) Bonsall Union Elementary located approximately 4.5 miles south-west, and 4) Pauma Valley and Pauma Elementary approximately 7.1 miles south-east of the Site.

This section describes existing air quality conditions in the immediate area, the maximum potential impacts from the Project, and certain Project features and measures taken to reduce these impacts to below the significance thresholds. Additional air quality data are presented in other sections of this application, including an evaluation of hazardous air pollutants (HAP) or toxic air contaminants (TAC) in Section 6.16, Public Health.

6.2.1 Air Quality Setting

6.2.1.1 Climate

The Site is located in northern San Diego County, approximately 12 miles inland from the Pacific Ocean. The climate in San Diego County is mostly influenced by the Pacific Ocean and its perennial high pressure systems that result in dry, warm summers and mild, occasionally wet winters. One of the main determinants of the climatology is a semi-permanent high pressure area (the Pacific High) in the eastern Pacific Ocean. In the summer, this pressure center is located well to the north, causing storm tracks to be directed north of California. This high pressure cell maintains clear skies in this region for much of the year.

When the Pacific High moves southward during the winter, this pattern changes, and low-pressure storms are brought into the region, causing widespread precipitation. In San Diego County, the months of heaviest precipitation are November through April, averaging about 9-14 inches annually. The mean temperature is 62.2 degrees Fahrenheit (°F), and the mean annual maximum and minimum temperatures are 75.7 °F and 48.5 °F, respectively.

6.2.1.2 Meteorology

6.2.1.2.1 Escondido Meteorological Data

The project site is located in the San Diego Air Basin. The boundaries of the air basin correspond to those of the County. Meteorological data closest to the project site location are available from the Escondido monitoring station, located approximately eight (8) miles directly south of Pala. The Escondido monitoring station is located within the City of Escondido and it is maintained by the SDAPCD in accordance with established EPA guidelines. Wind roses for the Escondido data from 1998 to 2000 are provided in Appendix 6.2-A.

According to the data, wind flows as monitored by the Escondido monitoring station are predominantly easterly. Wind speeds over the project region average 1.7 meters per second (m/s) or 5.58 feet per second (f/s). Hourly meteorological surface data from the Escondido monitoring station were used to represent transport and dispersion conditions for the purpose of health risk assessment (HRA) in Section 6.16 Public Health. The HRA for this project was completed using the HARP Version 1.3 program published by the California Air Resources Board (CARB) and three years of certified meteorological data. According to the San Diego Air Pollution Control District (SDAPCD), gaps in the Escondido wind speed and wind direction data were supplemented with data from the Miramar monitoring station.

6.2.1.2.2 Gregory Canyon Meteorological Data

More local than the Escondido meteorological data is another set of data collected by the Gregory Canyon Landfill project located approximately one (1) mile south west of the Site. The data encompassed entire years of 2002 and 2003. They were reviewed, approved and made available by the SDAPCD for this project. The data is composed of onsite surface data, surface data from the Miramar air monitoring station no. 93107, and upper air data from the Miramar air monitoring station No. 72293. Surface data from Miramar was incorporated to fill any missing hours from onsite surface data collected by the Gregory Canyon Landfill project. Onsite surface air data was processed along with Miramar's surface and upper air data using the U. S. Environmental Protection Agency (EPA) AERMET meteorological data processor.

Annual and quarterly directional vector wind roses are rendered and provided in Appendix 6.2-A for the Gregory Canyon meteorological data. The two year wind profiles show that the prevailing wind direction is 30 degrees northeast at an average wind speed of 4.17 knots (7.04 f/s). The average wind direction during the months of April through September is more strongly from the southwest at about 4.67 knots (7.88 f/s). During October through March, the average wind flow is from the northeast at about 3.68 knots (6.21 f/s).

Since the Gregory Canyon meteorological data is more local to the Project Site and they were approved and provided the SDAPCD, it is used to model the ambient incremental criteria pollutant contributions for the project. The proximity of where the data is collected (i.e. approximately one (1) mile west of the Project Site) qualifies the data as "site specific" under the EPA guidance for dispersion modeling (50 CFR Part 51, Appendix W - Guideline on Air Quality

Models). In lieu of using 5 years of National Weather Service meteorological data, a project may use at least one (1) year of site specific data under this EPA guidance. The two years of Gregory Canyon meteorological data will therefore be adequate for modeling purpose.

6.2.2 Overview of Air Quality Standards

The Project is located within the jurisdiction of the SDAPCD. The U.S. EPA has established national ambient air quality standards (NAAQS) for ozone (O_3), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with aerodynamic diameter less than or equal to 10 microns (PM_{10}), particulate matter with aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and airborne lead. Areas with ambient levels above these standards are designated by EPA as "non-attainment areas" subject to planning and pollution control requirements that are more stringent than standard requirements.

Statewide, CARB has established the California ambient air quality standards (CAAQS) for ozone, CO, NO_2, SO_2, PM_{10}, $PM_{2.5}$, sulfates, airborne lead, hydrogen sulfide (H_2S), and vinyl chloride at levels designed to protect the most sensitive members of the population, particularly children, the elderly, and people who suffer from lung or heart diseases.

Both the state and national air quality standards consist of two parts: an allowable concentration of a pollutant, and an averaging time over which the concentration is to be measured. Allowable concentrations are based on the results of studies of the effects of the pollutants on human health, crops and vegetation. The averaging times are based on whether the damage caused by the pollutant is more likely to occur during exposures to a high concentration for a short time (one hour, for instance), or to a relatively lower average concentration over a longer period (8 hours, 24 hours, or 1 month). For some pollutants there is more than one air quality standard, reflecting both short-term and long-term effects. Table 6.2-1 presents both the NAAQS and the CAAQS for applicable pollutants. The California standards are generally set at concentrations lower than the federal standards and, in some cases, have shorter averaging periods.

Table 6.2-1 – Federal and State Ambient Air Quality Standards

POLLUTANT	AVERAGING TIME	CALIFORNIA	NATIONAL
Ozone (O_3)	8 hours	0.070 ppm (137 $\mu g/m^3$)	0.08 ppm (157 $\mu g/m^3$)
	1 hour	0.09 ppm (180 $\mu g/m^3$)	-
Carbon Monoxide (CO)	8 hours	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
Nitrogen Dioxide (NO_2) (2)	Annual Average	0.030 ppm (56 $\mu g/m^3$)	0.053 ppm (100 $\mu g/m^3$)
	1 hour	0.18 ppm (338 $\mu g/m^3$)	-
Sulfur Dioxide (SO_2)	Annual Average	-	0.03 ppm (80 $\mu g/m^3$)
	24 hours	0.04 ppm (105 $\mu g/m^3$)	0.14 ppm (365 $\mu g/m^3$)
	3 hours	-	0.05 ppm (1300 $\mu g/m^3$) (3)
	1 hour	0.25 ppm (655 $\mu g/m^3$)	-

POLLUTANT	AVERAGING TIME	CALIFORNIA	NATIONAL
Respirable Particulate Matter (PM_{10})	Annual Arithmetic Mean	20 μg/m^3	-
	24 hours	50 μg/m^3	150 μg/m^3
Fine Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean	12 μg/m^3	15 μg/m^3
	24 hours	-	35 μg/m^3
Lead (Pb)	Calendar Quarter	-	1.5 μg/m^3
	30 days	1.5 μg/m^3	No National Standards
Sulfates (SO_4)	24 hours	25 μg/m^3	
Hydrogen Sulfide (H_2S)	1-hour	0.03 ppm (42 μg/m^3)	
Vinyl Chloride	24-hour	0.01 ppm (26 μg/m^3)	
Visibility Reducing Particles	8-hour (10am to 6pm PST)	Extinction coefficient of 0.23 per km – visibility of ten or miles or more.	

(1) Source – California Air Resource Board – 02/22/2007
(2) California NO_2 standard amended 02/22/2007 to reduce thresholds
(3) This is a national secondary standard, which is designed to protect public welfare

EPA, CARB and SDAPCD classify an area as attainment, unclassified, or nonattainment, depending on whether the monitored ambient air quality data show compliance, insufficient data, or non-compliance with the ambient air quality standards, respectively. The proposed Project is located in the northern portion of the San Diego Air Basin. Except for the 8-hour ozone standard, the County is in attainment with all other national criteria pollutant standards. The SDAPCD recently submitted its 8-Hour Ozone Attainment Plan (May 2007) to CARB for inclusion into the State Implementation Plan (SIP). With the California standards, the County is classified as nonattainment for the ozone, PM_{10} and $PM_{2.5}$ standards. The SDAPCD is due to update its Triennial Regional Air Quality Strategy (RAQS) in late July 2007 to address compliance with State standards. Table 6.2-2 below summarizes the attainment status with the California and national standards for each criteria pollutant.

Table 6.2-2 – Federal and State Attainment Status

Pollutant	California(1)	National(2)
Ozone – 1 hour	Nonattainment	Attainment (July 2003) Standard revoked June 2005
Ozone – 8 hour	Nonattainment	Nonattainment (Subpart 1 Basic) (3)
CO	Attainment	Attainment (June 1998)
NO_2	Attainment	Unclassified/Attainment
SO_2	Attainment	Attainment
PM_{10}	Nonattainment	Unclassified
$PM_{2.5}$	Nonattainment	Unclassifiable/Attainment

Pollutant	California(1)	National(2)
Lead	Attainment	No Designation
Hydrogen Sulfide	Unclassified	N/A
Visibility Reducing Particles	Unclassified	N/A

(1) Source – CARB Proposed 2006 State Area Designations (http://www.arb.ca.gov/desig/adm/adm.htm)
(2) Source – EPA Green Book for Nonattainment Areas for Criteria Pollutants (http://www.epa.gov/air/oaqps/greenbk/index.html)
(3) SDAPCD is undergoing a determination of attainment with the national 8-hour ozone standard.

6.2.3 Ambient Air Quality Data

In coordination with the SDAPCD, data from the two nearest ambient air monitoring stations were evaluated to characterize the air quality at the Project location. The nearest monitoring station to the project location is in Escondido, approximately eight (8) miles directly south of the Project site. The second monitoring station is at Camp Pendleton where its data are more representative of coastal conditions and reflects military training activities in the area. The Escondido station is in contrast approximately the same distance from the coast as the Project location. With greater commercial and industrial activities in this area, the ambient air quality data from this station is believed to be a conservative representation of the Project site condition. Since this station does not presently collect data on sulfur dioxide and lead, data from the San Diego 12th Avenue monitoring station are used.

The table below provides a summary of the highest ambient concentrations of criteria pollutants. All data were obtained from SDAPCD and CARB publications.

Table 6.2-3 - Criteria Pollutants Measured at the Escondido Station, 1999-2006 (2)

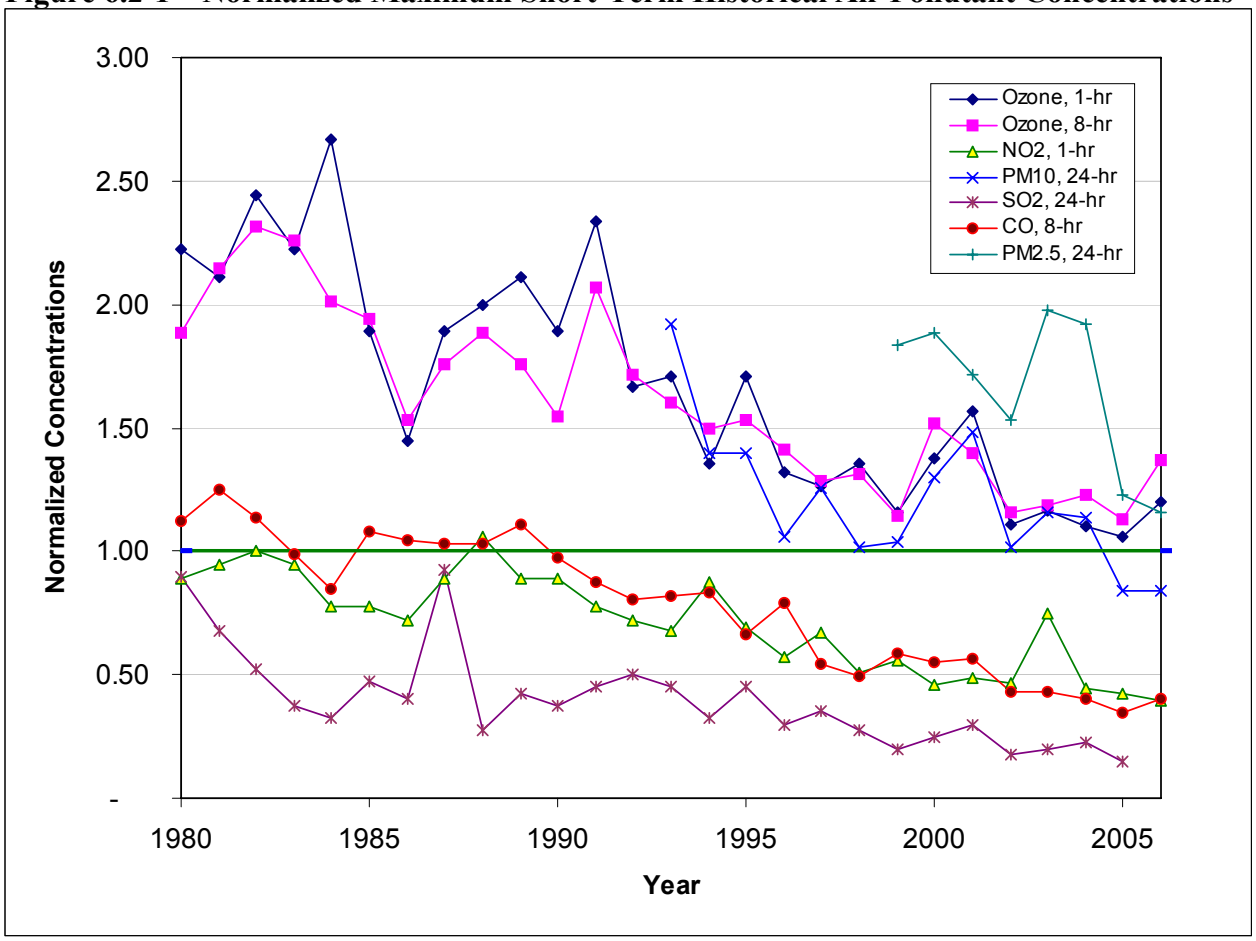
Pollutants	Averaging Period	1999	2000	2001	2002	2003	2004	2005	2006
Ozone (ppm)	Highest 1-Hour Average	0.104	0.124	0.141	0.100	0.105	0.099	0.095	0.108
Ozone (ppm)	Highest 8-Hour Average	0.080	0.106	0.098	0.081	0.083	0.086	0.079	0.096
NO_2 (ppm)	Highest 1-Hour Average (SAAQS > 0.25 ppm)	0.100	0.083	0.088	0.084	0.135	0.080	0.076	0.071
NO_2 (ppm)	Annual Average (NAAQS = 0.053 ppm)	0.023	0.021	0.020	0.021	0.020	0.018	0.016	0.017
CO (ppm)	Highest 1-hour average	-	-	8.5	8.5	8.9 (1)	6.3	5.9	5.7
CO (ppm)	Highest 8-hour average	5.26	4.93	5.11	3.85	3.9 (1)	3.61	3.10	3.61
SO_2 (ppm) (2)	Highest 1-Hour Average	-	-	5.2	2.8	4.0	4.2	4.0	-
SO_2 (ppm) (2)	Highest 3-Hour Average	-	-	3.6	1.5	1.9	2.0	1.9	-
SO_2 (ppm) (2)	Highest 24-Hour Average	0.008	0.010	0.012	0.007	0.008	0.009	0.006	-
SO_2 (ppm) (2)	Annual Average	0.002	0.004	0.003	0.003	0.004	0.004	0.002	-
PM_{10} ($\mu g/m^3$)	Highest 24-Hour Average	52.0	65.0	74.0	51.0	58 (1)	57.0	42.0	42.0
PM_{10} ($\mu g/m^3$)	Annual Arithmetic Mean	30.0	29.6	31.2	27.1	31.6	27.5	23.9	22.9
$PM_{2.5}$ ($\mu g/m^3$)	Highest 24-Hour Average	64.3	65.9	60.0	53.6	69.2	67.3	43.1	31.8

Pollutants	Averaging Period	1999	2000	2001	2002	2003	2004	2005	2006
$PM_{2.5}$ ($\mu g/m^3$)	98th % 24-Hour Average	45	48	41	39	34	37	32	28
$PM_{2.5}$ ($\mu g/m^3$)	Annual Arithmetic Mean	18.0	15.8	17.5	16.0	14.1	14.1	12.3	11.5

Source: California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html
Source: San Diego APCD website http://www.sdapcd.org/air/reports/smog.pdf
(1) Excluding data from wild fire episode
(2) Data for SO_2 were only available for Downtown San Diego (on 12th Avenue)
(3) 98th percentile value

Historically, the ambient air contaminant concentrations presented above, as compared to the most stringent air quality standards, CAAQS, are presented graphically in Figure 6.2-1 below. This figure shows that except for the 1-hour and 8-hour ozone standard in California, this region in general is in attainment with all other applicable national and state standards.

Figure 6.2-1 – Normalized Maximum Short-Term Historical Air Pollutant Concentrations



Additional data and more detailed discussion on each air contaminant are provided in Appendix 6.2-B – Supplemental Ambient Air Quality Data.

6.2.3.1 Air Quality Background Concentrations

Using data collected for the last three years, the highest reading is taken as the worst case background concentration for the Project. As presented in Table 6.2-4 below, this approach results in the background concentration exceeding the AAQS for PM_{10} and $PM_{2.5}$. These background concentrations will used for impact analysis later in this section.

Table 6.2-4 - Ambient Air Quality Background Concentration (Baseline) for Project Site

Pollutants	Averaging Period	2004	2005	2006	Background (1)	most stringent Standard
NO_2 (ppm)	Highest 1-Hour Average (CAAQS > 0.25 ppm)	0.080	0.076	0.071	0.080 ppm (150.5 µg/m^3)	0.18 ppm (338 µg/m^3)
NO_2 (ppm)	Annual Average (NAAQS = 0.053 ppm)	0.018	0.016	0.017	0.018 ppm (33.9 µg/m^3)	0.030 ppm (56 µg/m^3)
CO (ppm)	Highest 1-hour average	6.3	5.9	5.7	6.3 ppm (7,214 µg/m^3)	20 ppm (23,000 µg/m^3)
CO (ppm)	Highest 8-hour average	3.61	3.10	3.61	3.61 ppm (4,135 µg/m^3)	9.0 ppm (10,000 µg/m^3)
SO_2 (ppm) (2)	Highest 1-Hour Average	0.042	0.040	*	0.042 ppm (110 µg/m^3)	0.25 ppm (655 µg/m^3)
SO_2 (ppm) (2)	Highest 3-Hour Average	0.020	0.019	*	0.020 ppm (52.4 µg/m^3)	0.05 ppm (1,300 µg/m^3)
SO_2 (ppm) (2)	Highest 24-Hour Average	0.009	0.006	*	0.009 ppm (23.6 µg/m^3)	0.04 ppm (105 µg/m^3)
SO_2 (ppm) (2)	Annual Average	0.002	0.004	*	0.004 ppm (10.5 µg/m^3)	0.03 ppm (80 µg/m^3)
PM_{10} (µg/m^3)	Highest 24-Hour Average	57.0	42.0	42.0	57.0 µg/m^3	50 µg/m^3
PM_{10} (µg/m^3)	Annual Arithmetic Mean	27.5	23.9	22.9	27.5 µg/m^3	20 µg/m^3
$PM_{2.5}$ (µg/m^3)	Highest 24-Hour Average	67.3	43.1	31.8	67.3 µg/m^3	35 µg/m^3
$PM_{2.5}$ (µg/m^3)	Annual Arithmetic Mean	14.1	12.3	11.5	14.1 µg/m^3	12 µg/m^3

* Data not available

(1) Background is established using the highest recorded data point from the last three (3) years of data.

(2) SO_2 data were obtained from the San Diego 12th Avenue monitoring station. All other data were from the Escondido monitoring station.

Except for the annual arithmetic mean for PM_{10}, the maximum concentrations measured for PM_{10} and $PM_{2.5}$ in 2006 were below the CAAQS. From the data collected for the last three years, a general downward trend for these pollutants is observed.

6.2.4 Project Air Quality Impacts Analysis

Ambient air quality impact analyses were conducted and summarized in the following subsections for criteria pollutants (NO_2, CO, Ozone, PM_{10}, $PM_{2.5}$ and SO_2) for Project construction, commissioning and operation. The detailed emission calculation and methodology

for the construction phase is provided in Appendix 6.2-C – Construction Emission Estimates. The detailed emission calculation and methodology for the commissioning and operation phases of the Project is provided in Appendix 6.2-C – Commissioning and Operational Emission Estimates. The calculated emissions were then modeled to determine the incremental air quality concentrations and impacts associated with this project. The air dispersion modeling process and methodology are described in Appendix 6.2-E – Air Dispersion Modeling Approach.

6.2.4.1 Project Impacts Estimate Approach

The following subsections present emission summaries and impact analyses for the Project. These analyses were conducted to confirm that the proposed Project with and/or without mitigation will lead to less than significant impacts even with the following conservative assumptions and the likelihood that all of these scenarios could not physically occur at the same time.

- Impacts were projected using maximum allowable emission rates
- Project operating schedules were used that lead to maximum emissions,
- Worst-case meteorological conditions were used, and
- The worst-observed existing air quality (deemed background concentration) was added to the highest potential ground-level impact from modeling.

For these reasons, it is believed that the estimated impacts presented in the following subsections are conservative in nature and protective of public health and air quality.

6.2.4.2 Construction Impacts

Construction for the Project will consist of three primary areas/phases. The first area relates to the construction of an approximately 2.0 mile (total length over a direct distance of 1.0 mile) water line along Pala Del Norte road to the Project location (Refer to Figure 2-3 in Section 2.0 for details). The second area is the grading of the Site on which construction of the gas turbines and auxiliary equipment will take place. The grading process will include a subsurface transmission line conduit to the adjoining substation. The third area relates to an approximately 2.0 mile extension of the natural gas pipeline from Rice Canyon Road east of SR-76 (Pala Road) to the Site.

The construction for the Project will follow the projected schedule provided below once it is approved by the California Energy Commission (CEC) and the applicable discretionary permits are obtained.

Table 6.2-5 – Projected Construction Schedule

WEEKS 1 - 10	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10
Clearance of groves & boulders				◈						
Water Pipeline	◈	◈	◈	◈						
Grading & Excavation				◈	◈	◈	◈	◈	◈	
Transmission Conduit								◈	◈	◈
Stormwater Retention Pond							◈	◈	◈	◈
WEEKS 11 - 20	**W11**	**W12**	**W13**	**W14**	**W15**	**W16**	**W17**	**W18**	**W19**	**W20**
Foundation	◈	◈								
Setting Major Equipment			◈	◈	◈	◈	◈			
Stack and SCR Installation							◈	◈	◈	◈
Natural Gas Pipeline					◈	◈	◈	◈	◈	◈
WEEKS 21 - 30	**W21**	**W22**	**W23**	**W24**	**W25**	**W26**	**W27**	**W28**	**W29**	**W30**
CTG Assembly	◈	◈	◈							
Electrical Switches		◈	◈	◈						
Inter-Connection			◈	◈	◈					
Turbine Commissioning				◈	◈	◈				

The Site will occupy approximately 8.5 acres; the area will be graded and improved. Most earthmoving activities are expected to occur during the second and third months of the project, ideally after the construction of the water line. Peak construction activity in terms of fuel consumption and construction equipment activity will probably occur in the first calendar quarter of 2008.

Construction will commence with removal of the abandoned grove and rocks. There will be no rock crushing at the Project site. Those rocks found onsite will used for landscaping in the area. Shortly before the grading of the Project site, trenching along the Pala Del Norte private road will take place to lay the water line. This water line will connect to a water main operated by the Rainbow Water District. This will provide a water source option for grading and dust control at the Project site. During the grading process, horizontal directional drilling will be performed to install the underground transmission conduit to the adjoining substation. Additionally, the structure of a stormwater retention pond will be formed.

Once grading is complete, site preparation such as concrete foundation will begin. Delivery of major equipment is expected to commence in the first quarter of 2008 and continue for several months. At this time, certain administrative and utility structures will also be constructed. Installation of the power generation units is expected to be completed for start-up and commissioning by May 2008.

The third area of construction relates to the 2.0 mile of natural gas line that SDG&E will lay along the shoulder of Pala Road (SR-76) by trenching. As with the water line, the excavated

ground will be used to back-fill the trench. Construction will likely be completed by three crews of three to four persons. The first crew will trench along Pala road. A flatbed truck will be used to transfer pipe sections and stage them along the trenches. The second crew will connect and weld the pipe sections together. The third crew will backfill the trench and will repave the surface with asphalt as appropriate. Construction emission estimates are summarized below and provided in greater details in Appendix 6.2-C – Construction Emission Estimates. These estimates include estimates of emissions from the excavation and piling emissions.

Table 6.2-6 – Total Construction Criteria Pollutant Emissions (lb)

CONSTRUCTION AREA/PHASE	DURATION	CO	VOC	NOx	SOx	PM10	PM2.5
Water Line	3 - 4 Weeks	731	205	1,139	1	301	118
Site Grading & Construction	20 - 25 Weeks	2,931	677	2,812	4	487	236
Gas line	3 - 4 Weeks	1,837	514	2,320	2	386	97
Total Project (lb)	**30 Weeks**	5,499	1,396	6,270	7	1,173	451
Total Project (Tons)	**30 Weeks**	2.75	0.70	3.14	0.00	0.59	0.23

The emissions estimated above are non-recurring. These estimates include construction equipment emissions, offsite mobile sources and fugitive sources from construction activities. In order to review the construction impacts, the maximum one day emissions were estimated and presented in Appendix 6.2-C. A summary of the estimates is provided in Table 6.2-7 below. This summary table does not include emissions from the water line construction because it will be scheduled to take place separately from the construction of the natural gas pipeline.

As shown below, the maximum daily emissions are below the significance guideline as specified by the County of San Diego Land Use and Environmental Group (LUEG) of the Department of Planning and Land Use (DPLU). With respect to the potential exposure of diesel particulate matters (DPM) to sensitive receptors, the nearest school is more than 3,000 meters (1.86 miles) west of the Project Site.

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Table 6.2-7 – Daily Maximum Criteria Pollutant Construction Emissions (lb/day)

	Equipment/Vehicle Type	Summary of Maximum Daily Emissions (lb/day)					
		CO	VOC	NOX	SOX	PM10	PM2.5
Water Line	**Construction Equipment**						
	Welding rigs	-	-	-	-	-	-
	Backhoe	-	-	-	-	-	-
	Compressor	-	-	-	-	-	-
	Front-end loader	-	-	-	-	-	-
	Compactor	-	-	-	-	-	-
	Excavator	-	-	-	-	-	-
	15 ton crane	-	-	-	-	-	-
	Roller	-	-	-	-	-	-
	Reed Screen	-	-	-	-	-	-
	Motor Vehicles (Offsite)						
	On-Site Pickup Truck	-	-	-	-	-	-
	Dump Truck	-	-	-	-	-	-
	On-Site Water Truck	-	-	-	-	-	-
	Concrete Truck	-	-	-	-	-	-
	Delivery Truck	-	-	-	-	-	-
	Construction Worker Commute	-	-	-	-	-	-
Power Plant	**Construction Equipment**						
	Welding rigs	3.80	1.67	3.39	0.00	0.38	0.35
	Backhoe	2.25	0.71	4.19	0.00	0.38	0.35
	Compressor	7.04	3.13	5.92	0.01	0.70	0.64
	Front-end loader	3.86	1.06	8.31	0.01	0.46	0.42
	15 ton crane	5.97	1.70	13.21	0.01	0.74	0.68
	75 ton crane	-	-	-	-	-	-
	Motor Vehicles (Offsite)						
	On-Site Pickup Truck	0.96	0.10	0.10	0.00	0.01	0.01
	Dump Truck	0.28	0.06	1.78	0.00	0.03	0.03
	Concrete Truck	-	-	-	-	-	-
	Delivery Truck	0.28	0.06	1.78	0.00	0.03	0.03
	Construction Worker Commute	13.46	1.45	1.43	0.01	0.08	0.08
Gas Line	**Construction Equipment**						
	Welding rigs	3.80	1.67	3.39	0.00	0.38	0.35
	Backhoe	2.25	0.71	4.19	0.00	0.38	0.35
	Compressor	1.76	0.78	1.48	0.00	0.17	0.16
	Front-end loader	6.43	1.76	13.85	0.01	0.77	0.71
	Compactor	1.77	0.56	3.63	0.00	0.25	0.23
	Excavator	3.30	1.07	6.18	0.01	0.58	0.53
	15 ton crane	3.98	1.13	8.81	0.01	0.49	0.45
	Roller	1.77	0.56	3.63	0.00	0.25	0.23
	Reed Screen	3.36	1.03	6.35	0.01	0.54	0.49
	Motor Vehicles (Offsite)						
	On-Site Pickup Truck	0.38	0.04	0.04	0.00	0.00	0.00
	Dump Truck	0.33	0.07	2.14	0.00	0.04	0.04
	On-Site Water Truck	0.11	0.02	0.71	0.00	0.01	0.01
	Concrete Truck	-	-	-	-	-	-
	Delivery Truck	0.44	0.10	2.85	0.00	0.05	0.05
	Construction Worker Commute	7.05	0.76	0.75	0.00	0.04	0.04
Others	Construction Fugitive Emissions					3.17	0.66
	Excavation/Pile Fugitive Emissions					10.69	2.24
	Architectural Coatings Emissions		-				
	Asphalt Paving Emissions		0.60				
	Total (lb/day)	**74.63**	**20.83**	**98.11**	**0.11**	**20.64**	**9.13**
	Significance Thresholds	550	75	250	250	100	55
	Exceed Significance Threshold?	No	No	No	No	No	No

6.2.4.3 Plant Commissioning

Based on prior experience of the Project team, the commissioning duration for the natural gas turbines will not exceed a total of 400 hours for both turbines. This will be proposed as a permit condition with the SDAPCD. During this period, the turbines will initially be operated each and separately without the ammonia injection for NOx control. Once the turbines are each and separately stabilized, the emission control system will be commissioned with the injection of ammonia. For a limited time during the entire commissioning period, the NOx emissions will be higher when ammonia is not introduced into the emission control system. This scenario however has the benefit of having no potential ammonia slips.

Using emission rates provided by the equipment supplier, estimates of emissions during the commissioning period are provided and summarized below. Additional details and calculations can be found in Appendix 6.2-D.

Table 6.2-8 – Commissioning Emissions

	NOX	CO	VOC	PM_{10}	SO_2
Maximum hourly – lb/hr	39.75	24.20	3.32	3.00	0.83
Total Commissioning Period - lb (400 hours total for 2 turbines)	15,900	9,680	1,328	1,200	332
Total Commissioning Period - Ton	8.0	4.8	0.7	0.6	0.2

Impacts from the emissions of NO_x and CO during turbine commissioning are evaluated using the maximum predicted incremental concentrations derived from air dispersion modeling similar to the process used for evaluating operational impacts. Detailed description of the modeling methodology and approach is provided in Appendix 6.2-E. The results are summarized in Table 6.2-9 below.

Table 6.2-9 – Impacts during the Commissioning Period

POLLUTANT	AVERAGING PERIOD	MAXIMUM MODELED IMPACT ($\mu G/M^3$)	BACKGROUND ($\mu G/M^3$)	TOTAL PREDICTED CONCENTRATION ($\mu G/M^3$)	MOST STRINGENT STANDARD ($\mu G/M^3$)
NO_2	1 hour	19.4	151	170.4	338
CO	1 hour	2,004	6,758	8,762	23,000
	8 hour	1,220	4,135	5,355	10,000

As shown above, the maximum 1-hour NO_2 incremental impact during the commissioning period is 19.4 $\mu g/m^3$ based on emission modeling using Gregory Canyon meteorological data described in Appendix 6.2E. The predicted concentration (incremental + background) is therefore below the most stringent AAQS. Similarly, the predicted concentrations for CO at the 1-hour and 8-hour averaging periods are also below the most stringent AAQS.

6.2.4.4 Normal Plant Operations

6.2.4.4.1 Turbines

The proposed plant will operate as a peaker station. The proposed operating parameters for the CTG are proposed as follows. These operating parameters will be accepted as permit operating limits with the SDAPCD.

- Total annual operating hours (both turbines combined): 6,400 hours per year
- Total annual number of start-ups (both turbines combined): 500
- Total daily number of start-ups (both turbines combined): 6
- Total annual hours of turbines operating without SCR: 20 hours per year

Based on these operating parameters, detailed calculations of the CTG operating emissions are provided in Appendix 6.2-D. The following table summarizes the projected emissions from the facility based on the above maximum operating conditions.

Table 6.2-10 – CTG Operating Emission Summary

Maximum Hourly Emissions	Hours	NOx	CO	VOC	PM10	SO_2
Startup Event	0.167	3.00	5.60	1.10	0.67	0.14
Warm-up Event	0.500	10.93	7.50	1.11	1.50	0.41
Steady State	1.333	5.31	7.75	1.48	4.00	1.11
Total Maximum Hourly (lb/hr)	**2.00**	**19.24**	**20.85**	**3.69**	**6.17**	**1.66**
Maximum Daily Emissions	Hours	NOx	CO	VOC	PM10	SO_2
Startup Event	1.00	18.00	33.60	6.60	4.02	0.84
Warm-up Event	3.00	65.58	45.00	6.66	9.00	2.46
Shutdown Event	0.80	13.20	22.20	3.60	3.18	0.66
Steady State Controlled	27.20	108.26	158.03	30.19	81.60	22.58
Total Maximum Daily (lb/day)	**32.00**	**205.04**	**258.83**	**47.05**	**97.80**	**26.54**
Maximum Annual Emissions	Hours	NOx	CO	VOC	PM10	SO_2
Startup Event	83.33	1,500	2,800	550	335	70
Warm-up Event	250.00	5,465	3,750	555	750	205
Shutdown Event	66.67	1,100	1,850	300	265	55
Steady State Uncontrolled	40	1,590	968	133	120	33
Steady State Controlled	5,960	23,721	34,628	6,616	17,880	4,947
Total Maximium Annual Daily (lb/yr)	**6,400**	**33,376**	**43,996**	**8,153**	**19,350**	**5,310**
	Tons	**16.69**	**22.00**	**4.08**	**9.68**	**2.66**

6.2.4.4.2 Emergency and Back-Up Equipment

In addition to the CTG, the plant will be equipped with emergency and back-up equipment that will be permitted with the following anticipated maintenance schedule.

- Natural-gas fired black start turbine – 12 hours per year (1 hour per month)

- Diesel-fired emergency fire pump engine – 26 hours per year (0.5 hour per week).

Using emission data provided by the equipment supplier, the following are estimated emissions for these pieces of equipment.

Table 6.2-11 – Estimated Annual Emissions for the Diesel Fired Emergency Water Pump

Emergency Water Pump	NOx	CO	VOC	PM10	SO2
Emission Factor (g/HP/hr)	3.90	0.40	0.10	0.09	0.15
Emision Rates (lb/hr)	0.74	0.08	0.02	0.02	0.029
Annual Emissions (lb/yr)	**19.30**	**1.98**	**0.49**	**0.45**	**0.74**

Table 6.2-12 – Estimated Annual Emissions for the Natural-Gas Fired Black-Start Engine

Emergency Water Pump	NOx	CO	VOC	PM10	SO2
Emission Factor (g/HP/hr)	3.90	0.40	0.10	0.09	0.15
Emision Rates (lb/hr)	0.74	0.08	0.02	0.02	0.029
Annual Emissions (lb/yr)	**19.30**	**1.98**	**0.49**	**0.45**	**0.74**

6.2.4.4.3 Cooling Tower Emission

Of the ancillary equipment, the only source of criteria pollutant emissions is the cooling tower. The inlet combustion air will be cooled by a packaged chiller system during warm and hot days that rejects heat through a cooling tower. The cooling media is water and depending on the extent of dissolved solids in the water there would be some particulates emissions. The estimated emission is summarized below with the drift loss factor provided by the cooling package supplier and the average total dissolved solids (TDS) content obtained from the water utility.

Table 6.2-13 – Estimated Annual Drift Loss from the Cooling Tower

Parameters		
Cooling tower circulation rate (w)	1.50	gal/min
Total dissolved solids (TDS)	800	ppmw
Drift loss of circulating water (n)	0.04	gal/min
Density of water (d)	8.34	lb/gal
Annual Operating Hours (OH)	6,400	hours
PM Emission (E) = (TDS/1E6) (n) (d) (60) (OH)		
PM Emissions (lb/yr)	102.48	lb/yr

6.2.4.4.4 Facility Emissions

The total projected emission from all the sources proposed at the facility is summarized in the table below. Pursuant to the CEQA guidance provided by the San Diego DPLU, the significance criteria for air quality impact from the operation of a project is based on thresholds set by the

SDAPCD for air quality impact analysis (AQIA). These thresholds are found in SDAPCD Rule 20.3.

Table 6.2-14 - SDAPCD AQIA Emission Thresholds

Air Contaminant	Emission Thresholds			Total Project Emission Rates		
	lb/hr	lb/day	ton/yr	lb/hr	lb/day	ton/yr
CO	100	550	100	30	259	22.0
NOx	25	250	40	19.24	205	16.7
PM_{10}	N/A	100	15	NA	98	9.7
SOx	25	250	40	1.65	26.5	2.66

Source: Rule 20.3, Table 20.3-1.

As shown on the above table, the emission rates at all the specified intervals will not exceed the established thresholds. The project is thus expected to have less than significant impact.

6.2.4.5 Air Quality Impact Analysis

Using the above emission estimates, the local ambient air quality impacts are modeled using the latest U.S.EPA approved modeling software (AERMOD). The modeling methodology and approach is described in details in Appendix 6.2-E – Air Dispersion Modeling Approach. The air modeling results are summarized on Table 6.2-14 below.

The predicted concentrations for PM_{10} and $PM_{2.5}$ are the same because the same emission rate was used for both sets of pollutants. This is based on studies conducted by CARB which show that over 99% of the PM emissions from natural gas fired combustion sources are $PM_{2.5}$, which is a subset of PM_{10}.

As shown below, all predicted concentrations are either below the most stringent ambient air quality standards or below the significant level thresholds as established by EPA, SDAPCD and the San Diego County DPLU. Additionally, the predicted maximum concentrations for these pollutants are at locations where there are no receptors now or in the foreseeable future.

For PM_{10} and $PM_{2.5}$, the background concentrations without the Project are above the State ambient standards. At present, no attainment plan for $PM_{2.5}$ or PM_{10} is required by State regulations. Without specific regulations, the basis for significance is therefore evaluated one of three ways: 1) the SDAPCD AQIA thresholds; 2) EPA's guidance on significant impact levels for AAQS; and 3) the San Diego County DPLU significance thresholds. As discussed below, the operational phase of the Project will have less than significant impact based on either or all these three criteria.

Table 6.2-15 – Worst Case Air Quality Impacts from Facility Operation

Pollutant	Averaging Period	Back-ground (µg/m³)	Background Basis	Worst Case Increment (µg/m³)	Worst Case Increment + Background (µg/m³)	Most Stringent AAQS (µg/m³)	Meet Most Stringent AAQS	Meet Significant Level Thresholds
NO2	1-Hour	150.5	Escondido, H3Y	112.10	262.6	338	Yes	-
NO2	Annual	33.9	Escondido, H3Y	0.74	34.6	100	Yes	-
CO	1-Hour	6,758.1	Escondido, H2Y	345.43	7,559.4	23000	Yes	-
CO	8-Hour	4,135.0	Escondido, H3Y	62.64	4,197.7	10000	Yes	-
SO2	1-Hour	110.0	San Diego 12th St., H2Y	9.36	119.4	655	Yes	-
SO2	24-Hour	52.4	San Diego 12th St., H2Y	1.38	53.8	105	Yes	-
SO2	3-Hour	23.6	San Diego 12th St., H2Y	4.62	28.2	1300	Yes	-
SO2	Annual	10.5	San Diego 12th St., H2Y	0.12	10.6	80	Yes	-
PM10	24-Hour	42.0	Escondido, 2006, H3Y	3.34	60.3	50	-	Yes
PM10	Annual	22.9	Escondido, 2006, H3Y	0.52	28.0	20	-	Yes
PM2.5	24-Hour	31.8	Escondido, 2006, H3Y	3.34	70.6	35	-	Yes
PM2.5	Annual	11.5	Escondido, 2006, H3Y	0.52	12.0	12	-	Yes

H3Y = Highest concentration monitored in the last three (3) years (2004, 2005, 2006)
H2Y = Highest concentration monitored in the last three (3) years (2004, 2005, 2006), but 2006 data unavailable

With respect to the SDAPCD AQIA thresholds, Table 6.2-14 above shows the proposed PM emissions to be substantially below the respective thresholds. This proposed level of emission is therefore presumed to be less than significant. At this level, the proposed Project will not conflict with or obstruct the implementation of the San Diego County RAQS.

According to the CEQA guideline recently updated by the San Diego County DPLU, the significant threshold is defined as an increase of the ambient PM concentration by 5 micrograms per cubic meter (5.0 µg/m^3). At this level, the project is not expected to contribute substantially to an existing or projected air quality violation. This is consistent with EPA's significant impact levels (SIL) of a 5 µg/m^3 for the 24-hour PM_{10} standard and 1 µg/m^3 for its annual PM_{10} standard found in 40 CFR 51 Section 165. The SIL are levels where if they are not exceeded, the Project may conclusively be presumed to have no contravention to the AAQS. Since SIL have not been established for $PM_{2.5}$, the same SIL for PM_{10} are applied. For this Project, the predicted incremental increases in PM emissions are within these SIL even with all the conservative elements built into this assessment. This Project is thus not expected to impede further progress in this region.

6.2.5 Cumulative Air Quality Impacts Analysis

In addition to impacts associated with the Project, cumulative impacts by including all other applicable projects are also evaluated. For this evaluation, the SDAPCD was contacted and has provided a list of permit applications filed since 2006 from facilities within six (6) miles of the Project location. This list would include new facilities as well as any modifications proposed for existing facilities. It also includes projects that are at different stages of development, but have sufficient commitment to warrant the filing for authorities to construct.

With this inquiry, the only applications found were a portable thermal oxidizer proposed for soil remediation in Escondido and a dust collector for a spent abrasive handling and recycling system in the city of Vista. There appears to be no other sources of potential emission proposed with the SDAPCD.

A review of potential projects listed with the San Diego Department of Planning and Land Use (DPLU) as described in Section 6.1 reveals three potential projects that can have air quality impacts. The primary projects are the Gregory Canyon Landfill and the Rosemary Mountain Quarry projects. These projects will have particulates emission as well as products of combustion from earth moving and transport equipment. However, the Gregory Canyon Landfill project has been in the planning stage for the last five years and its eventual construction is uncertain. It has not filed any permit application with the SDAPCD. The proposed Rosemary Mountain Quarry site is sufficiently far west of the Project Site and is not expected to add significant impact to the Orange Grove Project. The proposed quarry operation has also not filed any application with the SDAPCD.

A third project that can potentially have air quality impact is a back-up generator proposed for the Verizon Cellular Tower. The backup nature of the generator will however not add any significant impacts to the Project.

In addition to the absence of projects for cumulative analysis, an aggregate mine on the opposite side of SR 76 from the Project location has recently ceased operation. The property was purchased by the Pala tribe that has indicated that no future development is planned for the property during a recent meeting with tribal representatives. The cessation of this operation means that locally there would less cumulative impacts, particularly in PM and NOx emissions associated with the quarry operation and transportation activity.

6.2.6 Project Design and Control Measures

The following section describes certain design features and measures incorporated into the Project and the construction phase of the facility. Collectively, these measures are to further reduce impacts that have already been determined to be less than significant above.

6.2.6.1 Construction

As discussed above, the estimated construction emissions are below the established significance thresholds. Consistent with good construction practices, the following measures will be applied for the Project during the construction phase.

- The area disturbed by clearing, grading, earth moving, or excavation operations will be minimized to prevent excessive amounts of dust.
- Pre-grading/excavation activities will include watering the area to be graded or excavated before commencement of grading or excavation operations. Application of water will penetrate sufficiently to minimize fugitive dust during grading activities.

- Fugitive dust produced during grading, excavation, and construction activities will be controlled by the following activities:
  a) Although not anticipated, if soil is hauled offsite, all trucks will be required to cover their loads as required by California Vehicle Code §23114.
  b) All graded and excavated material, exposed soil areas, and active portions of the construction site, including unpaved on-site roadways, will be treated to prevent fugitive dust. Treatment will include periodic watering, application of environmentally-safe soil stabilization materials, and/or roll-compaction as appropriate.
- Signs will be posted on-site limiting traffic to 15 miles per hour or less.
- Adjacent streets and roads will be swept daily at the end of each day, if visible soil material is carried over to adjacent streets and roads.
- Equipment idling time will not exceed five minutes.
- The construction schedule will be managed to reduce the number and/or intensity of high-emitting construction activity emissions occurring on the same day.

6.2.6.2 Commissioning

During the commissioning of the facility, the initial phase would be to stabilize the turbines prior to commissioning the ammonia injection system. Once the turbines are stabilized, ammonia injection will commence to optimize the operation of the SCR system. As presented above, air modeling results on the worst case commissioning conditions show that this process will have less than significant impacts. To further minimize potential emissions, the facility will apply the following measures:

- Limit the commissioning of the turbines to one unit at any one time.
- Minimize the extent of testing on the turbines prior to the commissioning of the SCR system.

6.2.6.3 Operation

As required by the SDAPCD, the proposed CTG will be controlled by water injection to the turbine to reduce NOx formation. In addition, the turbines will be further controlled by the application of a CO oxidation catalyst and an ammonia SCR system. The resulting emissions as presented in Table 6.2-14 are below the SDAPCD major source and offset thresholds. The proposed project is also determined to be below the Prevention of Significant Deterioration (PSD) thresholds and the SDAPCD air quality impact analysis (AQIA) thresholds. While not a requirement, detailed air modeling analysis was conducted and presented above. The analysis shows that the Project as proposed will conform to the San Diego RAQS and will not violate any air quality standard or contribute significantly to an existing air quality violation.

Additionally, the plant will have the following operating features that will moderate the impacts already presented above:

- It will be extremely rare for the plant to operate pass 16 hours per day except during periods when CAISO declares a state of emergency to the electrical grid.
- To the extent practical, the facility will stagger the start up of the turbines such that no more than one unit will be in start up mode at a time.

6.2.7 Laws, Ordinances, Regulations and Standards (LORS)

The applicable LORS on this project are summarized in Table 6.2-16 below. Detailed discussions of compliance with federal, state and local requirements are provided in the following section.

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Table 6.2-16 – Laws, Ordinances, Regulations Standards and Permit Requirements

AUTHORITY	AGENCY	REQUIREMENT(S)	COMPLIANCE	SPPE SECTION
FEDERAL				
Clean Air Act (CAA) §160-169A and implementing regulations, Title 42 United States Code (USC) §7470-7491 (42 USC §7470-7491), Title 40 Code of Federal Regulations (CFR) Parts 51 & 52 Prevention of Significant Deterioration (PSD) Program	EPA	Requires PSD review and facility permitting for construction of new or modified major stationary sources of air pollution. PSD review applies to pollutants for which ambient concentrations are lower than NAAQS.	The proposed project emissions are below the applicability thresholds of PSD.	6.2.7.1.1
CAA §171-193, 42 USC §7501 et seq. (New Source Review)	SDAPCD with EPA Oversight	Requires NSR facility permitting for construction or modification of specified stationary sources. NSR applies to pollutants for which ambient concentration levels are higher than NAAQS.	Determination of Compliance (DOC) with conditions limiting emissions. Agency approval will be obtained before start of construction.	6.2.7.1.2
CAA §401 (Title IV), 42 USC §7651 (Acid Rain Program)	SDAPCD with EPA Oversight	Requires reductions in NOx and SO_2 emissions.	DOC to be made with permit application to be submitted within 12 months after commencement of operations.	6.2.7.1.3
CAA §501 (Title V), 42 USC §7661 (Federal Operating Permits Program)	SDAPCD with EPA Oversight	Establishes comprehensive permit program for major stationary sources.	The proposed project will not exceed the program thresholds; however, it will be issued a Title V compliant permit through the Acid Rain Program. Application to be submitted 12 months after commencement of operation.	6.2.7.1.4
CAA §111, 42 USC §7411, 40 CFR Part 60 (New Source Performance Standards – NSPS)	SDAPCD with EPA Oversight	Establishes national standards of performance for new stationary sources.	DOC by SDAPCD with conditions limiting emissions. Approval will be obtained prior to start of construction.	6.2.7.1.5
STATE (CALIFORNIA)				
Health & Safety Code (H&SC) §44300-44384; California Code of Regulations (CCR) §93300-93347 (Toxic "Hot Spots" Act)	SDAPCD with CARB Oversight	Requires preparation and biennial updating of facility emission inventory of hazardous substances; HRA.	DOC will be completed through periodic SDAPCD inspection. A HRA has been completed and submitted with this SPPE filing.	6.2.7.2.3 6.2.7.2.6

AUTHORITY	AGENCY	REQUIREMENT(S)	COMPLIANCE	SPPE SECTION
17 CCR § 93115 (Airborne Toxic Control Measure [ATCM] for Stationary Compression Ignition Engines)	SDAPCD with CARB Oversight	Establishes emission and operational limits for diesel-fueled stationary compression ignition engines.	DOC with conditions limiting emissions and operation. Agency approval to be obtained before start of construction.	6.2.7.2.4
California Public Resources Code §25523(a); 20 CCR §§1752, 2300-2309 (CEC & CARB Memorandum of Understanding)	CEC	Requires CEC decision to include requirements to assure protection of the environmental including air quality.	DOC will be incorporated into the Initial Study for the Commission Decision. DOC will also be made by SDAPCD prior to issuance of permits.	6.2.7.2.7
LOCAL				
SDAPCD Rule 20.2 (New Source Review – Non-Major Stationary Sources)	SDAPCD with CARB Oversight	NSR: Requires that pre-construction review be conducted for all proposed new or modified sources of air pollution, including Best Available Control Technology (BACT), and AQIA and PSD	DOC by SDAPCD with conditions limiting emissions. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 20.5 (Power Plants)	SDAPCD with CARB Oversight	SDAPCD coordination with CEC on permitting power plants. CEC to serve as the California Environmental Quality Act of 1970 (CEQA) lead agency and SDAPCD to issue permit upon CEC issuance and adoption of an Initial Study.	CEC to prepare and issue CEQA document based on SPPE. SDAPCD to evaluate and issue permit once the CEQA document (Initial Study) is approved by CEC.	6.2.7.3.2
SDAPCD Rule 50 (Visible Emissions)	SDAPCD with CARB Oversight	Limits visible emissions to no darker than Ringelmann No. 1 for periods greater than 3 minutes in any hour.	DOC by SDAPCD with conditions limiting emissions, controls and fuel type. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 51 (Nuisance)	SDAPCD with CARB Oversight	Prohibits emissions in quantities that adversely affect public health, other businesses, or property.	DOC by SDAPCD with conditions limiting emissions, controls and fuel type. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 52 (Particulate Matter)	SDAPCD with CARB Oversight	Limits PM emissions from stationary sources.	DOC by SDAPCD with conditions limiting emissions, controls and fuel type. Agency approval will be obtained prior to start of construction.	6.2.7.3.2

AUTHORITY	AGENCY	REQUIREMENT(S)	COMPLIANCE	SPPE SECTION
SDAPCD Rule 53 (Combustion Contaminants)	SDAPCD with CARB Oversight	Limits SO_2 emissions from stationary sources.	DOC by SDAPCD with conditions limiting emissions and fuel type. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 62 (Sulfur Content of Fuels)	SDAPCD with CARB Oversight	Limits the sulfur content of fuels combusted in stationary sources.	DOC by SDAPCD with conditions limiting fuel type. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 69.3.1 (Stationary Gas Turbines)	SDAPCD with CARB Oversight	Limits NOx emissions from stationary gas turbines.	DOC by SDAPCD with conditions limiting emissions, controls and fuel type. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 69.4.1 (Stationary Reciprocating Internal Combustion Engines)	SDAPCD with CARB Oversight	Limits CO, NOx, and VOC emissions from stationary reciprocating internal combustion engines.	DOC by SDAPCD with conditions limiting emissions and operating hours. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Regulation X (New Source Performance Standards: 40 CFR 60, Subpart KKKK, Stationary Gas Turbines)	SDAPCD with CARB Oversight	Requires monitoring of fuel, other operating parameters; limits NOx and SO2 and PM emissions, requires source testing, emissions monitoring, and recordkeeping.	DOC by SDAPCD with monitoring, source testing and recordkeeping conditions. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 1200 (Toxics – New Source Review)	SDAPCD with CARB Oversight	Requires that pre-construction review be conducted for all proposed new or modified sources of toxic air contaminants, including toxics – best available control technology (T-BACT), and a health risk assessment.	DOC by SDAPCD based on review of health risk assessment completed for SPPE and permit application. Agency approval will be obtained prior to start of construction.	6.2.7.3.2
SDAPCD Rule 1412 (Federal Acid Rain Program Requirements)	SDAPCD with EPA Oversight	Implements acid rain regulations of CAA Title IV.	DOC to be made with permit application to be submitted within 12 months after commencement of operations.	6.2.7.3.2
SDAPCD Rule 1414 (Title V Applications)	SDAPCD with EPA Oversight	Implements operating permits requirements of CAA Title V.	Facility below Title V threshold but for Acid Rain Provision. Application to be submitted 12 months after commencement of operation.	6.2.7.3.2

6.2.7.1 Federal

The EPA implements and enforces the requirements of many of the federal environmental laws. EPA Region 9, which has its offices in San Francisco, administers federal air programs in California. The federal CAA, as most recently amended in 1990, provides EPA with the legal authority to regulate air pollution from stationary sources such as this Project. EPA has promulgated the following stationary source regulatory programs to implement the requirements of the federal Clean Air Act.

- PSD
- NSR
- Title IV: Acid Rain Program
- Title V: Operating Permits
- NSPS
- National Emission Standards for Hazardous Air Pollutants (NESHAP)

6.2.7.1.1 Prevention of Significant Deterioration Program

Authority: Clean Air Act §160-169A, 42 USC §7470-7491; 40 CFR Parts 51 and 52
Administering Agency: EPA Region 9

Requirements: Requires pre-construction review and permitting of new or modified major stationary sources of air pollution to prevent significant deterioration of ambient air quality. PSD applies to pollutants for which ambient concentrations do not exceed the corresponding NAAQS (i.e., attainment pollutants). The PSD program allows new sources of air pollution to be constructed, or existing sources to be modified, while preserving the existing ambient air quality levels, protecting public health and welfare, and protecting Class I areas (e.g., national parks and wilderness areas). Although this program is normally implemented at the local level with federal oversight, it is presently implemented in San Diego by EPA Region 9.

Conformance: The PSD trigger thresholds and the proposed project emission and modeled emission concentrations are provided below in Table 6.2-16.

Table 6.2-17 - PSD Trigger Levels

AIR CONTAMINANT	PSD TRIGGER LEVELS (TON/YR)	PROJECT (TON/YR)
Particulate Matter (PM_{10})	250	9.7
Oxides of Nitrogen (NO_X)	250	16.7
Volatile Organic Compounds (VOC)	250	4.1
Oxides of Sulfur (SO_X)	250	2.7
Carbon Monoxide (CO)	250	22.0

Source: SDAPCD Rule 20.1 Table 20.1-11

Table 6.2-18 - PSD Air Quality Increments

AIR CONTA-MINANT	AVERAGING PERIOD	ALLOWABLE CLASS I INCREMENT (MG/M^3)	ALLOWABLE CLASS II INCREMENT (MG/M^3)	HIGHEST CLASS I MODELED INCREMENT (MG/M^3)	HIGHEST CLASS II MODELED INCREMENT (MG/M^3)
NO_2	Annual	2.5	25.0	0.00269	0.73
SO_2	Annual	2.0	20.0	0.00045	0.12
	24-Hour	5.0	91.0	0.01468	1.37
	3-Hour	25.0	512.0	0.11717	4.90
PM_{10}	Annual	4.0	17.0	0.00169	0.56
	24-Hour	8.0	30.0	0.04120	4.92

Source: Rule 20.1, Table 20.1-1 & 20.1-2
Class I modeled concentration for the Project based on 2000 met data for Escondido

Since the estimated emissions and modeled concentration presented above for this project are well below the respective thresholds, the proposed facility will be evaluated as a non-major stationary source under District Rule 20.2 (not Rule 20.3). Additionally, the projected project emissions are below the PSD trigger level of 250 ton/yr and the modeled emission concentration from the facility as provided in Appendix C and D are below the PSD increments. Therefore, PSD requirements will not apply to this project.

6.2.7.1.2 New Source Review

Authority: CAA §171-193, 42 USC §7501 et seq.; 40 CFR Parts 51 and 52
Administering Agency: SDAPCD, with EPA Region 9 oversight

Requirement: Requires pre-construction review and permitting of new or modified major stationary sources of air pollution to allow industrial growth without interfering with the attainment and maintenance of NAAQS. NSR jurisdiction has been delegated to the SDAPCD for all non-attainment pollutants.

Conformance: Refer to local LORS and conformance discussed below.

6.2.7.1.3 Acid Rain Program

Authority: CAA §401 (Title IV), 42 USC §7651
Administering Agency: SDAPCD, with EPA Region 9 oversight

Requirement: Requires the monitoring and reporting of emissions of acidic compounds and their precursors. The principal source of these compounds is the combustion of fossil fuels. Therefore, Title IV established national standards to monitor, record, and in some cases limit SO_2 and NO_x emissions from electrical power generating facilities. These standards are implemented at the local level with federal oversight.

Conformance: Refer to local LORS and conformance discussed below.

6.2.7.1.4 Title V Operating Permits Program

Authority: CAA §501 (Title V), 42 USC §7661
Administering Agency: SDAPCD, with EPA Region 9 oversight

Requirements: Requires the issuance of operating permits that identify all applicable federal performance, operating, monitoring, recordkeeping, and reporting requirements. Title V applies to major facilities (NSPS, NESHAP), Phase II acid rain facilities, subject solid waste incinerator facilities, and any facility listed by EPA as requiring a Title V permit. SDAPCD has received delegation authority for this program.

Conformance: The major source thresholds for San Diego County and the proposed Project emissions are presented below. The proposed plant will therefore not be a major source. However, the facility is subject to the Acid Rain requirements which are implemented through Title V. A permit application will therefore be submitted to the SDAPCD within 12 months of plant operation.

Table 6.2-19 - Major Stationary Source Thresholds

AIR CONTAMINANT	THRESHOLDS (TON/YR)	PROJECT (TON/YR)
Particulate Matter (PM_{10})	100	9.7
Oxides of Nitrogen (NO_X)	50	16.7
Volatile Organic Compounds (VOC)	50	4.1
Oxides of Sulfur (SO_X)	100	2.7
Carbon Monoxide (CO)	100	22.0
Lead (Pb)	100	0

Source: SDAPCD Rule 20.1 Table 20.1-6

6.2.7.1.5 National Standards of Performance for New Stationary Sources

Authority: Clean Air Act §111, 42 USC §7411; 40 CFR Part 60
Administering Agency: SDAPCD, with EPA Region 9 oversight

Requirements: Establishes standards of performance to limit the emission of criteria pollutants (air pollutants for which EPA has established NAAQS) from new or modified facilities in specific source categories. These standards are implemented at the local level with federal oversight. The applicability of these regulations depends on the equipment size, process rate, and/or the date of construction, modification, or reconstruction of the affected facility. The NSPS Subpart KKKK, Standards of Performance for Stationary Gas Turbines set limits on NO_x and SO_2 emissions.

Conformance: Standards will be incorporated into local permit conditions. Refer to local LORS and compliance discussion below.

6.2.7.1.6 National Emission Standards for Hazardous Air Pollutants

Authority: Clean Air Act §112, 42 USC §7412
Administering Agency: SDAPCD, with EPA Region 9 oversight

Requirements: Establishes national emission standards to limit emissions of hazardous air pollutants (HAP, or air pollutants identified by EPA as causing or contributing to the adverse health effects of air pollution, but for which NAAQS have not been established) from major sources of HAP in specific source categories. These standards are implemented at the local level with federal oversight. Only the NESHAP for combustion turbines, which limit formaldehyde emissions from turbines, are potentially applicable to a new power plant.

Conformance: The combustion turbine NESHAP is not expected to be applicable to the proposed Project because the facility would not be a major source of HAP (i.e., 10 TPY of any one HAP or 25 TPY of all combined HAP). Thus, NESHAP requirements will not be addressed further.

6.2.7.2 State

CARB was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update, as necessary, the California Ambient Air Quality Standards (CAAQS); to review the operations of the local air pollution control districts (APCDs); and to review and coordinate preparation of the State Implementation Plan (SIP) for achievement of the NAAQS. CARB has implemented the following state or federal stationary source regulatory programs in accordance with the requirements of the federal Clean Air Act and H&SC:

- SIP
- CAA
- TAC Program
- ATCM for Stationary Compression-Ignition Engines
- Nuisance Regulation
- Air Toxics "Hot Spots" Act
- CEC and CARB Memorandum of Understanding

6.2.7.2.1 State Implementation Plan (SIP)

Authority: H&SC §39500 et seq.
Administering Agency: SDAPCD, with CARB and EPA Region 9 oversight

Requirements: The SIP demonstrates the means by which all areas of the state will attain and maintain NAAQS within the federally mandated deadlines, as required by the federal CAA. CARB reviews and coordinates preparation of the SIP. Local districts must adopt new rules or

revise existing rules to demonstrate that the resulting emission reductions, in conjunction with reductions in mobile source emissions, will result in attainment of the NAAQS.

Conformance: The relevant SDAPCD Rules and Regulations that have been incorporated into the SIP are discussed with the local LORS below.

6.2.7.2.2 California Clean Air Act

Authority: H&SC §40910 – 40930
Administering Agency: SDAPCD, with CARB oversight

Requirements: Established in 1989, the California Clean Air Act requires local districts to attain and maintain both national and state ambient air quality standards at the "earliest practicable date." Local districts must prepare air quality plans demonstrating the means by which the ambient air quality standards will be attained and maintained.

Conformance: The relevant components of the SDAPCD Air Quality Plan are discussed with the local LORS below.

6.2.7.2.3 Toxic Air Contaminant Program

Authority: H&SC §39650 – 39675
Administering Agency: SDAPCD, with CARB oversight

Requirements: Established in 1983, the Toxic Air Contaminant Identification and Control Act created a two-step process to identify TAC and control their emissions. CARB identifies and prioritizes the pollutants to be considered for identification as TAC. CARB assesses the potential for human exposure to a substance, while the Office of Environmental Health Hazard Assessment (OEHHA) evaluates the corresponding health effects. Both agencies collaborate in the preparation of a risk assessment report, which concludes whether a substance poses a significant health risk and should be identified as a TAC. In 1993, the Legislature amended the program to include the 187 federally-identified hazardous air pollutants (HAP) as TAC. CARB reviews the emission sources of an identified TAC and, if necessary, develops ATCM to reduce the emissions.

Conformance: As a SDAPCD permitted source, the facility will submit from time to time the necessary information for the SDAPCD to estimate TAC emissions and perform the necessary HRA.

6.2.7.2.4 Airborne Toxic Control Measure for Stationary Compression-Ignition Engines

Authority: Title 17, California Code of Regulations, §93115
Administering Agency: SDAPCD and CARB

Requirements: The purpose of the ATCM is to reduce diesel particulate matter (DPM) and criteria pollutant emissions from stationary diesel-fueled compression ignition engines. The

ATCM applies to stationary compression-ignition engines with a rating greater than 50 brake horsepower. This applies to the emergency diesel fired engine pump specified for the Project. The ATCM requires the use of CARB-certified diesel fuel or equivalent, and limits emissions from, and operations of, compression ignition engines.

Conformance: Standards will be incorporated into local permit conditions. Refer to local LORS (SDAPCD Rule 62 & Rule 69.4.1) and conformance discussed below.

6.2.7.2.5 Nuisance Regulation

Authority: CA H&SC §41700
Administering Agency: SDAPCD and CARB

Requirements: Provides that "no person shall discharge from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public or which endanger the comfort, repose, health, or safety of any such persons or the public, or which cause, or have a natural tendency to cause injury or damage to business or property."

Conformance: Stipulations will be incorporated into local permit conditions. Refer to local LORS (SDAPCD Rule 51) and conformance discussed below.

6.2.7.2.6 Air Toxic "Hot Spots" Act

Authority: H&SC §44300-44384; 17 CCR §93300-93347
Administering Agency: SDAPCD and CARB

Requirements: Established in 1987, the Air Toxics "Hot Spots" Information and Assessment Act supplements the toxic air contaminant program, by requiring the development of a statewide inventory of air toxics emissions from stationary sources. The program requires affected facilities to prepare (1) an emissions inventory plan that identifies relevant air toxics and sources of air toxics emissions; (2) an emissions inventory report quantifying air toxics emissions; and (3) a health risk assessment, if necessary, to characterize the health risks to the exposed public. Facilities whose air toxics emissions are deemed to pose a significant health risk must issue notices to the exposed population. In 1992, the Legislature amended the program to further require facilities whose air toxics emissions are deemed to pose a significant health risk to implement risk management plans to reduce the associated health risks. This program is implemented at the local level with state oversight.

Conformance: The facility will submit the necessary plan and report as required. A HRA has been prepared and presented in Section 6.16 based on the maximum operating conditions of the facility.

6.2.7.2.7 CEC and CARB Memorandum of Understanding

Authority: CA Pub. Res. Code §25523(a); 20 CCR §1752, 1752.5, 2300-2309 and Div. 2, Chap. 5, Art. 1, Appendix B, Part (k)
Administering Agency: CEC

Requirements: Provides for the inclusion of requirements in the CEC decision on an Application for Certification (AFC) and SPPE to assure protection of environmental quality; the application is required to include information concerning air quality protection.

Conformance: The air quality impacts of this Project have been evaluated and hereby presented with proposed mitigation.

6.2.7.3 Local

When the state's air pollution statutes were reorganized in the mid-1960s, local air pollution districts were established in each county of the state. There are three different types of districts: county (including the SDAPCD), regional, and unified. In addition, special air quality management district (AQMD), with more comprehensive authority over non-vehicular sources, as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California. Local districts have principal responsibility to do the following:

- Develop plans for meeting the NAAQS and California ambient air quality standards
- Develop control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards
- Implement permit programs established for the construction, modification, and operation of sources of air pollution
- Enforce air pollution statutes and regulations governing non-vehicular sources
- Develop programs to reduce emissions from indirect sources

6.2.7.3.1 San Diego Regional Air Quality Strategies (RAQS)

Authority: H&SC §40914
Administering Agency: SDAPCD with EPA Region 9 and CARB oversight

Requirements: Air quality plans define the proposed strategies, including stationary source and transportation control measures and NSR rules that will be implemented to attain and maintain the state ambient air quality standards. The relevant stationary source control measures and NSR requirements are discussed with SDAPCD Rules and Regulations below.

6.2.7.3.2 San Diego Air Pollution Control District Rules and Regulations

Authority: H&SC §4000 et seq., H&SC §40200 et seq., indicated SDAPCD Rules
Administering Agency: SDAPCD with EPA Region 9 and CARB oversight

Requirements: Establishes procedures and standards for issuing permits; establishes standards and limitations on a source-specific basis.

Authority to Construct - SDAPCD Rule 10 (Permits Required) – Specifies that any facility installing nonexempt equipment that causes or controls the emission of air pollutants must first obtain an Authority to Construct from the SDAPCD. Under Rule 20.5 (h) (Power Plants), the District's Final Determination of Compliance acts as an authority to construct for a power plant upon approval of the Project by the CEC.

Review of New or Modified Sources - Rule 20.2 (New Source Review – Non-Major Stationary Sources) – Implements the federal PSD and new source review requirements of the California Clean Air Act. The rule contains the following elements:

- BACT
- AQIA
- PSD
- Public Notice and Comment

Since this project is not subject to NSR for major stationary sources under Rule 20.3, emission offsets are not applicable.

Best Available Control Technology

As a NSR requirement under Rule 20.2, BACT applies to any new or modified source resulting in an emissions increase exceeding 10 lb/day. Since the projected emission rates for the project exceed this threshold, BACT applies.

The SDAPCD defines BACT as the most stringent emission limitation or control technique that:

- Has been proven in field application and that is cost-effective unless not achievable; or
- Has been demonstrated, but not necessarily proven, in field applications, and that is cost-effective; or
- Is any control equipment, process modification, changes in raw material including alternate fuels, and substitution of equipment or processes with any equipment or processes (or any combination of these) determined to be technologically feasible and cost-effective; or

- Is contained in any SIP approved by EPA for such emission unit category, unless demonstrated to not be proven in field application, not be technologically feasible, or not be cost-effective

The proposed BACT for this Project is a CO oxidation catalyst follow by an ammonia selective catalytic reduction (SCR) system. A complete BACT analysis is provided in Attachment 6.2-E.

Air Quality Impact Analysis

An AQIA must be conducted to evaluate impacts on ambient air quality of emission increases from new or modified facilities exceeding any AQIA threshold shown in Table 6.2-20. Project emissions must not cause a new exceedance or contribute significantly to an existing exceedance of any ambient air quality standard. As shown below, the only exceedance is with the hourly NOx emissions associated with a maintenance event where the turbines are operated without the benefit of the SCR system. The analysis shows that for normal steady state operation including start-up and shut down events, the projected background concentration with the increments will be below the most stringent AAQS. For the limited time for which certain uninhabited offsite concentration may exceed the AAQS, mitigation is proposed in form of emission offsets.

Table 6.2-20 - SDAPCD AQIA Emission Thresholds

AIR CONTAMINANT	EMISSION THRESHOLDS			PROJECT EMISSION RATES		
	lb/hr	lb/day	ton/yr	lb/hr	lb/day	ton/yr
CO	100	550	100	30	259	22.0
NOx	25	250	40	19.25	205	16.7
PM_{10}	N/A	100	15	NA	98	9.7
SOx	25	250	40	1.65	26.5	2.66

Source: Rule 20.3, Table 20.3-1.

Prevention of Significant Deterioration

As shown in the federal LORS discussion above, the proposed emissions level and the modeled increments of emissions for this project are below the PSD thresholds.

Public Notice

Since the proposed emission rates for this project are below the AQIA thresholds, public notice under this rule other than those required under the SPPE and CEQA process are not required.

CEC Review - Rule 20.5 establishes a procedure for coordinating SDAPCD review of power plant projects with the CEC AFC and SPPE processes. Under this rule, the SDAPCD will directly issue permits upon its determination of compliance under its permit evaluation process and upon CEC approval of the SPPE and its CEQA review.

A full permit application will be submitted to the SDAPCD shortly after the submittal of the SPPE such that simultaneous review of the project can take place.

Prohibitory Rules – The general prohibitory rules of the SDAPCD applicable to the Project include the following. Full conformances via permit evaluation and or permit conditions are expected.

Rule 50 – Visible Emissions. Prohibits visible emissions as dark as, or darker than, Ringelmann No. 1 for periods greater than three minutes in any hour

Rule 51 – Nuisance. Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public, or that damage business or property

Rule 52 – Particulate Matter Emission Standards. Prohibits PM emissions in excess of 0.10 grains per dry standard cubic foot (gr/dscf)

Rule 53 – Combustion Contaminants. Prohibits sulfur emissions, calculated as SO_2, in excess of 0.05 percent by volume (500 parts per million by volume [ppmv]), and combustion particulate emissions in excess of 0.10 gr/dscf at 12 percent CO_2.

Rule 62 – Sulfur Content of Fuels. Prohibits the burning of gaseous fuel with a sulfur content of more than 10 gr/100 scf and liquid fuel with a sulfur content of more than 0.05 percent sulfur by weight.

Rule 69 – Electrical Generating Steam Boilers. Limits NO_x and NH_3 emissions from electrical generating steam boilers rated greater than or equal to 100 MMBtu/hr to BACT levels.

Rule 69.3.1 – Stationary Gas Turbines. Limits NO_x emissions from stationary gas turbines rated greater than or equal to 10 MW with post-combustion controls to 9 ppmv (at 15 percent O_2, corrected for efficiency).

Rule 69.4.1 – Stationary Reciprocating Internal Combustion Engines. Limits CO, NOx, and VOC emissions from stationary reciprocating internal combustion engines rated greater than or equal to 50 bhp. However, emergency equipment operating less than or equal to 52 hours per year for testing or maintenance purposes and less than or equal to 200 hours per year for any purpose are exempt from the emission limits of Rule 69.4.1.

New Source Performance Standards – SDAPCD Regulation X (Standards of Performance for New Stationary Sources) adopts, by reference, the federal standards of performance for new or modified stationary sources.

Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) applies to gas turbines with a heat input in excess of 1 MMBTU/hr. Subpart KKKK limits NOx and SO_2 emissions from new gas turbines based on power output. The limits for turbines greater than 30 MW are 0.39 lb-NOx per MW-hr and 0.58 lb SO_2 per MW-hr. The proposed turbines the emission rate is 0.08 lb-NOx per MW-hr and 0.02 lb-SO_2 per MW-hr.

Toxic Air Contaminants – New Source Review – SDAPCD Rule 1200 - Provides a mechanism for evaluating the potential impact of TAC air emissions from new, modified, and relocated sources in the SDAPCD. The rule requires a demonstration that the source will not exceed the risk thresholds summarized in the table below. As shown in this table, there are different

acceptable risk levels depending upon whether a project uses T-BACT. The proposed project will have T-BACT installed.

Table 6.2-21 - SDAPCD Health Risk Thresholds

RISK CRITERION	RISK THRESHOLD
Cancer Risk with T-BACT	1×10^{-5}
Cancer Risk without T-BACT	1×10^{-6}
Acute Noncarcinogenic Health Hazard Index	1.0
Chronic Noncarcinogenic Health Hazard Index	1.0

As presented in Section 6.16 – Public Health, the modeled incremental risk associated with this project are below the respective thresholds listed above.

Acid Rain Permit – SDAPCD Rule 1412 (Federal Title IV Acid Rain Program Requirements) – This rule adopts, by reference, the federal requirements of 40 CFR Part 72, which requires that certain subject facilities comply with maximum operating emissions levels for SO_2 and NOx, and monitor SO_2, NOx, and carbon dioxide emissions and exhaust gas flow rates. A Phase II acid rain facility, such as a new power plant project, must obtain an acid rain permit. A permit application must be submitted to the SDAPCD at least 24 months before the operation commences. The application must present all relevant Phase II sources at the facility, a compliance plan for each unit, applicable standards, and an estimated commencement date of operations.

This project is proposed to commence operation June 2008; the acid rain permit application for the Project will be submitted to the SDAPCD by the second quarter of 2009.

Federal Operating Permit – SDAPCD Rule 1414 (Title V Applications) requires new or modified major facilities, NSPS sources, NESHAP sources, and/or Phase II acid rain facilities to obtain an operating permit containing the federally enforceable requirements mandated by Title V of the 1990 Clean Air Act Amendments. A permit application for a new or modified source must be submitted to the SDAPCD within 12 months of commencing operation. The application must present a process description, all new stationary sources at the facility, applicable regulations, estimated emissions, associated operating conditions, alternative operating scenarios, a facility compliance plan, and a compliance certification.

This project is subject to this requirement solely because it is categorized as an acid rain facility. The proposed emissions from the project are well below the major source threshold for criteria pollutants and HAP. The application will be submitted along with the application for Title IV Acid Rain requirements.

6.2.8 Responsible Agencies and Contacts

The EPA has responsibility for enforcing, on a national basis, the requirements of many of the country's environmental and hazardous waste laws. California is under the jurisdiction of EPA Region 9, which has its offices in San Francisco. Region 9 is responsible for the local administration of EPA programs for California, Arizona, Nevada, Hawaii, and certain Pacific trust territories. EPA's activities relative to the California air pollution control program focus principally on reviewing California's submittals for the SIP. The SIP is required by the federal Clean Air Act to demonstrate how all areas of the state will meet the national ambient air quality standards within the federally specified deadlines (42 USC §7409, 7411).

CARB was created in 1968 by the Mulford-Carrell Air Resources Act, through the merger of two other state agencies. CARB's primary responsibilities are to develop, adopt, implement, and enforce the state's motor vehicle pollution control program; to administer and coordinate the state's air pollution research program; to adopt and update, as necessary, the state's ambient air quality standards; to review the operations of the local air pollution control districts (APCD); and to review and coordinate preparation of the SIP for achievement of the federal ambient air quality standards (California H&SC §39500 et seq.).

When the state's air pollution statutes were reorganized in the mid-1960s, local APCD were required to be established in each county of the state (H&SC §4000 et seq.). There are three different types of districts: county, regional, and unified. In addition, special AQMD, with more comprehensive authority over non-vehicular sources, as well as transportation and other regional planning responsibilities, have been established by the Legislature for several regions in California.

APCD and AQMD in California have principal responsibility for:

- Developing plans for meeting the state and federal ambient air quality standard
- Developing control measures for non-vehicular sources of air pollution necessary to achieve and maintain both state and federal air quality standards
- Implementing permit programs established for the construction, modification, and operation of sources of air pollution
- Enforcing air pollution statutes and regulations governing non-vehicular sources and for developing employer-based trip reduction programs

Each level of government (state, federal, and county/local air district) has adopted specific regulations that limit emissions from stationary combustion sources, several of which are applicable to this Project. The air agencies having permitting authority for this Project are shown in the table below. The applicable federal LORS and compliance with these requirements are provided in earlier sections.

Table 6.2-22 - Air Quality Agencies

AGENCY	CONTACT/TITLE	CONTACT INFORMATION
U.S. Environmental Protection Agency (EPA) Region 9 75 Hawthorne Street San Francisco, CA 94105	Gerardo Rios Chief Permits Office	(415) 744-1259
California Air Resource Board (CARB) 2020 L Street Sacramento, CA 95814	Mike Tollstrup Chief Project Assessment Branch	(916) 322-6026
San Diego Air Pollution Control District (SDAPCD) 10124 Old Grove Road San Diego, CA 92131	Arthur Carbonell Senior Engineer	Arthur.Carbonell@SDCounty.CA.Gov (858) 586-2741
	John Annicchiarico Supervising Engineer	John.Annicchiarico@SDCounty.CA.Gov (858) 586-2733
	Tom Weeks Chief, Engineering Division	Tom.Weeks@SDCounty.CA.Gov (858) 586-2600
	Ralph DeSiena Meteorologist	Ralph.DeSiena@SDCounty.CA.Gov (858) 586-2772
	Mahmood Hossain Chief Monitoring & Technical Service	Mahmood.Hossain@SDCounty.CA.Gov (858) 586-2760

6.2.9 Permits and Permitting Schedule

Pursuant to SDAPCD Rule 10 (Permits Required), the SDAPCD requires that all new construction and modification shall first obtain written authorization. A separate Authority to Construct (ATC) will be required for each piece of equipment, system or process. An ATC shall remain in effect until the Permit to Operate is granted, denied or cancelled.

Certain pieces of equipment are exempt from permit pursuant to SDAPCD Rule 11 (Exemption from Rule 10 Permit Requirement). Under SDAPCD Rule 18 (Action on Application), the SDAPCD shall act on a completed application within 90 days if possible, or within a maximum of 180 days.

While permit application will be submitted to the SDAPCD shortly after the filing of the SPPE with the CEC, the SDAPCD will proceed with its permit evaluation process, but it will only issue the ATC after the CEC has completed its SPPE review and issued the final environmental study.

In addition to SDAPCD operating permits, this facility will be required to obtain an acid rain permit within 12 months after commencement of operation under SDAPCD Rule 1412 (Federal Acid Rain Program Requirements). This rule adopts, by reference, the federal requirements of 40 CFR Part 72 which requires that certain subject facilities comply with maximum operating emissions levels for SO2 and NOx, and monitor SO_2, NOx, and carbon dioxide emissions and exhaust gas flow rates. The SDAPCD has received delegation from USEPA for Title IV implementation under its Title V Operating Permit program pursuant to Rule 1414. Sources

such as this Project that use pipeline-quality natural gas as the exclusive fuel are exempt from many of the acid rain program requirements; however, the facility will be required to estimate SO_2 and CO_2 emissions from the Project and monitor NOx emissions with a certified continuous emission monitoring system (CEMS).

6.2.10 References

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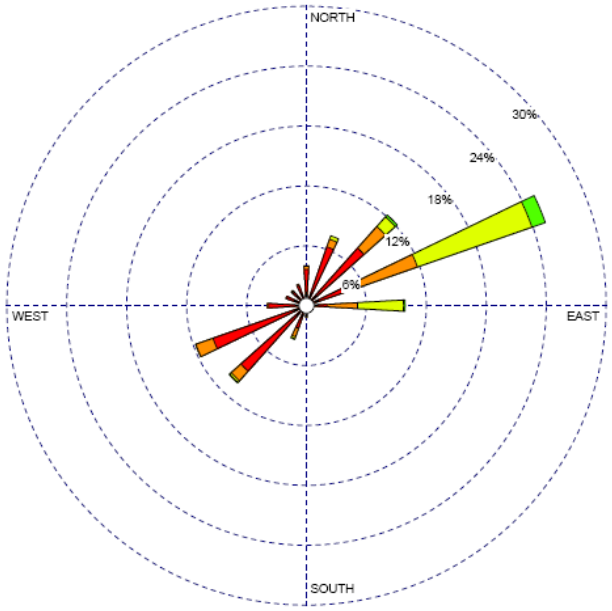
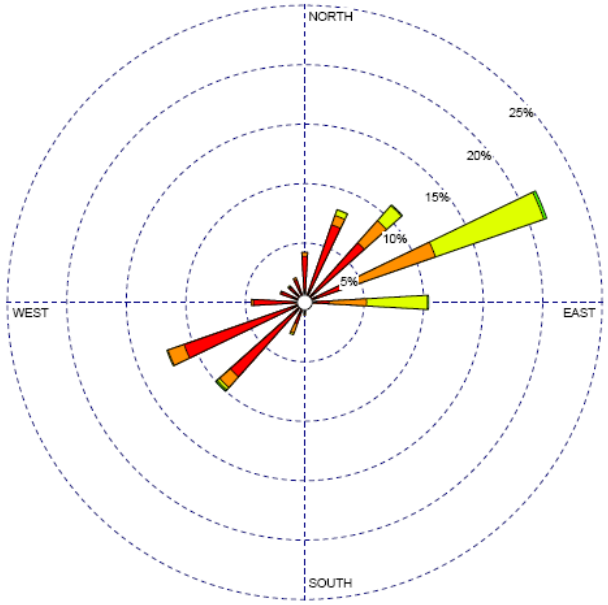
APPENDIX 6.2-A – FLOW VECTOR WIND ROSES

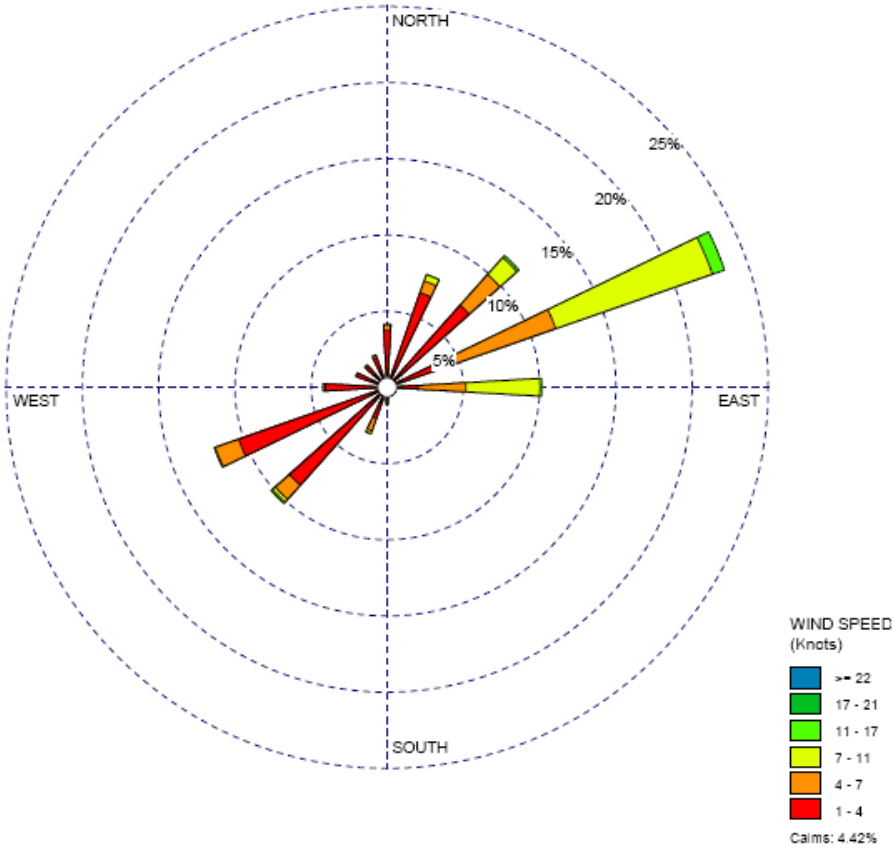
Figure 6.2-2 – Flow Vector Wind Roses - Annual Met Data 2002 & 2003 – Gregory Canyon



2002 – Calm Winds 2.64% - Avg. Wind Speed 4.38 Knots

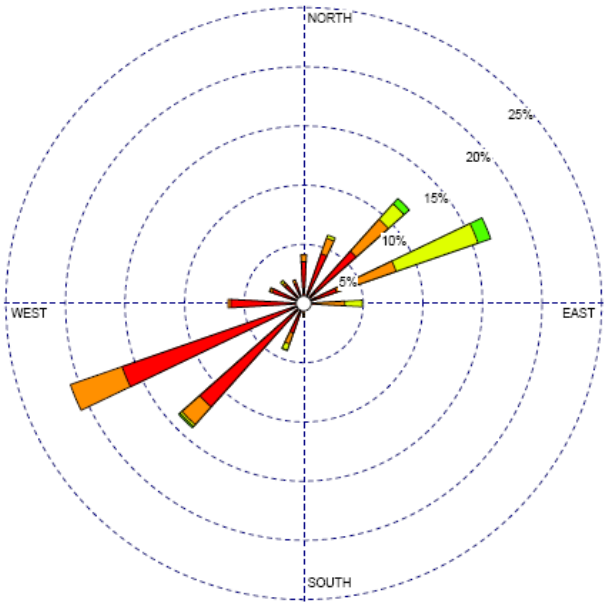


2003 – Calm Winds 6.21% - Avg. Wind Speed 3.96 Knots

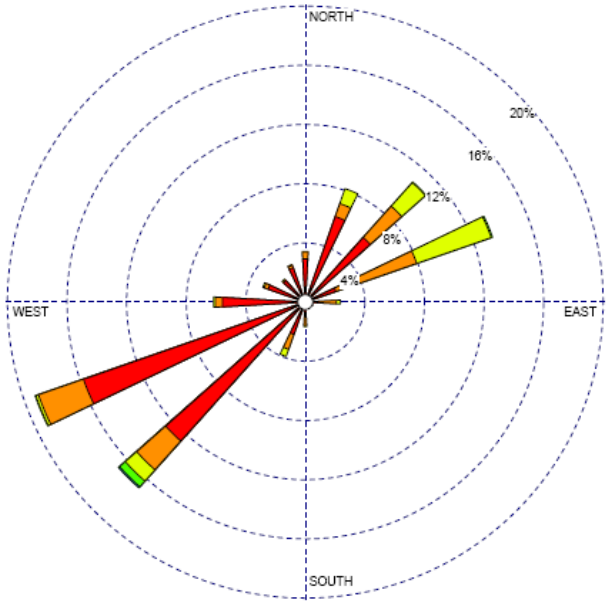


2002 & 2003 Combined – Calm Winds 4.42% - Avg. Wind Speed 4.17 Knots

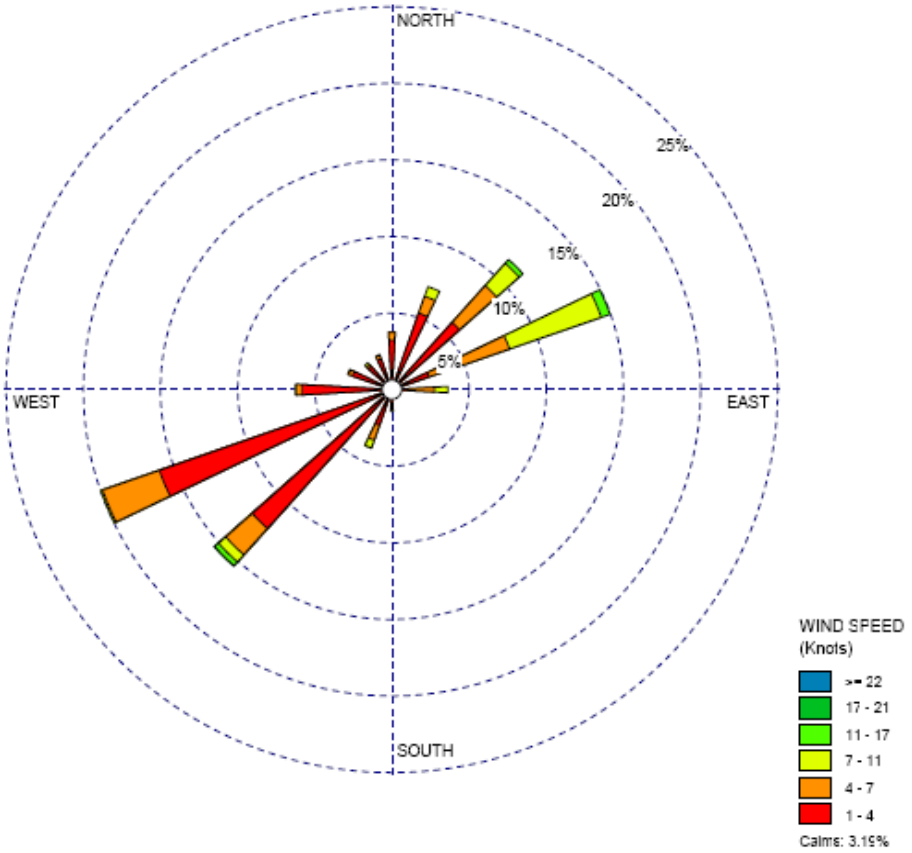
Figure 6.2-3 – 1st Calendar Quarters 2002 & 2003 Flow Vector Wind Roses – Gregory Canyon



Q1 - 2002 – Calm Winds 1.16% - Avg. Wind Speed 4.07 Knots

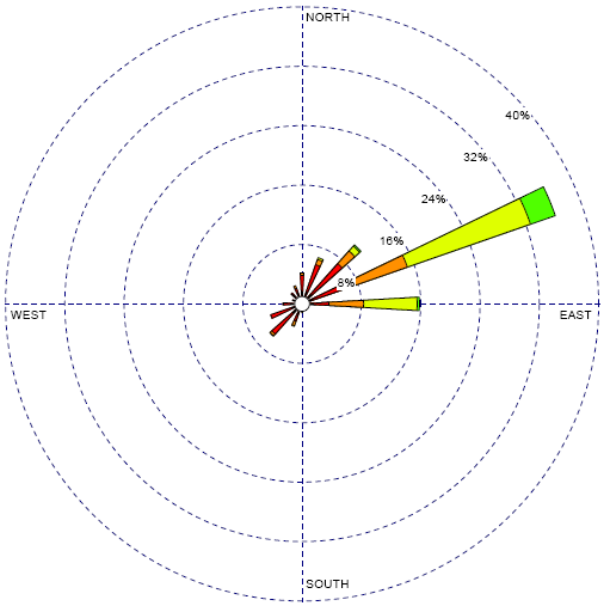


Q1 - 2003 – Calm Winds 5.23% - Avg. Wind Speed 3.66 Knots

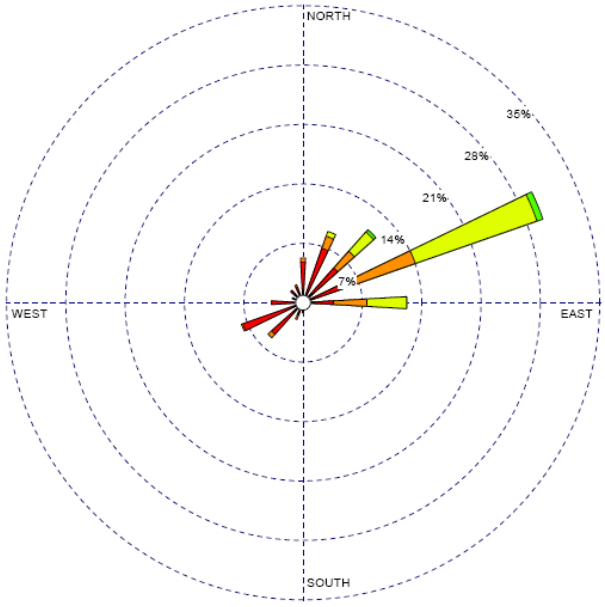


1st Calendar Quarter 2002 & 2003 Combined – Calm Winds 3.19% - Avg. Wind Speed 3.87 Knots

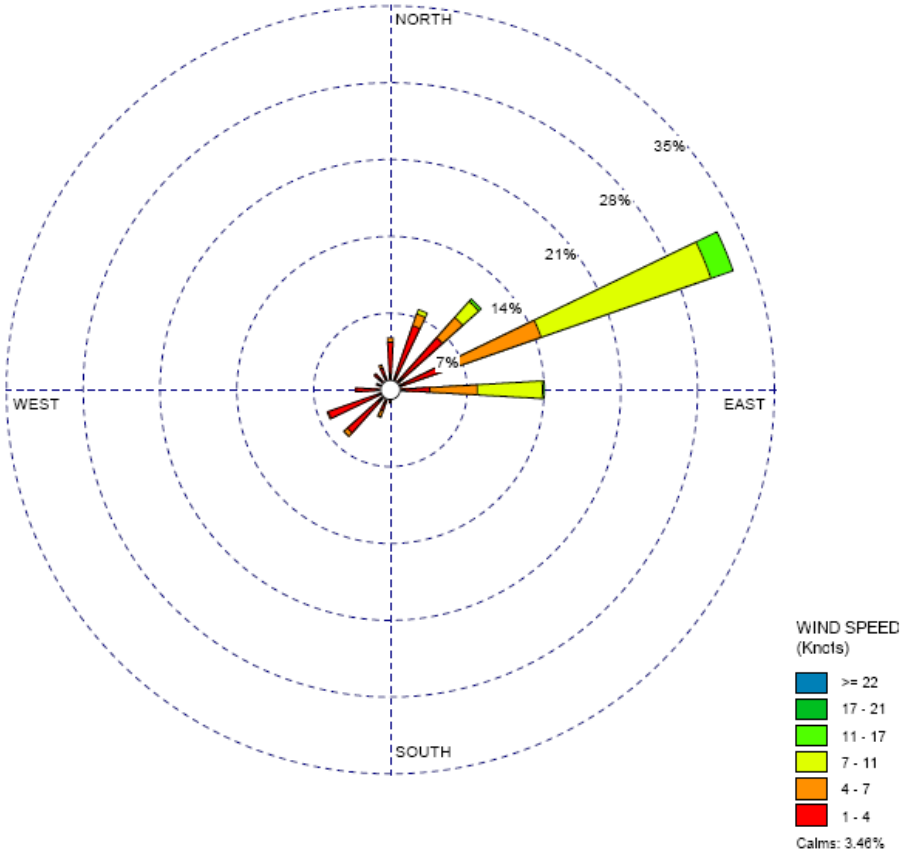
Figure 6.2-4 – 2nd Calendar Quarters 2002 & 2003 Flow Vector Wind Roses – Gregory Canyon



Q2 - 2002 – Calm Winds 2.20% - Avg. Wind Speed 5.06 Knots

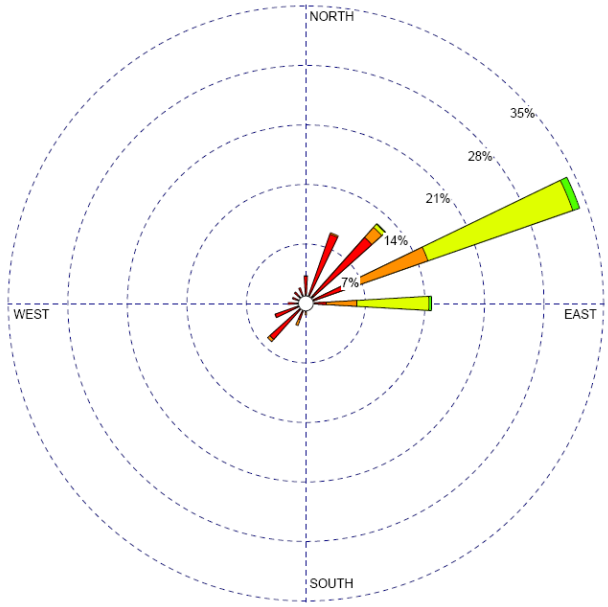


Q2 - 2003 – Calm Winds 4.72% - Avg. Wind Speed 4.44 Knots

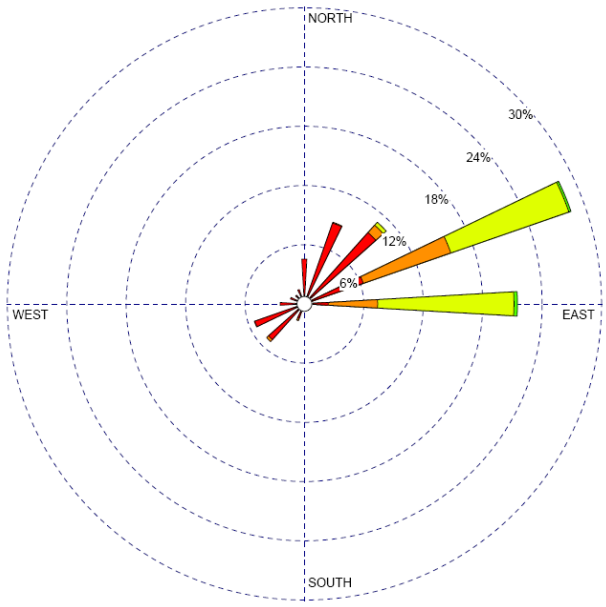


2nd Calendar Quarter 2002 & 2003 Combined – Calm Winds 3.46% - Avg. Wind Speed 4.75 Knots

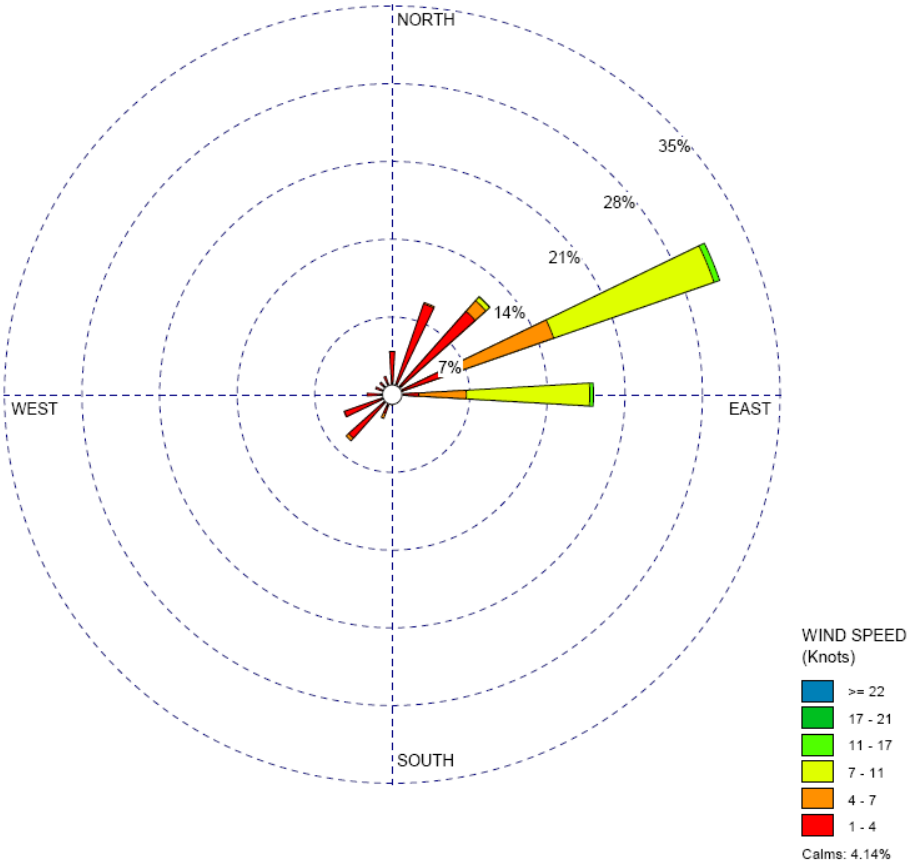
Figure 6.2-5 – 3rd Calendar Quarters 2002 & 2003 Flow Vector Wind Roses – Gregory Canyon



Q3 - 2002 – Calm Winds 3.22% - Avg. Wind Speed 4.70 Knots

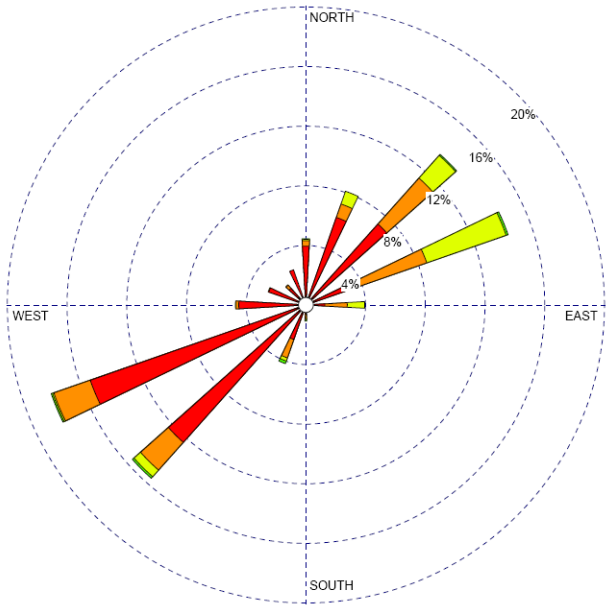


Q3 - 2003 – Calm Winds 5.07% - Avg. Wind Speed 4.46 Knots

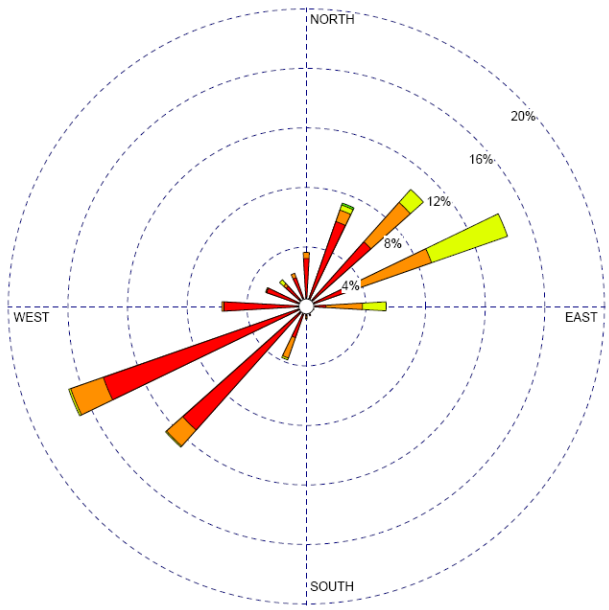


3rd Calendar Quarter 2002 & 2003 Combined – Calm Winds 4.14% - Avg. Wind Speed 4.58 Knots

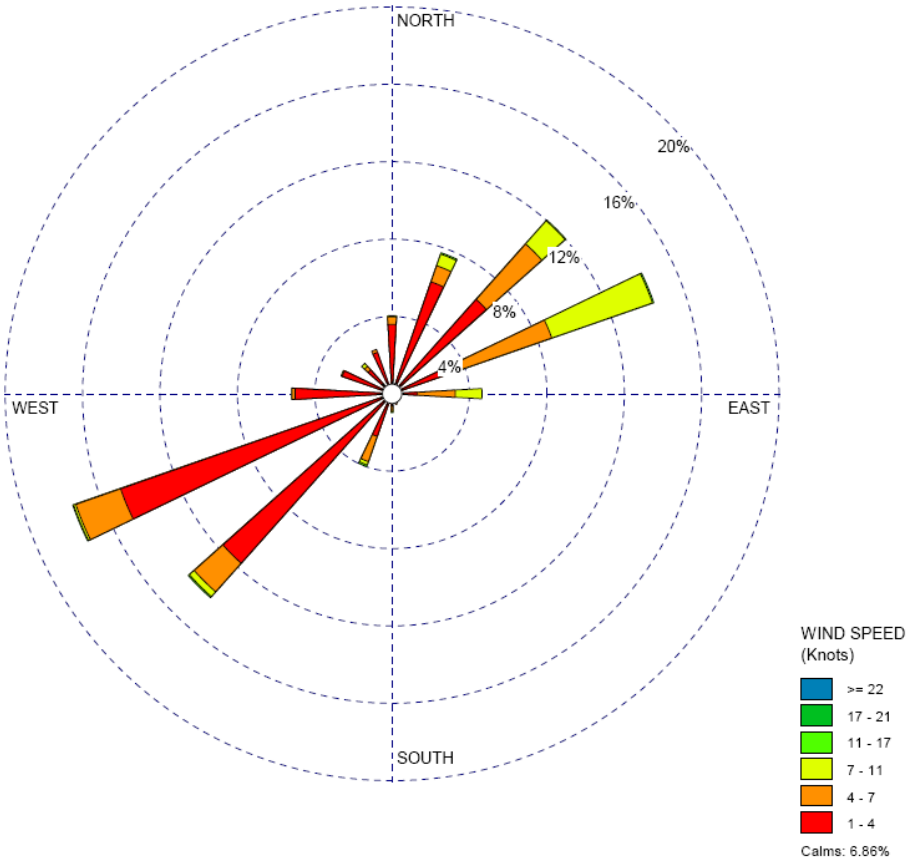
Figure 6.2-6 – 4th Calendar Quarters 2002 & 2003 Flow Vector Wind Roses – Gregory Canyon



Q4 - 2002 – Calm Winds 3.94% - Avg. Wind Speed 3.68 Knots



Q4 - 2003 – Calm Winds 9.78% - Avg. Wind Speed 3.30 Knots

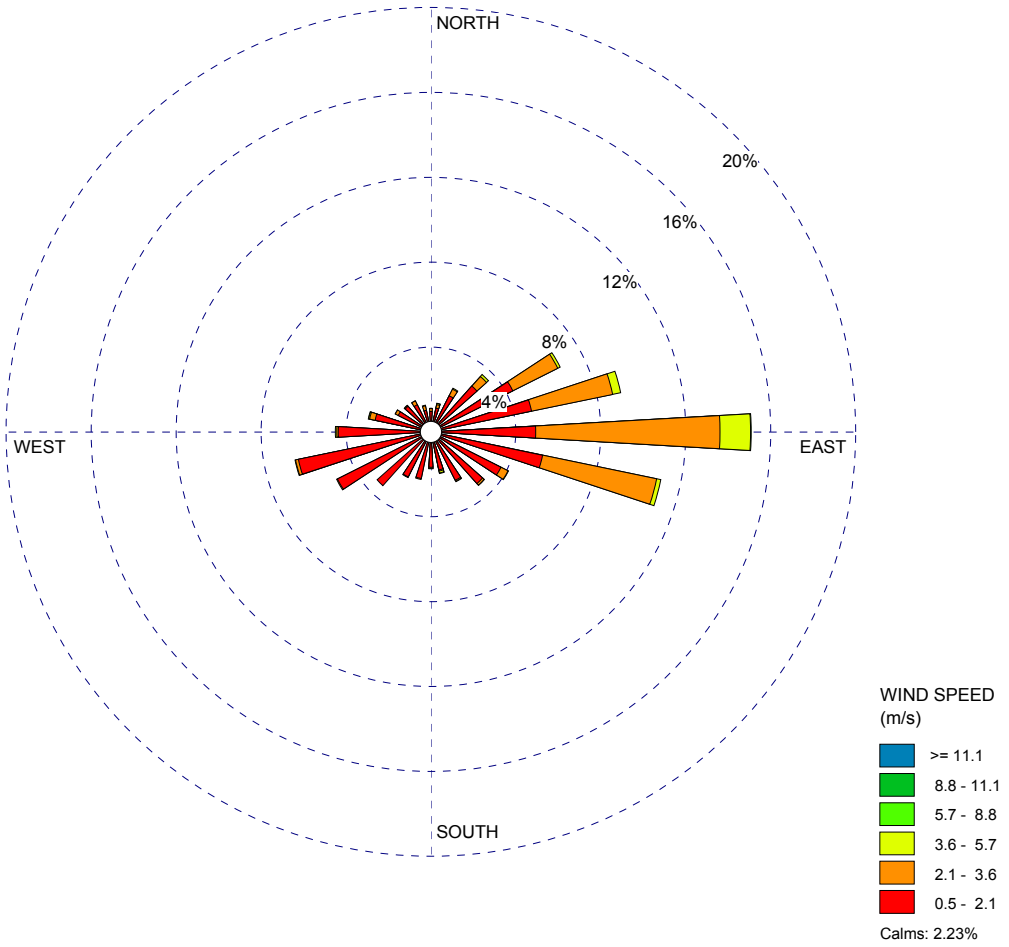


4th Calendar Quarter 2002 & 2003 Combined – Calm Winds 6.86% - Avg. Wind Speed 3.49 Knots

Figure 6.2-7 – Escondido Wind Rose Year 2000

STATION NAME:
Escondido, CA (Station No. 72293)

GRAPH TYPE:
Wind Speed
Flow Vector (blowing to)

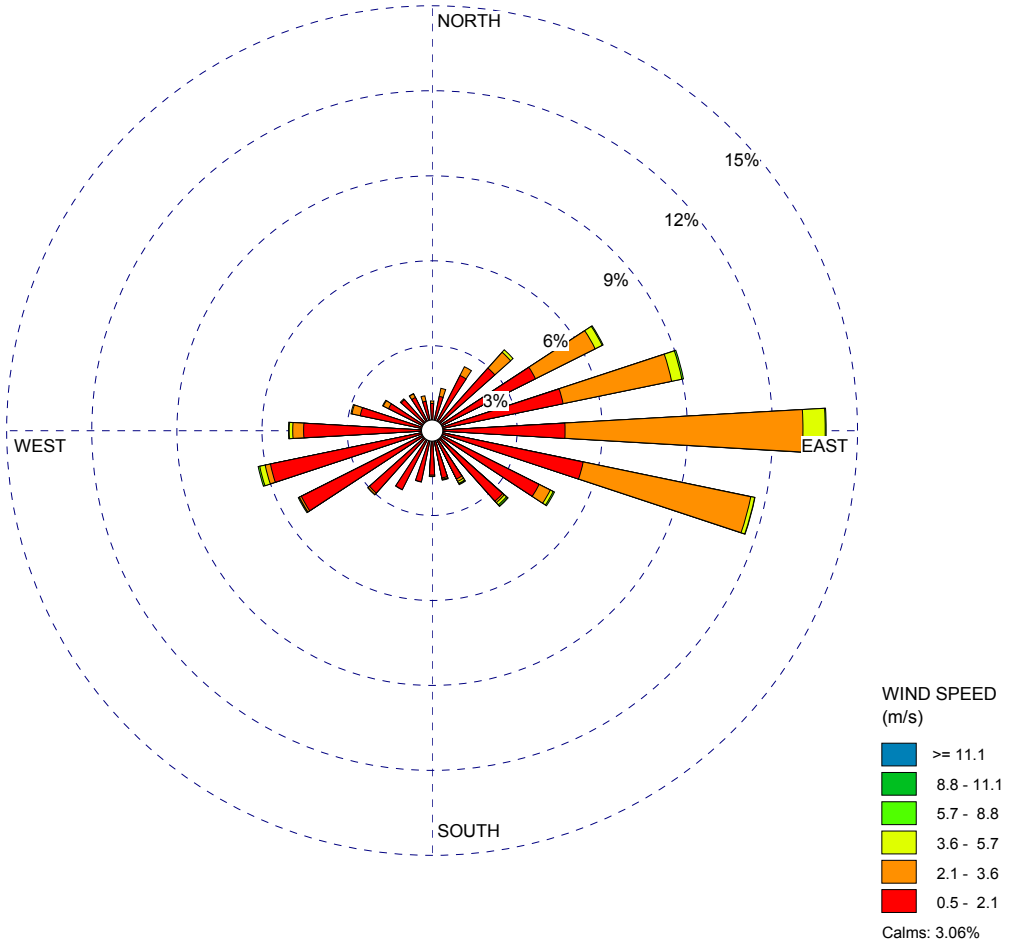


COMMENTS:	DATA PERIOD:	PROJECT NAME:	
	2000 **Jan 1 - Dec 31** **00:00 - 23:00**	**The Orange Grove Project**	
		PREPARED BY: **TRC**	
	CALM WINDS: **2.23%**	TOTAL COUNT: **8698 hrs.**	
	AVG. WIND SPEED: **1.61 m/s**	DATE: **3/20/2007**	PROJECT NO.:

Figure 6.2-8 – Escondido Wind Rose Year 1999

STATION NAME:
Escondido, CA (Station No. 72293)

GRAPH TYPE:
Wind Speed
Flow Vector (blowing to)

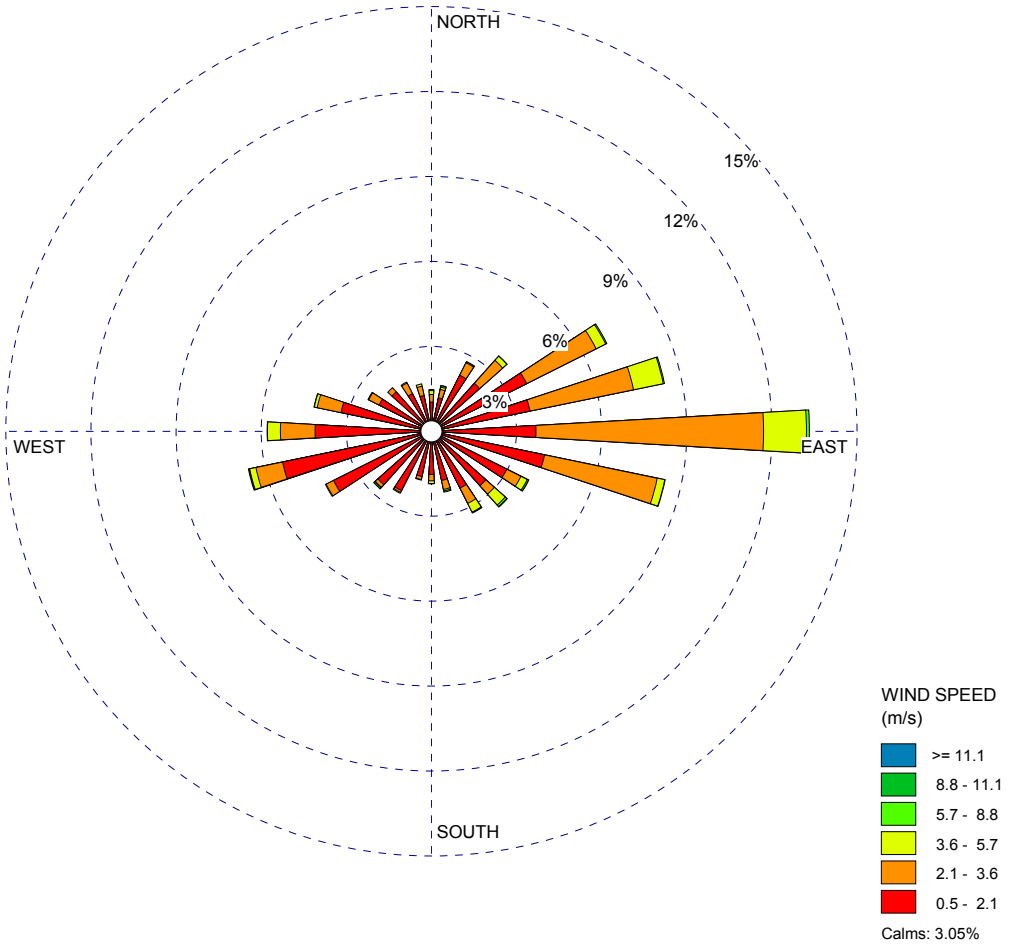


COMMENTS:	DATA PERIOD:	PROJECT NAME:	
	1999 **Jan 1 - Dec 31** **00:00 - 23:00**	**The Orange Grove Project**	
		PREPARED BY: **TRC**	
	CALM WINDS: **3.06%**	TOTAL COUNT: **8674 hrs.**	
	AVG. WIND SPEED: **1.62 m/s**	DATE: **3/20/2007**	PROJECT NO.:

Figure 6.2-9 – Escondido Wind Rose Year 1998

STATION NAME:
Escondido, CA (Station No. 72293)

GRAPH TYPE:
Wind Speed
Flow Vector (blowing to)

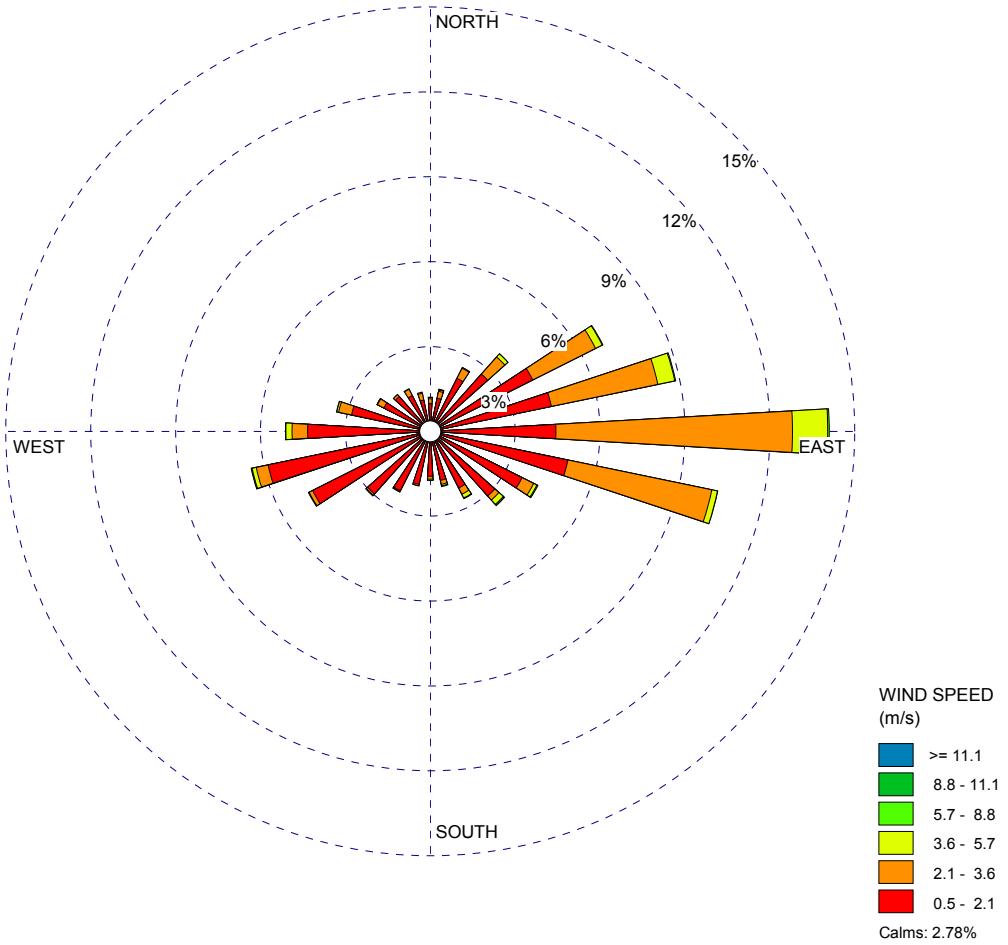


COMMENTS:	DATA PERIOD:	PROJECT NAME:	
	1998 **Jan 1 - Dec 31** **00:00 - 23:00**	**The Orange Grove Project**	
		PREPARED BY: **TRC**	
	CALM WINDS: **3.05%**	TOTAL COUNT: **8533 hrs.**	
	AVG. WIND SPEED: **1.86 m/s**	DATE: **3/20/2007**	PROJECT NO.:

Figure 6.2-10 – Escondido Wind Rose - Years 1998 – 2000 Combined

STATION NAME:
Escondido, CA (Station No. 72293)

GRAPH TYPE:
Wind Speed
Flow Vector (blowing to)



COMMENTS:	DATA PERIOD:	PROJECT NAME:	
	1998-2000 **Jan 1 - Dec 31** **00:00 - 23:00**	**The Orange Grove Project**	
		PREPARED BY: **TRC**	
	CALM WINDS: **2.78%**	TOTAL COUNT: **25905 hrs.**	
	AVG. WIND SPEED: **1.70 m/s**	DATE: **3/20/2007**	PROJECT NO.:

6.2-B. B

APPENDIX 6.2-B – SUPPLEMENTAL AMBIENT AIR QUALITY DATA

APPENDIX 6.2-B – SUPPLEMENTAL AMBIENT AIR QUALITY DATA

This appendix and the following sections provide additional background information and data on the ambient air quality from the closest air monitoring station for each criteria pollutant.

1.0 Ozone

Ozone is generated by a complex series of chemical reactions between volatile organic compounds (VOC) and NO_x in the presence of ultraviolet radiation. Ambient ozone concentrations follow a seasonal pattern: higher in the summertime and lower in the wintertime. At certain times, the general area can provide ideal conditions for the formation of ozone due to the persistent temperature inversions, clear skies, mountain ranges that trap the air mass, and exhaust emissions from vehicles and other stationary sources. Based upon ambient air measurements at stations throughout the area, San Diego County is classified as a serious non-attainment area for the state ozone standard and a non-attainment area for the federal 8-hour ozone standard.

Table 6.2-23 - Ozone Levels, Escondido Monitoring Station, 1996-2005 (ppm)

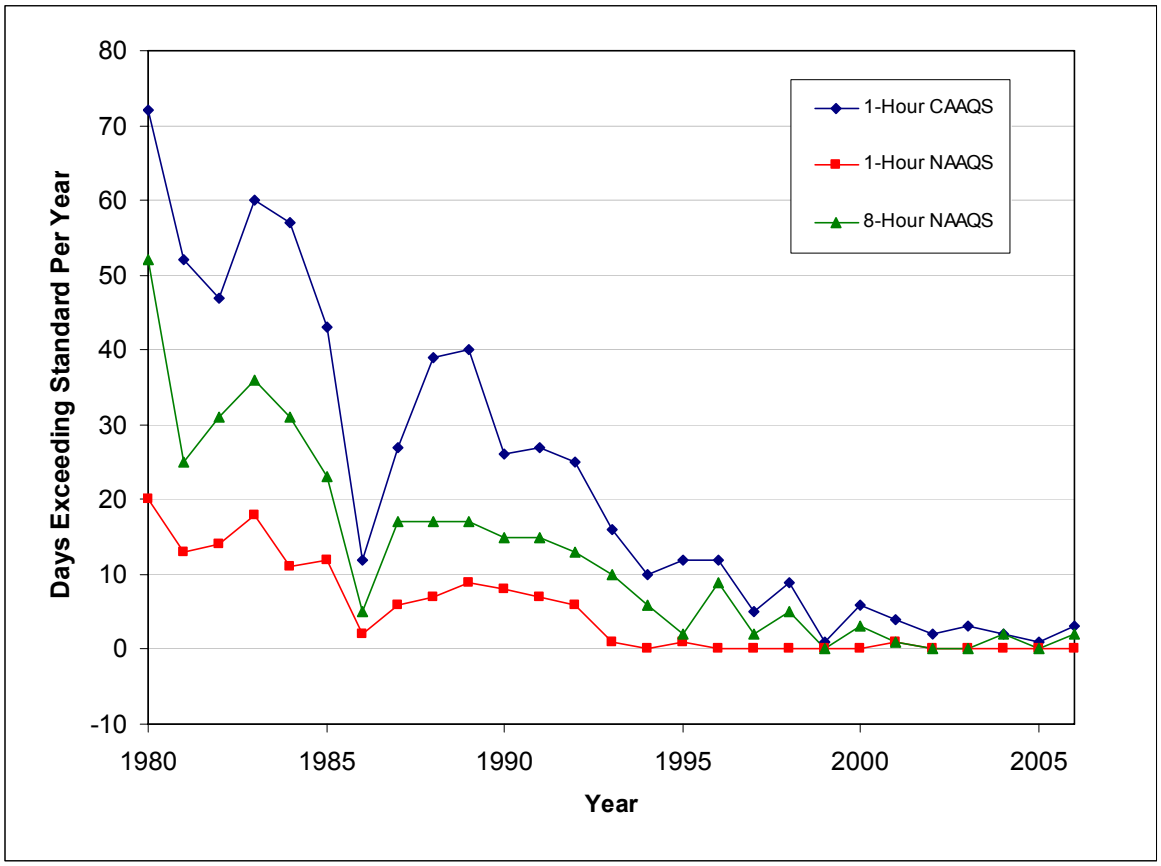
Year	Days Above Standard			Station: Escondido - E. Valley Parkway					
	1-Hour		8-Hour	1-Hour Observations			8-Hour Averages		
	CAAQS	NAAQS	NAAQS	Maximum	Date Observed	3-Year 4th High	Maximum	Date Observed	3-Year 4th High
2006	3	0	2	0.108	Jul-22	0.098	0.096	Jul-22	0.073
2005	1	0	0	0.095	Sep-03	0.098	0.079	Apr-16	0.073
2004	2	0	2	0.099	Apr-27	0.099	0.086	Apr-27	0.073
2003	3	0	0	0.105	Sep-21	0.103	0.083	Sep-21	0.074
2002	2	0	0	0.100	Sep-01	0.110	0.081	Sep-22	0.075
2001	4	1	1	0.141	Sep-30	0.110	0.098	Sep-30	0.075
2000	6	0	3	0.124	Sep-16	0.122	0.106	Sep-16	0.079
1999	1	0	0	0.104	Aug-25	0.114	0.080	Apr-18	0.080
1998	9	0	5	0.122	Jul-26	0.115	0.092	Aug-29	0.086
1997	5	0	2	0.114	Oct-31	0.114	0.090	Jul-03	0.085
1996	12	0	9	0.119	Jun-10	0.120	0.099	Jun-30	0.089
1995	12	1	2	0.154	Jul-27	0.122	0.107	Jul-27	0.090
1994	10	0	6	0.122	Aug-05	0.140	0.105	Aug-05	0.096
1993	16	1	10	0.154	Sep-25	0.154	0.112	Sep-25	0.098
1992	25	6	13	0.150	Apr-26	0.170	0.120	Apr-25	0.099
1991	27	7	15	0.210	Oct-19	0.170	0.145	Oct-19	0.101
1990	26	8	15	0.170	Jun-26	0.170	0.108	Jun-26	0.102
1989	40	9	17	0.190	Mar-31	0.170	0.123	Mar-31	0.105
1988	39	7	17	0.180	Oct-09	0.160	0.132	Apr-06	0.099
1987	27	6	17	0.170	Sep-30	0.160	0.123	Sep-30	0.105
1986	12	2	5	0.130	May-18	0.170	0.107	May-18	0.110
1985	43	12	23	0.170	Jul-08	0.200	0.136	Apr-13	0.125
1984	57	11	31	0.240	Sep-15	0.200	0.141	Sep-15	0.121
1983	60	18	36	0.200	Aug-05	0.190	0.158	Aug-05	0.116
1982	47	14	31	0.220	Sep-01	0.180	0.162	Sep-01	0.113
1981	52	13	25	0.190	Feb-19	0.200	0.150	Feb-19	0.115
1980	72	20	52	0.200	Apr-16	0.200	0.132	Apr-16	0.118

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html).

As shown in the above table, this region has attained the national maximum 1-hour standard for the last five years and it is making progress with the average 8-hour national standard and the State 1-hour standard.

The long-term trends of maximum ozone exceedance of the state and federal standard are shown in the figure below (Figure 6.2-11) for the Escondido monitoring station. The data show a significant reduction in the number of days the standards were exceeded.

Figure 6.2-11 – Long-Term Trends of Maximum Ozone Readings Days Exceedance



Source: TRC, 2007

2.0 Nitrogen Dioxide

Atmospheric NO_2 is formed primarily from reactions between nitric oxide (NO) and oxygen or ozone. NO is formed during high temperature combustion processes, when the nitrogen and oxygen in the combustion air combine. Although NO is less harmful than NO_2, it can be converted to NO_2 in the atmosphere within minutes to hours, depending on the composition and

temperature of the atmosphere. For purposes of state and federal air quality planning, San Diego County is in attainment for NO_2.

The table below (Table 6.2-24) shows the long-term trend of maximum one-hour NO_2 levels recorded at the Escondido monitoring station, as well as the annual average level for each of those years. During this period there has not been a single violation of either the state one-hour standard or the annual average standard. This is also true with the Federal standards since they are less stringent than the State standards.

Table 6.2-24 – NO_2 Levels, Escondido Monitoring Station, 1996-2005 (ppm)

Year	Est. Days > Std.	Annual Average	Highest Hourly		Year	Est. Days > Std.	Annual Average	Highest Hourly	
	CAAQS	CAAQS	CAAQS	Date Observed		CAAQS	CAAQS	CAAQS	Date Observed
2006	0	0.017	0.071	Nov-22	1992	0	0.026	0.130	Jan-23
2005	0	0.016	0.076	Oct-13	1991	0	0.028	0.140	Feb-04
2004	0	0.018	0.080	Oct-08	1990	0	0.029	0.160	Oct-25
2003	0	0.020	0.135	Oct-28	1989	0	0.031	0.160	Nov-08
2002	0	0.021	0.084	Feb-27	1988	0	0.031	0.190	Feb-08
2001	0	0.020	0.088	Nov-20	1987	0	0.028	0.160	Jan-22
2000	0	0.021	0.083	Nov-28	1986	0	0.030	0.130	Jan-10
1999	0	0.023	0.100	Mar-01	1985	0	0.028	0.140	Jan-17
1998	0	0.018	0.092	Oct-23	1984	0	0.028	0.140	Sep-05
1997	0	0.021	0.121	Oct-31	1983	0	0.025	0.170	Nov-03
1996	0	0.020	0.103	Nov-12	1982	0	0.026	0.180	Oct-22
1995	0	0.026	0.125	Nov-24	1981	0	0.027	0.170	Dec-18
1994	0	0.024	0.157	Jan-22	1980	0	0.029	0.160	Sep-29
1993	0	0.022	0.122	Sep-27					

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html).

The figure below (Figure 6.2-12) shows the historical trend of maximum one-hour NO2 levels at Escondido. Annual average concentrations and trends are also shown.

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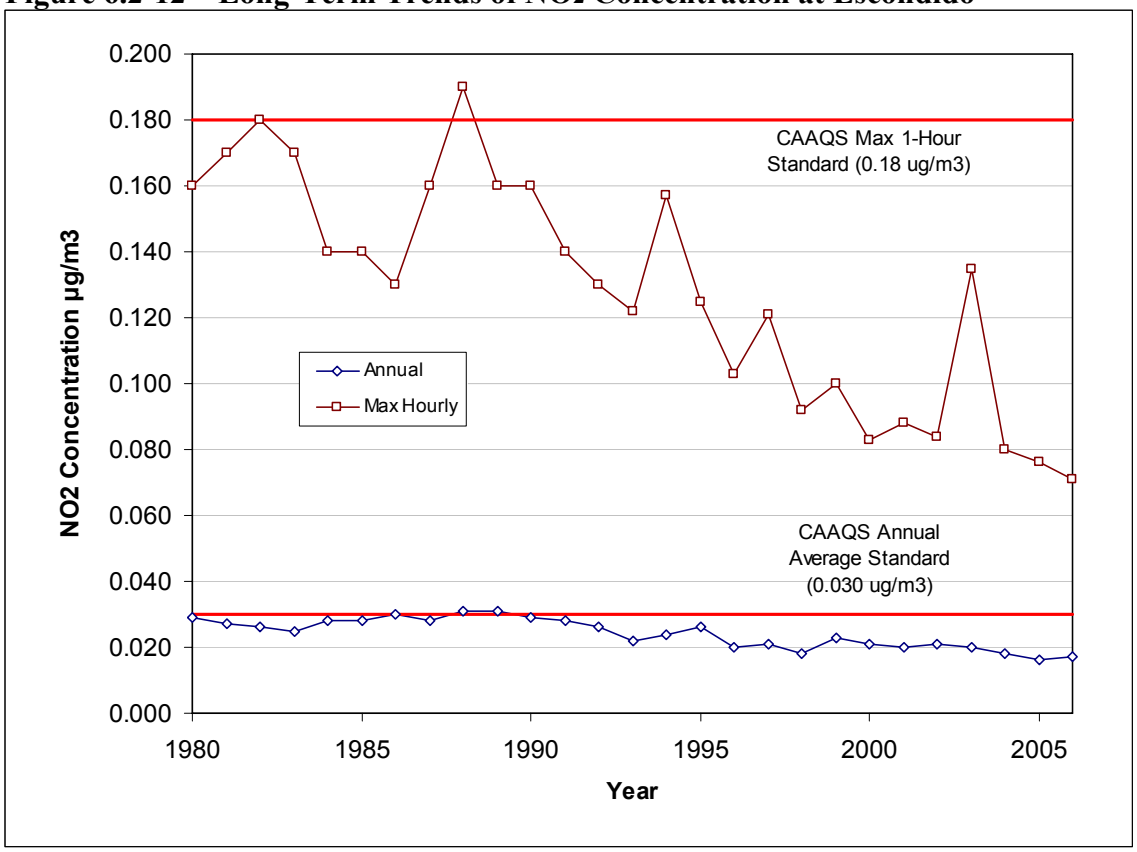
Figure 6.2-12 – Long-Term Trends of NO_2 Concentration at Escondido



Source: TRC, 2007

3.0 Carbon Monoxide

CO is a product of inefficient combustion, principally from automobiles and other mobile sources of pollution. In many areas of California, CO emissions from wood-burning stoves and fireplaces can also be measurable contributors to ambient CO levels. Industrial sources typically contribute less than 10 percent of ambient CO levels. Peak CO levels usually occur during late fall and early winter due to a combination of higher emission rates and calm weather conditions with strong, ground-based inversions. San Diego County is classified as an attainment area for CO with respect to both state and national standards.

Table 6.2-25 below shows the California and National Ambient Air Quality Standards for CO, and the maximum one- and eight-hour average levels recorded at the Escondido monitoring station during the period 1980-2006.

Table 6.2-25 - CO Levels, Escondido Monitoring Station, 1998-2006 (ppm)

Year	Est. Days > CAAQS Std.	Highest 8-Hour Average CAAQS	Date Observed	Year	Est. Days > CAAQS Std.	Highest 8-Hour Average CAAQS	Date Observed
2006	0	3.610	Dec-25	1992	0	7.250	Jan-25
2005	0	3.100	Jan-20	1991	0	7.880	Dec-04
2004	0	3.610	Dec-11	1990	0	8.750	Jan-10
2003	1	10.640	Oct-28	1989	4	10.000	Dec-23
2002	0	3.850	Jan-21	1988	0	9.250	Dec-02
2001	0	5.110	Jan-05	1987	0	9.250	Dec-01
2000	0	4.930	Nov-21	1986	0	9.380	Jan-12
1999	0	5.260	Dec-18	1985	1	9.750	Dec-19
1998	0	4.450	Jan-08	1984	0	7.630	Dec-25
1997	0	4.910	Nov-01	1983	0	8.880	Dec-08
1996	0	7.130	Jan-07	1982	1	10.250	Jan-09
1995	0	5.950	Nov-25	1981	1	11.250	Jan-10
1994	0	7.510	Dec-20	1980	1	10.130	Nov-27
1993	0	7.380	Nov-27				

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html).

The trend of maximum eight-hour average CO concentrations has been below the state standard of 9.0 ppm for the last 10 years. The one day exceedance listed for 2003 was due to a local fire. The highest reading excluding the fire event is 3.9 ppm for that year.

4.0 Sulfur Dioxide

SO_2 is produced when any sulfur-containing fuel is burned. It is also emitted by chemical plants that treat, or refine, sulfur or sulfur-containing chemicals. Natural gas contains only a small amount of sulfur, typically about 0.2 grains per standard cubic foot, while fuel oils contain larger amounts, typically in the range of 15 ppm (for ultra-low sulfur Diesel fuel) to 4 percent (for marine bunker fuels). Peak, but low, concentrations of SO_2 occur at different times of the year in different parts of California, depending on local fuel characteristics, weather, and topography. San Diego County is considered to be in attainment for SO_2 for purposes of state and federal air quality planning. The table below presents the state air quality standard for SO_2 and the maximum levels recorded from 1980 through 1998 at the Escondido and the San Diego monitoring stations. Monitoring of SO_2 was discontinued thereafter. The federal 24-hour average standard is 0.14 ppm; during the period shown, the average SO_2 levels measured at stations in the Project area have been approximately 10 percent of the federal standard.

Table 6.2-26 - CO Levels, Escondido Monitoring Station, 1998-2006 (ppm)

Year	# Days above NAAQS Std.	# Days above CAAQS Std.	First High	Date	Annual Avg
San Diego 12th Avenue					
1998	0	0	0.011	Jul-17	0.003
1997	0	0	0.014	May-29	0.003
1996	0	0	0.012	Apr-26	0.003
1995	0	0	0.018	Aug-08	0.003
1994	0	0	0.013	Jun-23	0.003
1993	0	0	0.018	Jan-31	0.003
Escondido					
> 1992	Monitoring discontinued at location				
1992	0	0	0.013	Jan-24	0.004
1991	0	0	0.015	Feb-14	0.003
1990	0	0	0.012	Dec-03	0.002
1989	0	0	0.013	Nov-10	0.002
1988	0	0	0.011	Dec-05	0.002
1987	0	0	0.037	Oct-05	0.002
1986	0	0	0.016	Dec-04	0.003
1985	0	0	0.019	Dec-18	0.002
1984	0	0	0.013	Feb-03	0.002
1983	0	0	0.015	Dec-07	0.003
1982	0	0	0.021	Feb-01	0.006
1981	0	0	0.027	Dec-02	0.007
1980	0	0	0.036	Feb-26	0.008

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html).

5.0 Fine Particulates (PM_{10})

Particulates in the air are caused by a combination of wind-blown fugitive dust; particles emitted from combustion sources and manufacturing processes; sea salts; and organic, sulfate, and nitrate aerosols formed in the air from emitted hydrocarbons, sulfur oxides, and nitrogen oxides, respectively. In 1984, CARB adopted standards for PM_{10} and phased out the total suspended particulate (TSP) standards that had been in effect previously. PM_{10} standards were substituted for TSP standards because PM_{10} corresponds to the size range of particulates that can be inhaled into the lungs (respired), and therefore is a better measure to use in assessing potential health effects. In 1987, EPA also replaced national TSP standards with PM_{10} standards. San Diego County is unclassified for the federal PM_{10} standard and is a non-attainment area for the state standard.

The table below shows the federal and state air quality standards for PM_{10}, maximum levels recorded at the Escondido monitoring station during 1993-2006. The maximum 24-hour PM_{10} levels exceed the state standard for several years, but the annual average PM_{10} levels have remained below the federal standards throughout the period.

Table 6.2-27 - PM_{10} Levels, Escondido Monitoring Station, 1993-2006 (µg/m^3)

Year	Est. Days > Std.		Annual Average		High 24-Hr Average		
	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	Date Observed
2006	*	*	22.9	*	42	43	Feb-10
2005	0	0	23.9	23.9	42	42	Oct-13
2004	0	6.1	27.5	27.3	57	58	Jan-10
2003	3.3	30.7	31.6	32.7	179	179	Oct-29
2002	0	0	27.1	25.1	51	50	Sep-05
2001	0	12.6	31.2	30.6	74	72	Jan-01
2000	0	12.3	29.6	29.5	65	63	Dec-02
1999	0	0	30	29.7	52	50	Dec-08
1998	*	*	18.7	*	51	51	Oct-08
1997	0	18.6	28.8	28.8	63	63	Oct-31
1996	0	12.3	26.8	26.7	53	53	Dec-05
1995	0	*	31.5	*	70	70	Dec-11
1994	0	30.3	35.3	35.3	70	70	Nov-22
1993	0	30.1	31.8	31.8	96	96	Oct-28

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html).

Note: (*) denotes that there was insufficient (or no) data available to determine the value

The trend of maximum 24-hour average and annual average PM_{10} levels are plotted in the following figure. The trend for PM_{10} the last three years have been reduced steadily with the 24-hour maximum concentrations meeting both national and state standards. The annual arithmetic mean concentrations are also very close to meeting the most stringent state standard of 20 µg/m^3. The spike in year 2003 is due to a local fire event. The maximum 24-hour average outside the fire event is 58 µg/m^3.

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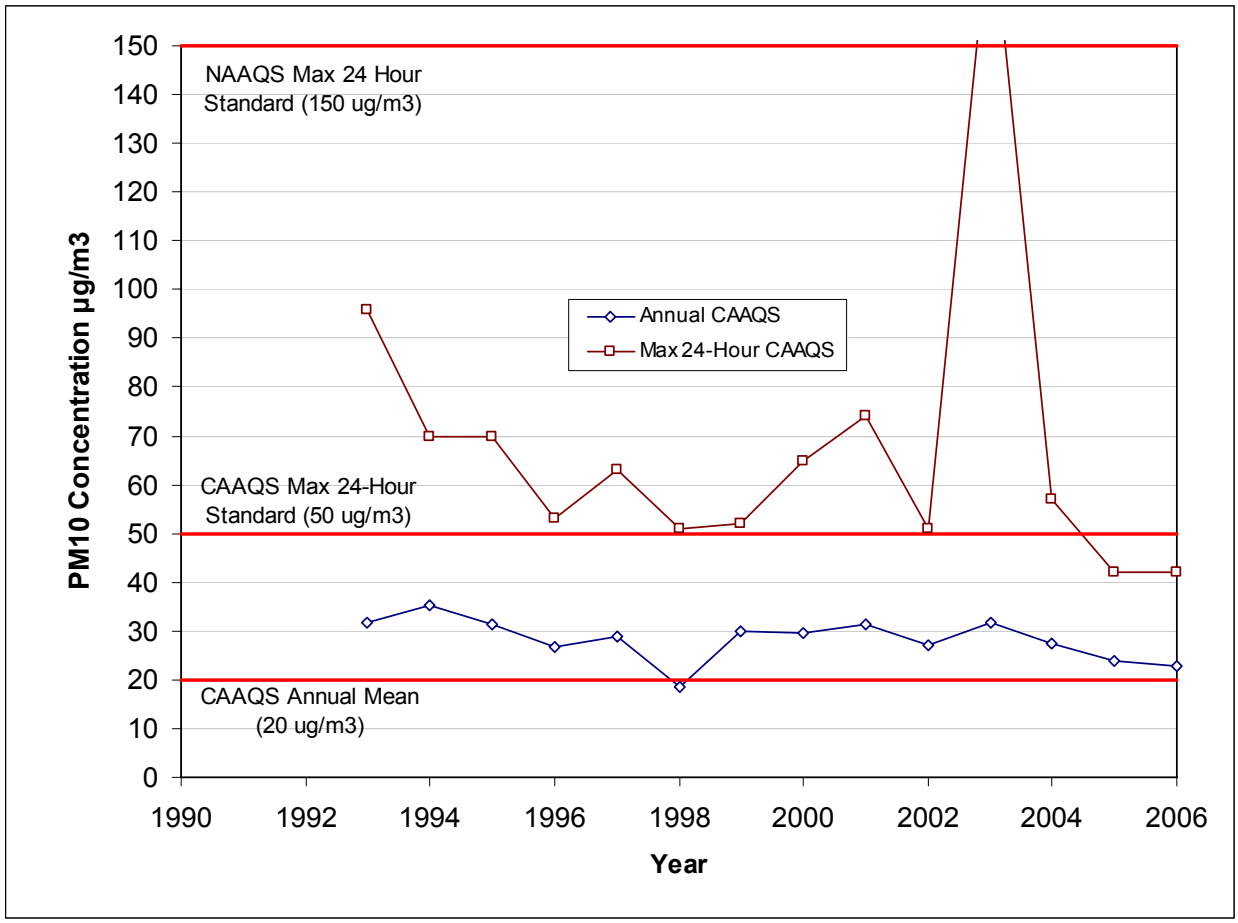
Figure 6.2-13 – Long-Term Trends of Maximum Particulate Matters (PM_{10})



6.0 Fine Particulates ($PM_{2.5}$)

As discussed previously, the NAAQS for particulates were further revised by EPA with new standards that went into effect on September 16, 1997; two new $PM_{2.5}$ standards were added at that time. In June 2002, CARB established a new annual standard for $PM_{2.5}$. $PM_{2.5}$ data have been collected at the Escondido monitoring station since 1999, and are presented below.

The table below shows the state and federal air quality standards for $PM_{2.5}$, maximum levels recorded at the Escondido monitoring station 1999-2005, and 3-year averages for the same period. The 24-hour average concentrations have exceeded the federal standard only once throughout the monitoring period; however, there are not enough data available to draw conclusions regarding trends in the 3-year average of 98th percentile values. Annual average $PM_{2.5}$ levels have generally been below the federal standard, but above the state standard. San Diego County is considered a non-attainment area for the state $PM_{2.5}$ standard, but is unclassified for the federal standard.

Table 6.2-28 - PM_{10} Levels, Escondido Monitoring Station, 1993-2006 ($\mu g/m^3$)

Year	Est. Days > Std.		Annual Average		High 24-Hr Average		
	NAAQS	CAAQS	NAAQS	CAAQS	NAAQS	CAAQS	Date Observed
2006	0		*	*	40.6	40.6	Dec-25
2005	0		*	*	43.1	43.1	Jan-01
2004	1		14.1	14.1	67.3	67.3	Jan-01
2003	1		14.2	14.2	69.2	69.2	Oct-27
2002	0		16.0	*	53.6	53.6	Jan-01
2001	0		17.5	*	60.0	60.0	Jan-01
2000	1		15.8	*	65.9	65.9	Dec-24
1999	0		18.0	*	64.3	64.3	Oct-28
< 1998	Not measured at station						

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html).

Note: (*) denotes that there was insufficient (or no) data available to determine the value

7.0 Airborne Lead

The majority of lead in the air results from the combustion of fuels that contain lead. Twenty-five years ago, motor gasoline contained relatively large amounts of lead compounds used as octane-rating improvers, and ambient lead levels were relatively high. Beginning with the 1975 model year, new automobiles began to be equipped with exhaust catalysts, which were poisoned by the exhaust products of leaded gasoline. Thus, unleaded gasoline became the required fuel for an increasing fraction of new vehicles, and the phase-out of leaded gasoline began. As a result, ambient lead levels decreased dramatically. San Diego County has been in attainment of state and federal airborne lead levels for air quality planning purposes for a number of years.

The ambient lead levels are also monitored in Escondido. Table 8.1-8 lists the federal air quality standard for airborne lead and the levels reported in Escondido between 1996 and 2005. Maximum quarterly levels are well below the federal standard.

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Table 6.2-29 - Airborne Lead Levels, 1996-2006 (µg/m^3)

Year	Max Highest	Mean	Est. Days > NAAQS Std.	Lead Type	Monitoring Station
2006	0.014	0.0022	0	Lead (PM2.5)	Escondido
2005	0.009	0.0028	0	Lead (PM2.5)	Escondido
2004	0.012	0.0030	0	Lead (PM2.5)	Escondido
2003	0.011	0.0046	0	Lead (PM2.5)	Escondido
2002	0.007	0.0032	0	Lead (PM2.5)	Escondido
2001	0.060	0.0150	0	Lead (TSP)	12th Ave., San Diego
2000	0.070	0.0180	0	Lead (TSP)	12th Ave., San Diego
1999	0.050	0.0140	0	Lead (TSP)	12th Ave., San Diego
1998	0.030	0.0120	0	Lead (TSP)	12th Ave., San Diego
1997	0.160	0.0230	0	Lead (TSP)	12th Ave., San Diego
1996	0.040	0.0130	0	Lead (TSP)	12th Ave., San Diego

Source: California Air Quality Data, California Air Resources Board website http://www.arb.ca.gov/adam/welcome.html).

APPENDIX 6.2-C – CONSTRUCTION EMISSION ESTIMATES

CONSTRUCTION EMISSION CALCULATIONS

Construction emissions are categorized as either onsite or offsite emissions. Onsite emissions generated during construction principally consist of exhaust emissions (CO, VOC, NOx, SO_X, PM_{10} and $PM_{2.5}$) from construction equipment, fugitive dust (PM_{10}) from grading and excavation, and VOC from painting and asphalt paving. Offsite emissions produced during the construction phase consist of exhaust emissions from worker commute trips and material delivery trips.

1.0 Construction Equipment Exhaust Emission Calculations

The combustion of fuel to provide power for the operation of various construction activities and equipment results in the generation of CO, VOC NO_X, SO_X, PM_{10} and $PM_{2.5}$ emissions. The following equation was used to calculate exhaust emissions from each type of construction equipment:

$$\text{Exhaust Emissions}_{i,j}\ (\text{lb/day}) = EF_{C,i,j} \times T_{H,j} \qquad \text{(EQ. C-1)}$$

where:

$EF_{C,i,j}$ = Emission factor for specific air contaminant i from construction equipment type j (lb/hr)

$T_{H,j}$ = Daily operating time for equipment of type j (hr/day)

The exhaust emission factors used for the calculations of CO, VOC, NO_x and PM_{10} are composite horsepower-based off-road emission factors for 2007 developed for the SCAQMD by CARB from its OFF-ROAD Model. The composite off-road emission factors were derived based on equipment category (tractor, dozer, scraper, etc.), and average equipment age and horsepower rating within horsepower ranges for the year. The emission factors developed by CARB for the SCAQMD for 2007 can be downloaded from http://www.aqmd.gov/ceqa/hdbk.html/offroadEF05_20.xls.

SO_x emission factors for diesel-fueled construction equipment calculated by the OFF-ROAD model are based on a diesel fuel sulfur content of 2,800 parts per million by weight (ppmw) and were corrected for the actual sulfur content of the diesel fuel of 15 ppmw that will be used during construction of the project. Therefore, the SO_x emission factors from the OFF-ROAD model were adjusted by a factor of 15/2,800.

$PM_{2.5}$ emission factors were calculated from PM_{10} emission factors using the following equation:

$$EF_{C,PM2.5,j}\ (\text{lb/day}) = EF_{C,PM10,j} \times F_{PM2.5,j} \qquad \text{(EQ. C-2)}$$

where:

$EF_{C,PM2.5,,j}$ = PM2.5 emission factor for construction equipment type j (lb/hr)

$EF_{C,PM10,,j}$ = PM_{10} emission factor for construction equipment type j (lb/hr)

$F_{PM2.5,,j}$ = Mass fraction of $PM_{2.5}$ emissions in PM_{10} emissions from equipment of type j (unit less)

The mass fractions of $PM_{2.5}$ in PM_{10} emissions from construction equipment exhaust depend on the type of fuel (diesel or gasoline). The CARB has compiled $PM_{2.5}$ fractions in PM_{10} emissions from several emission source categories. These $PM_{2.5}$ mass fractions are from PM profiles in the California Emission Inventory Data and Reporting System (CEIDARS) developed by CARB.

The types of construction equipment and the maximum daily operating time for each type of equipment during each bi-weekly construction period were estimated by the engineering contractor for the project. Emission factors for CO, VOC, NO_x, SO_x, PM_{10} and $PM_{2.5}$ were prepared for the specified equipment and are provided in Table 6.2C-1 and Table 6.2C-2 at the back of this appendix.

The anticipated construction equipment usages by bi-weekly period are listed in Table 6.2C-3A to F at the end of this appendix

2.0 Motor Vehicle Exhaust Emission Calculations

The combustion of fuel in motor vehicle engines results in the generation of CO, VOC NO_X, SO_X, PM_{10} and $PM_{2.5}$ emissions. The following equation was used to calculate exhaust emissions from both on-site and off-site motor vehicles:

$$\text{Exhaust Emissions}_{i,j}\ (\text{lb/day}) = EF_{V,i,j} \times N_{V,j} \times D_j \qquad \text{(EQ. C-3)}$$

where:

$EF_{V,i,j}$ = Emission factor for specific air contaminant i from motor vehicle type j (lb/mi)

$N_{V,j}$ = Number of motor vehicles of type j

D_j = Distance traveled each day by motor vehicles of type j (mi/day)

CO, VOC, NO_x, SO_x and PM_{10} emission factors were compiled by the SCAQMD by running the CARB's EMFAC2002 (version 2.2) Burden Model. A weighted average of vehicle types was used to calculate emission factors for passenger vehicles, and emission factors for heavy-duty diesel trucks were used for delivery trucks. The emission factors account for the emissions from starting, running and idling exhaust. In addition, the VOC emission factors take into account diurnal, hot soak, running and resting emissions, and PM_{10} emission factors take into account tire and brake wear. $PM_{2.5}$ emission factors were calculated by multiplying the PM_{10} emission factors by the mass fraction of $PM_{2.5}$ emissions in motor vehicle exhaust PM_{10} emissions. The $PM_{2.5}$ mass fractions in PM_{10} emissions from gasoline and diesel-fueled engine exhaust were from Appendix A of "Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5

Significance Thresholds," SCAQMD, October 2006. The motor vehicle exhaust emission factors are below.

PASSENGER VEHICLES (POUNDS/MILE)		DELIVERY TRUCKS (POUNDS/MILE)	
CO	0.01282	CO	0.0055
NOx	0.00136	NOx	0.0356
VOC	0.00138	VOC	0.0012
SOx	0.00001	SOx	0.0000
PM10	0.00008	PM10	0.0006

The engineering contractor estimated the number and length of daily on-site and off-site motor vehicle trips by trucks to deliver materials and supplies, remove construction debris, etc., by biweekly construction period. The anticipated number of construction workers during each biweekly construction period was used to calculate the number of construction worker commute trips, assuming each worker would drive separately to and from the off-site parking facility each day. This assumption overestimates the number of trips, since it is likely that some workers will carpool.

The anticipated number of motor vehicles and the resulting emissions by bi-weekly period are included in **Table 6.2C-3A** to **F** at the back of this appendix.

3.0 Motor Vehicle Entrained Paved Road Dust Emission Calculations

Vehicle travel on paved roads generates fugitive PM_{10} and $PM_{2.5}$ emissions by entrainment of dust on the roads. It should be noted that all motor vehicle travel during construction of the project will be on paved roads except for one-half mile per day assumed for travel on the undeveloped portion of the property. The following equation was used to calculate exhaust emissions from both on-site and off-site motor vehicles:

$$\text{Entrained Dust } PM_{10} \text{ Emissions}_j \text{ (lb/day)} = EF_{D,j} \times N_{V,j} \times D_j \qquad \text{(EQ. C-4)}$$

where:

$EF_{D,j}$ = Emission factor for entrained road dust PM_{10} from motor vehicle type j (lb/mi)

$N_{V,j}$ = Number of motor vehicles of type j

D_j = Distance traveled each day by motor vehicles of type j (mi/day)

The emission factor was calculated from the following equation from CARB Emission Inventory Methodology 7.9, "Entrained Paved Road Dust" (1997):

$$EF_{D,j} \text{ (lb/mi)} = 7.26 / 453.6 \times (sL_j/2)^{0.65} \times (W_j/3)^{1.5} \qquad \text{(EQ. C-5)}$$

where:

7.26 = A constant for PM_{10} emissions (g/mi)

453.6 = Factor to convert from grams to pounds (g/lb)

sL_j = Silt loading on roads traveled by motor vehicle of type j (g/m^2)

W_j = Average weight of vehicles on roads traveled by vehicles of type j (tons)

The silt loadings were taken from Table 3 of CARB Emission Inventory Methodology 7.9. As indicated in Table 6.2C-4 below, on-site motor vehicles were assumed to travel on paved roads and areas with silt loadings equivalent to local roads, and off-site motor vehicles were assumed to travel on roads with silt loadings equivalent to collector roads.

Table 6.2C-4 – Construction Equipment Exhaust Emission Factors

VEHICLE TYPE	ON-ROAD AVERAGE VEHICLE WEIGHT (TONS)[1]	ROAD TYPE	SILT LOADING (G/M2)[2]	PM10 EMISSION FACTOR (LB/MI)[3]	PM2.5 EMISSION FACTOR (LB/MI)[4]
On-Site Pickup Truck	2.7	Local	0.24	0.0034	0.0006
On-Site Water Truck	30	Local	0.24	0.1276	0.0216
Dump Truck	2.7	Collector	0.037	0.0010	0.0002
Concrete Truck	2.7	Collector	0.037	0.0010	0.0002
Delivery Truck	2.7	Collector	0.037	0.0010	0.0002
Construction Worker Commute	2.7	Collector	0.037	0.0010	0.0002

(1) Weight of on-site vehicles based on vehicle class. Off-site average vehicle weight from Methodology 7.9, Entrained Paved Road Dust (1997)
(2) From ARB Emission Inventory Methodology 7.9, Entrained Paved Road Dust (1997)
(3) Emission factor [g/mi] = 7.26 (Silt Loading/2)^0.65 (Weight/3)^1.5, from ARB Emission Inventory Methodology 7.9, Entrained Paved Road Dust (1997)
(4) PM2.5 emission factor [lb/hr] = PM10 emission factor [lb/hr] x PM2.5 fraction of PM10

Weights of on-site vehicles traveling on paved areas were based on vehicle class. The average weight of vehicles on roads traveled by off-site motor vehicles was assumed to be 2.7 tons, as listed in Table 3 of CARB Emission Inventory Methodology 7.9.

$PM_{2.5}$ emission factors were calculated by multiplying the PM_{10} emission factors by the mass fraction of $PM_{2.5}$ emissions in PM_{10} emissions from entrained paved road dust. The $PM_{2.5}$ mass fractions were from Appendix A of "Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds," SCAQMD, October 2006. The calculated PM_{10} and $PM_{2.5}$ entrained paved road dust emission factors and the associated maximum emissions are listed for both on-site and off-site motor vehicles by bi-weekly construction period in **Table 6.2C-5A** and **B**.

4.0 Excavation Fugitive PM10 and PM2.5 Emission Calculations

Excavation for foundations for new and modified equipment during construction of the project will generate fugitive PM_{10} and $PM_{2.5}$ emissions from soil handling (i.e., dropping) and from wind erosion of temporary storage piles. Although fugitive dust emissions from construction activities are temporary, they may have an impact on local air quality. Fugitive dust emissions often vary substantially from day to day, depending on the level of activity, the specific operations, and the prevailing meteorological conditions. The following methodologies provide the predictive emission equations, emission factors, and default values used to calculate fugitive dust emissions for the project.

Construction contractors will water the site two times per day, reducing the uncontrolled on-site fugitive dust emissions by 50 percent.

Emissions from Soil Handling

Fugitive PM_{10} and $PM_{2.5}$ emissions are generated during excavation when excavated material is dropped onto the ground at the side of the excavation location or dropped into trucks for removal from the site. The following equation was used to estimate these emissions:

Emissions (lb/day) = EFS x Vs (EQ. C-6)

where:

EFS = Controlled PM_{10} emission factor for soil dropping (lb/yd3)

VS = Volume of soil handled (yd3/day)

The controlled emission factor was calculated from:

EFS (lb/yd3) = 0.0011 x (U/5)1.3 / (M/2)1.4 x D x ND x (1-CE403/100) (EQ. C-7)

where:

U = Mean wind speed (mph)

M = Soil moisture content (percent)

D = Soil density (tons/yd3)

N_D = Number of times soil is dropped

CE_{403} = Control efficiency from complying with SCAQMD Rule 403 (percent)

[Source: Equation 1, Section 13.2.4, US EPA Compilation of Air Pollutant Emission Factors (AP- 42), January 1995.]

The mean wind speed was assumed to be the default value of 12 mph, from Table 9-9-G of the SCAQMD CEQA Handbook (1993). The moisture content was assumed to be 15 percent, from "Open Fugitive Dust PM_{10} Control Strategies Study," Midwest Research Institute, October 12, 1990, for moist conditions. Soil density was assumed to be 1.215 tons per cubic yard, from Table 2.46, Handbook of Solid Waste Management. It was conservatively assumed that soil would be handled (dropped) four times: 1) onto the ground at the side of the excavation; 2) onto a temporary storage pile; 3) into a truck; and 4) out of the truck. The control efficiency was assumed to be 50 percent.

The $PM_{2.5}$ emission factor was calculated by multiplying the PM_{10} emission factor by the mass fraction of $PM_{2.5}$ emissions in PM_{10} emissions from construction dust. The $PM_{2.5}$ mass fraction was taken from Appendix A of "Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM $_{2.5}$ Significance Thresholds," SCAQMD, October 2006. The emission factors and projected activities are listed in **Table 6.2C-6A**.

The construction contractor estimated the excavation volumes for construction of foundations for the equipment. The anticipated schedule for constructing the foundations was used to calculate the amount of soil that will be excavated during each bi-weekly construction period. The maximum daily excavation volume during each construction period was estimated to be one-sixth of the total for the 12 working days during the bi-weekly period.

Maximum daily volumes of soil handled during each bi-weekly construction period and the resulting fugitive PM_{10} and $PM_{2.5}$ emissions are listed in **Table 6.2C-6B**.

<u>Wind Erosion from Temporary Storage Piles</u>

Wind erosion of temporary soil storage piles during excavation generates fugitive PM_{10} emissions. The following equation was used to estimate these emissions:

$$\text{Emissions (lb/day)} = EF_W \times A \qquad \text{(EQ. C-8)}$$

where:

EF_W = Controlled PM_{10} emission factor for storage pile wind erosion (lb/acre-day)

A = Temporary storage pile surface area (acres)

The controlled emission factor was calculated from:

$$EF_W\,(\text{lb/acre-day}) = 0.85 \times (s/1.5) \times (365-p/235) \times (U_{12}/15) \times (1-CE_{403}/100) \qquad \text{(EQ. C-9)}$$

where:

s = Soil silt content (percent)

p = Number of days per year with precipitation of 0.01 inches or more

U_{12} = Percentage of time unobstructed wind speed exceeds 12 miles per hour (mph)

CE_{403} = Control efficiency from complying with SCAQMD Rule 403 (percent)

[Source: US EPA Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, 1992.]

The storage pile silt contents were assumed to be 7.5 percent, as listed in Table A9-9-F-1 of the SCAQMD CEQA Air Quality Handbook for overburden. The number of days with precipitation was conservatively assumed to be zero, and the percentage of the time that the wind speeds exceeds 12 mph was conservatively assumed to be 100 percent. The control efficiency from daily watering was assumed to be 50 percent.

The $PM_{2.5}$ emission factor was calculated by multiplying the PM_{10} emission factor by the mass fraction of $PM_{2.5}$ emissions in PM_{10} emissions from construction dust. The $PM_{2.5}$ mass fraction was from Appendix A of "Final–Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds," SCAQMD, October 2006. The emission factors are listed in Table 6.2C-6A.

The maximum daily surface area of temporary storage piles was estimated by assuming that the volume of soil excavated each day would be in storage piles three feet tall, square in shape, and flat on the top.

Maximum daily surface areas of storage piles during each bi-weekly construction period and the resulting fugitive PM_{10} and $PM_{2.5}$ emissions are listed in Table 6.2C-6B.

5.0 Painting VOC Emission Calculations

The application of architectural surface coatings (painting) generates VOC emissions when organic solvents in the coating evaporate as the coating dries. The following equation was used to estimate VOC emissions from architectural coatings:

$$\text{Emissions (lb/day)} = C \times V \qquad \text{(EQ. C-10)}$$

where:

C = VOC content of coating (lb/gal)

V = Amount of coating applied (gal/day)

A VOC content of 2.1 lb/gal (250 g/l) was assumed based on the VOC limit specified in SCAPCD Rule 67 - Architectural Coatings for an industrial maintenance coating.

It is anticipated that a maximum of 20 gallons of coating would be used for touchup. A maximum usage of 10 gallons per day was assumed to occur during the bi-weekly period prior to the start of equipment testing and commissioning.

Maximum daily surface coating usage and VOC emissions during each bi-weekly construction period are listed in Table 6.2C-7.

6.0 Asphalt Paving VOC Emission Calculations

Paving areas with asphalt generates VOC emissions as the asphalt cures. The following equation was used to estimate daily VOC emissions from asphalt paving:

$$\text{Emissions (lb/day)} = 2.62 \times A \qquad \text{(EQ. C-11)}$$

where:

A = Area paved (acres/day)

[Source: URBEMIS 2002 User's Guide, 2005]

It was assumed that half the 200 foot-by-300 foot area of the site and a maximum of one-quarter mile of a 30-foot wide access road would be paved with asphalt, and that half the paving would be conducted on one day at the end of the construction for each site. The total square footage paved is estimated to be (200 feet x 300 feet) / 2 + (1,320 feet x 30 feet) = 69,600 square feet, which is equivalent to 1.6 acres.

Maximum daily paved surface areas and VOC emissions during each bi-weekly construction period are listed in Table 6.2C-8.

7.0 Peak Daily Construction Emission Calculations

Daily emissions from construction equipment exhaust, on-site motor vehicle exhaust and entrained dust, grading and excavation, asphalt paving, painting, and off-site motor vehicle exhaust and entrained dust during each bi-weekly construction period were calculated using the procedures described in the preceding subsections. Total daily emissions of each criteria pollutant (CO, VOC, NO_x, SO_x, PM_{10} and $PM_{2.5}$) during each period were then calculated by summing the daily emissions from the various emission sources. Peak daily emissions of each criteria pollutant were then determined from the daily emissions during each construction period.

Maximum daily emissions during each bi-weekly construction period and peak daily construction emissions for the project are listed in **Table 6.2C-9**.

Table 6.2C-1 – Construction Equipment Exhaust Emission Factors

Equipment Type	Fuel	Horsepower	ARB Off-Road Model Category	CO (lb/hr)	VOC (lb/hr)	NOx (lb/hr)	SOx (lb/hr)	PM10 (lb/hr)	PM2.5 (lb/hr)[a]
Welding rigs	D	35	Welders	0.317	0.139	0.282	0.000	0.032	0.029
Backhoe	D	79	Tractors/Loaders/Backhoes	0.375	0.118	0.698	0.001	0.063	0.058
Compressor	D	37	Air Compressors	0.293	0.131	0.247	0.000	0.029	0.027
Front-end loader	D	147	Rubber Tired Loaders	0.643	0.176	1.385	0.001	0.077	0.071
15 ton crane	D	175	Cranes	0.497	0.142	1.101	0.001	0.061	0.057
75 ton crane	D	250	Cranes	0.412	0.148	1.466	0.001	0.057	0.053
Welding rigs	D	38	Welders	0.317	0.139	0.282	0.000	0.032	0.029
Backhoe	D	118	Tractors/Loaders/Backhoes	0.375	0.118	0.698	0.001	0.063	0.058
Compressor	D	49	Air Compressors	0.293	0.131	0.247	0.000	0.029	0.027
Front-end loader	D	140	Rubber Tired Loaders	0.643	0.176	1.385	0.001	0.077	0.071
Compactor	D	99	Rollers	0.442	0.141	0.907	0.001	0.063	0.058
Excavator	D	99	Excavators	0.550	0.179	1.031	0.001	0.096	0.089
15 ton crane	D	230	Cranes	0.412	0.148	1.466	0.001	0.057	0.053
Roller	D	65	Rollers	0.442	0.141	0.907	0.001	0.063	0.058
Reed Screen	D	65	Other Construction Equipment	0.561	0.171	1.058	0.001	0.090	0.082

Notes:

(a) Diesel PM2.5 emission factor is derived for PM10 emission factor with an adjustment of 0.920 as profiled by the CARB

Table 6.2C-2 – Projected Construction Equipment and Motor Vehicle Numbers

	Equipment/Vehicle Type	Fuel	Units	(Weeks) Bi-Weekly Maximum Daily Number														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Construction Equipment**		Hrs/day															
	Water Line Welding rigs	D	6	2	2													
	Water Line Backhoe	D	6	1	1													
	Water Line Compressor	D	3	2	2													
	Water Line Front-end loader	D	5	2	2													
	Water Line Compactor	D	4	1	1													
	Water Line Excavator	D	6	1	1													
	Water Line 15 ton crane	D	4	2	2													
	Water Line Roller	D	4	1	1													
	Water Line Reed Screen	D	6	1	1													
	Motor Vehicles (Offsite)		Miles/day															
	On-Site Pickup Truck	G	15	2	2													
	Dump Truck	D	30	1	1													
	On-Site Water Truck	D	20	1	1													
	Concrete Truck	D	80	0	0													
	Delivery Truck	D	80	1	1													
	Construction Worker Commute	G	55	10	10													
Power Plant	**Construction Equipment**		Hrs/day															
	Welding rigs	D	6		2	2	2	2	2	2	1	1	0					
	Backhoe	D	6		1	2	2	1	1	0	0	0	0					
	Compressor	D	6		1	2	4	4	4	3	2	2	0					
	Front-end loader	D	6		0	1	1	1	1	0	0	0	0					
	15 ton crane	D	6		0	1	1	3	2	2	2	2	0					
	75 ton crane	D	6		0	0	0	1	0	0	0	0	0					
	Motor Vehicles (Offsite)		Miles/day															
	On-Site Pickup Truck	G	25		1	2	2	3	3	2	2	2	1	2	2	2	2	2
	Dump Truck	D	50		1	2	2	1	1	0	0	0	0	0	0	0	0	0
	Concrete Truck	D	50		0	5	0	0	0	0	0	0	0	0	0	0	0	0
	Delivery Truck	D	50		0	1	1	1	1	1	1	1		1	1	1	1	1
	Construction Worker Commute	G	35		5	20	30	30	30	25	25	20	15	15	15	15	15	15
Gas Line	**Construction Equipment**		Hrs/day															
	Gas Line Welding rigs	D	6						2	2	2	2	2					
	Gas Line Backhoe	D	6						1	1	1	1	1					
	Gas Line Compressor	D	3						2	2	2	2	2					
	Gas Line Front-end loader	D	5						2	2	2	2	2					
	Gas Line Compactor	D	4						1	1	1	1	1					
	Gas Line Excavator	D	6						1	1	1	1	1					
	Gas Line 15 ton crane	D	4						2	2	2	2	2					
	Gas Line Roller	D	4						1	1	1	1	1					
	Gas Line Reed Screen	D	6						1	1	1	1	1					
	Motor Vehicles (Offsite)		Miles/day															
	On-Site Pickup Truck	G	15						2	2	2	2	2					
	Dump Truck	D	30						2	2	2	2	2					
	On-Site Water Truck	D	20						1	1	1	1	1					
	Concrete Truck	D	80						0	0	0	0	0					
	Delivery Truck	D	80						1	1	1	1	1					
	Construction Worker Commute	G	55						10	10	10	10	10					

Table 6.2C-3A – Estimated Construction Equipment and Motor Vehicle CO Emissions

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Combustion CO Emissions (Maximum Daily lb/day)															
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30	
Water Line	**Construction Equipment**		lb/hr	36.57	47.22	30.48	37.11	43.35	74.63	63.92	60.26	58.02	43.79	7.65	7.65	7.65	7.65	7.65	
	Welding rigs	D	0.3169	3.80	3.80	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Backhoe	D	0.3748	2.25	2.25	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Compressor	D	0.2933	1.76	1.76	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Front-end loader	D	0.6425	6.43	6.43	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Compactor	D	0.4419	1.77	1.77	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Excavator	D	0.5504	3.30	3.30	-	-	-	-	-	-	-	-	-	-	-	-	-	
	15 ton crane	D	0.4975	3.98	3.98	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Roller	D	0.4419	1.77	1.77	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Reed Screen	D	0.5607	3.36	3.36	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Motor Vehicles (Offsite)		lb/mile																
	On-Site Pickup Truck	G	0.0128	0.38	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Dump Truck	D	0.0055	0.17	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-	
	On-Site Water Truck	D	0.0055	0.11	0.11	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Concrete Truck	D	0.0055	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Delivery Truck	D	0.0055	0.44	0.44	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Construction Worker Commute	G	0.0128	7.05	7.05	-	-	-	-	-	-	-	-	-	-	-	-	-	
Power Plant	**Construction Equipment**		lb/hr																
	Welding rigs	D	0.3169	-	3.80	3.80	3.80	3.80	3.80	3.80	1.90	1.90	-	-	-	-	-	-	
	Backhoe	D	0.3748	-	2.25	4.50	4.50	2.25	2.25	-	-	-	-	-	-	-	-	-	
	Compressor	D	0.2933	-	1.76	3.52	7.04	7.04	7.04	5.28	3.52	3.52	-	-	-	-	-	-	
	Front-end loader	D	0.6425	-	-	3.86	3.86	3.86	3.86	-	-	-	-	-	-	-	-	-	
	15 ton crane	D	0.4975	-	-	2.98	2.98	8.95	5.97	5.97	5.97	5.97	-	-	-	-	-	-	
	75 ton crane	D	0.4119	-	-	-	-	2.47	-	-	-	-	-	-	-	-	-	-	
	Motor Vehicles (Offsite)		lb/mile																
	On-Site Pickup Truck	G	0.0128	-	0.32	0.64	0.64	0.96	0.96	0.64	0.64	0.64	0.32	0.64	0.64	0.64	0.64	0.64	
	Dump Truck	D	0.0055	-	0.28	0.55	0.55	0.28	0.28	-	-	-	-	-	-	-	-	-	
	Concrete Truck	D	0.0055	-	-	1.38	-	-	-	-	-	-	-	-	-	-	-	-	
	Delivery Truck	D	0.0055	-	-	0.28	0.28	0.28	0.28	0.28	0.28	0.28	-	0.28	0.28	0.28	0.28	0.28	
	Construction Worker Commute	G	0.0128	-	2.24	8.97	13.46	13.46	13.46	11.22	11.22	8.97	6.73	6.73	6.73	6.73	6.73	6.73	
Gas Line	**Construction Equipment**		lb/hr																
	Welding rigs	D	0.3169	-	-	-	-	-	3.80	3.80	3.80	3.80	3.80	-	-	-	-	-	
	Backhoe	D	0.3748	-	-	-	-	-	2.25	2.25	2.25	2.25	2.25	-	-	-	-	-	
	Compressor	D	0.2933	-	-	-	-	-	1.76	1.76	1.76	1.76	1.76	-	-	-	-	-	
	Front-end loader	D	0.6425	-	-	-	-	-	6.43	6.43	6.43	6.43	6.43	-	-	-	-	-	
	Compactor	D	0.4419	-	-	-	-	-	1.77	1.77	1.77	1.77	1.77	-	-	-	-	-	
	Excavator	D	0.5504	-	-	-	-	-	3.30	3.30	3.30	3.30	3.30	-	-	-	-	-	
	15 ton crane	D	0.4975	-	-	-	-	-	3.98	3.98	3.98	3.98	3.98	-	-	-	-	-	
	Roller	D	0.4419	-	-	-	-	-	1.77	1.77	1.77	1.77	1.77	-	-	-	-	-	
	Reed Screen	D	0.5607	-	-	-	-	-	3.36	3.36	3.36	3.36	3.36	-	-	-	-	-	
	Motor Vehicles (Offsite)		lb/mile																
	On-Site Pickup Truck	G	0.0128	-	-	-	-	-	0.38	0.38	0.38	0.38	0.38	-	-	-	-	-	
	Dump Truck	D	0.0055	-	-	-	-	-	0.33	0.33	0.33	0.33	0.33	-	-	-	-	-	
	On-Site Water Truck	D	0.0055	-	-	-	-	-	0.11	0.11	0.11	0.11	0.11	-	-	-	-	-	
	Concrete Truck	D	0.0055	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	Delivery Truck	D	0.0055	-	-	-	-	-	0.44	0.44	0.44	0.44	0.44	-	-	-	-	-	
	Construction Worker Commute	G	0.0128	-	-	-	-	-	7.05	7.05	7.05	7.05	7.05	-	-	-	-	-	
	Total (Max/day)			**36.6**	**47.2**	**30.5**	**37.1**	**43.3**	**74.6**	**63.9**	**60.3**	**58.0**	**43.8**	**7.6**	**7.6**	**7.6**	**7.6**	**7.6**	
	Total			**365.7**	**472.2**	**304.8**	**371.1**	**433.5**	**746.3**	**639.2**	**602.6**	**580.2**	**437.9**	**76.5**	**76.5**	**76.5**	**76.5**	**76.5**	**5,336.0**

Notes:

Table 6.2C-3B – Estimated Construction Equipment and Motor Vehicle VOC Emissions

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Combustion VOC Emissions (Maximum Daily lb/day)														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Construction Equipment**		lb/hr	10.24	13.74	8.13	9.88	11.73	20.83	17.34	15.72	15.53	11.09	0.90	0.86	9.26	0.86	0.86
	Welding rigs	D	0.1392	1.67	1.67	-	-	-	-	-	-	-	-	-	-	-	-	-
	Backhoe	D	0.1179	0.71	0.71	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compressor	D	0.1306	0.78	0.78	-	-	-	-	-	-	-	-	-	-	-	-	-
	Front-end loader	D	0.1759	1.76	1.76	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compactor	D	0.1410	0.56	0.56	-	-	-	-	-	-	-	-	-	-	-	-	-
	Excavator	D	0.1786	1.07	1.07	-	-	-	-	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.1417	1.13	1.13	-	-	-	-	-	-	-	-	-	-	-	-	-
	Roller	D	0.1410	0.56	0.56	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reed Screen	D	0.1711	1.03	1.03	-	-	-	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0014	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dump Truck	D	0.0012	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
	On-Site Water Truck	D	0.0012	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0012	0.10	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Worker Commute	G	0.0014	0.76	0.76	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.1392	-	1.67	1.67	1.67	1.67	1.67	1.67	0.84	0.84	-	-	-	-	-	-
	Backhoe	D	0.1179	-	0.71	1.41	1.41	0.71	0.71	-	-	-	-	-	-	-	-	-
	Compressor	D	0.1306	-	0.78	1.57	3.13	3.13	3.13	2.35	1.57	1.57	-	-	-	-	-	-
	Front-end loader	D	0.1759	-	-	1.06	1.06	1.06	1.06	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.1417	-	-	0.85	0.85	2.55	1.70	1.70	1.70	1.70	-	-	-	-	-	-
	75 ton crane	D	0.1478	-	-	-	-	0.89	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0014	-	0.03	0.07	0.07	0.10	0.10	0.07	0.07	0.07	0.03	0.07	0.07	0.07	0.07	0.07
	Dump Truck	D	0.0012	-	0.06	0.12	0.12	0.06	0.06	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0012	-	-	0.31	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0012	-	-	0.06	0.06	0.06	0.06	0.06	0.06	0.06	-	0.06	0.06	0.06	0.06	0.06
	Construction Worker Commute	G	0.0014	-	0.24	0.97	1.45	1.45	1.45	1.21	1.21	0.97	0.73	0.73	0.73	0.73	0.73	0.73
Gas Line	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.1392	-	-	-	-	-	1.67	1.67	1.67	1.67	1.67	-	-	-	-	-
	Backhoe	D	0.1179	-	-	-	-	-	0.71	0.71	0.71	0.71	0.71	-	-	-	-	-
	Compressor	D	0.1306	-	-	-	-	-	0.78	0.78	0.78	0.78	0.78	-	-	-	-	-
	Front-end loader	D	0.1759	-	-	-	-	-	1.76	1.76	1.76	1.76	1.76	-	-	-	-	-
	Compactor	D	0.1410	-	-	-	-	-	0.56	0.56	0.56	0.56	0.56	-	-	-	-	-
	Excavator	D	0.1786	-	-	-	-	-	1.07	1.07	1.07	1.07	1.07	-	-	-	-	-
	15 ton crane	D	0.1417	-	-	-	-	-	1.13	1.13	1.13	1.13	1.13	-	-	-	-	-
	Roller	D	0.1410	-	-	-	-	-	0.56	0.56	0.56	0.56	0.56	-	-	-	-	-
	Reed Screen	D	0.1711	-	-	-	-	-	1.03	1.03	1.03	1.03	1.03	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0014	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-
	Dump Truck	D	0.0012	-	-	-	-	-	0.07	0.07	0.07	0.07	0.07	-	-	-	-	-
	On-Site Water Truck	D	0.0012	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	-	-	-	-	-
	Concrete Truck	D	0.0012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0012	-	-	-	-	-	0.10	0.10	0.10	0.10	0.10	-	-	-	-	-
	Construction Worker Commute	G	0.0014	-	-	-	-	-	0.76	0.76	0.76	0.76	0.76	-	-	-	-	-
	Construction Combustion Emissions (lb/day)			10.24	13.74	8.09	9.83	11.68	20.23	17.34	15.72	15.48	11.04	0.86	0.86	0.86	0.86	0.86
	Architectural Coatings Emissions (lb/day)			-	-	-	-	-	-	-	-	-	-	-	-	8.40	-	-
	Asphalt Paving Emissions (lb/day)			-	-	0.05	0.05	0.05	0.60	-	-	0.05	0.05	0.05	-	0.00	-	-
	Total			**10.2**	**13.7**	**8.1**	**9.9**	**11.7**	**20.8**	**17.3**	**15.7**	**15.5**	**11.1**	**0.9**	**0.9**	**9.3**	**0.9**	**0.9**

Notes:

Table 6.2C-3C – Estimated Construction Equipment and Motor Vehicle NOx Emissions

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Combustion NOx Emissions (Maximum Daily lb/day)														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Construction Equipment**		lb/hr	56.93	68.04	44.92	39.44	55.52	98.11	82.08	78.90	78.66	58.74	2.56	2.56	2.56	2.56	2.56
	Welding rigs	D	0.2825	3.39	3.39	-	-	-	-	-	-	-	-	-	-	-	-	-
	Backhoe	D	0.6979	4.19	4.19	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compressor	D	0.2468	1.48	1.48	-	-	-	-	-	-	-	-	-	-	-	-	-
	Front-end loader	D	1.3849	13.85	13.85	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compactor	D	0.9073	3.63	3.63	-	-	-	-	-	-	-	-	-	-	-	-	-
	Excavator	D	1.0305	6.18	6.18	-	-	-	-	-	-	-	-	-	-	-	-	-
	15 ton crane	D	1.1009	8.81	8.81	-	-	-	-	-	-	-	-	-	-	-	-	-
	Roller	D	0.9073	3.63	3.63	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reed Screen	D	1.0579	6.35	6.35	-	-	-	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0014	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dump Truck	D	0.0356	1.07	1.07	-	-	-	-	-	-	-	-	-	-	-	-	-
	On-Site Water Truck	D	0.0356	0.71	0.71	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0356	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0356	2.85	2.85	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Worker Commute	G	0.0014	0.75	0.75	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.2825	-	3.39	3.39	3.39	3.39	3.39	3.39	1.69	1.69	-	-	-	-	-	-
	Backhoe	D	0.6979	-	4.19	8.38	8.38	4.19	4.19	-	-	-	-	-	-	-	-	-
	Compressor	D	0.2468	-	1.48	2.96	5.92	5.92	5.92	4.44	2.96	2.96	-	-	-	-	-	-
	Front-end loader	D	1.3849	-	-	8.31	8.31	8.31	8.31	-	-	-	-	-	-	-	-	-
	15 ton crane	D	1.1009	-	-	6.61	6.61	19.82	13.21	13.21	13.21	13.21	-	-	-	-	-	-
	75 ton crane	D	1.4665	-	-	-	-	8.80	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0014	-	0.03	0.07	0.07	0.10	0.10	0.07	0.07	0.07	0.03	0.07	0.07	0.07	0.07	0.07
	Dump Truck	D	0.0356	-	1.78	3.56	3.56	1.78	1.78	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0356	-	-	8.91	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0356	-	-	1.78	1.78	1.78	1.78	1.78	1.78	1.78	-	1.78	1.78	1.78	1.78	1.78
	Construction Worker Commute	G	0.0014	-	0.24	0.95	1.43	1.43	1.43	1.19	1.19	0.95	0.71	0.71	0.71	0.71	0.71	0.71
Gas Line	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.2825	-	-	-	-	-	3.39	3.39	3.39	3.39	3.39	-	-	-	-	-
	Backhoe	D	0.6979	-	-	-	-	-	4.19	4.19	4.19	4.19	4.19	-	-	-	-	-
	Compressor	D	0.2468	-	-	-	-	-	1.48	1.48	1.48	1.48	1.48	-	-	-	-	-
	Front-end loader	D	1.3849	-	-	-	-	-	13.85	13.85	13.85	13.85	13.85	-	-	-	-	-
	Compactor	D	0.9073	-	-	-	-	-	3.63	3.63	3.63	3.63	3.63	-	-	-	-	-
	Excavator	D	1.0305	-	-	-	-	-	6.18	6.18	6.18	6.18	6.18	-	-	-	-	-
	15 ton crane	D	1.1009	-	-	-	-	-	8.81	8.81	8.81	8.81	8.81	-	-	-	-	-
	Roller	D	0.9073	-	-	-	-	-	3.63	3.63	3.63	3.63	3.63	-	-	-	-	-
	Reed Screen	D	1.0579	-	-	-	-	-	6.35	6.35	6.35	6.35	6.35	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0014	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-
	Dump Truck	D	0.0356	-	-	-	-	-	2.14	2.14	2.14	2.14	2.14	-	-	-	-	-
	On-Site Water Truck	D	0.0356	-	-	-	-	-	0.71	0.71	0.71	0.71	0.71	-	-	-	-	-
	Concrete Truck	D	0.0356	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0356	-	-	-	-	-	2.85	2.85	2.85	2.85	2.85	-	-	-	-	-
	Construction Worker Commute	G	0.0014	-	-	-	-	-	0.75	0.75	0.75	0.75	0.75	-	-	-	-	-
	Total			**56.9**	**68.0**	**44.9**	**39.4**	**55.5**	**98.1**	**82.1**	**78.9**	**78.7**	**58.7**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**

Notes:

Table 6.2C-3D – Estimated Construction Equipment and Motor Vehicle SOx Emissions

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Combustion SOx Emissions (Maximum Daily lb/day)														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Construction Equipment**		lb/hr	0.06	0.07	0.05	0.05	0.06	0.11	0.09	0.09	0.08	0.06	0.01	0.01	0.01	0.01	0.01
	Welding rigs	D	0.0003	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Backhoe	D	0.0006	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compressor	D	0.0003	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Front-end loader	D	0.0012	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compactor	D	0.0008	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Excavator	D	0.0009	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.0009	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	Roller	D	0.0008	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reed Screen	D	0.0009	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0000	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dump Truck	D	0.0000	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	On-Site Water Truck	D	0.0000	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0000	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Worker Commute	G	0.0000	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0003	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-
	Backhoe	D	0.0006	-	0.00	0.01	0.01	0.00	0.00	-	-	-	-	-	-	-	-	-
	Compressor	D	0.0003	-	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	-	-	-	-	-	-
	Front-end loader	D	0.0012	-	-	0.01	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.0009	-	-	0.01	0.01	0.02	0.01	0.01	0.01	0.01	-	-	-	-	-	-
	75 ton crane	D	0.0013	-	-	-	-	0.01	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0000	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Truck	D	0.0000	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0000	-	-	0.01	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0000	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.00	0.00	0.00
	Construction Worker Commute	G	0.0000	-	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Gas Line	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0003	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Backhoe	D	0.0006	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Compressor	D	0.0003	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Front-end loader	D	0.0012	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	Compactor	D	0.0008	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Excavator	D	0.0009	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	15 ton crane	D	0.0009	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	Roller	D	0.0008	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Reed Screen	D	0.0009	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0000	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Dump Truck	D	0.0000	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	On-Site Water Truck	D	0.0000	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Concrete Truck	D	0.0000	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0000	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Construction Worker Commute	G	0.0000	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Total			**0.1**	**0.1**	**0.1**	**0.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**

Notes:

Table 6.2C-3E – Estimated Construction Equipment and Motor Vehicle PM_{10} Emissions

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Combustion PM10 Emissions (Maximum Daily lb/day)														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0317	0.38	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-
	Backhoe	D	0.0635	0.38	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compressor	D	0.0290	0.17	0.17	-	-	-	-	-	-	-	-	-	-	-	-	-
	Front-end loader	D	0.0769	0.77	0.77	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compactor	D	0.0629	0.25	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Excavator	D	0.0963	0.58	0.58	-	-	-	-	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.0615	0.49	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-
	Roller	D	0.0629	0.25	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reed Screen	D	0.0896	0.54	0.54	-	-	-	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0001	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dump Truck	D	0.0006	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
	On-Site Water Truck	D	0.0006	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0006	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Worker Commute	G	0.0001	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0317	-	0.38	0.38	0.38	0.38	0.38	0.38	0.19	0.19	-	-	-	-	-	-
	Backhoe	D	0.0635	-	0.38	0.76	0.76	0.38	0.38	-	-	-	-	-	-	-	-	-
	Compressor	D	0.0290	-	0.17	0.35	0.70	0.70	0.70	0.52	0.35	0.35	-	-	-	-	-	-
	Front-end loader	D	0.0769	-	-	0.46	0.46	0.46	0.46	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.0615	-	-	0.37	0.37	1.11	0.74	0.74	0.74	0.74	-	-	-	-	-	-
	75 ton crane	D	0.0571	-	-	-	-	0.34	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0001	-	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Truck	D	0.0006	-	0.03	0.06	0.06	0.03	0.03	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0006	-	-	0.16	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0006	-	-	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-	0.03	0.03	0.03	0.03	0.03
	Construction Worker Commute	G	0.0001	-	0.01	0.06	0.08	0.08	0.08	0.07	0.07	0.06	0.04	0.04	0.04	0.04	0.04	0.04
Gas Line	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0317	-	-	-	-	-	0.38	0.38	0.38	0.38	0.38	-	-	-	-	-
	Backhoe	D	0.0635	-	-	-	-	-	0.38	0.38	0.38	0.38	0.38	-	-	-	-	-
	Compressor	D	0.0290	-	-	-	-	-	0.17	0.17	0.17	0.17	0.17	-	-	-	-	-
	Front-end loader	D	0.0769	-	-	-	-	-	0.77	0.77	0.77	0.77	0.77	-	-	-	-	-
	Compactor	D	0.0629	-	-	-	-	-	0.25	0.25	0.25	0.25	0.25	-	-	-	-	-
	Excavator	D	0.0963	-	-	-	-	-	0.58	0.58	0.58	0.58	0.58	-	-	-	-	-
	15 ton crane	D	0.0615	-	-	-	-	-	0.49	0.49	0.49	0.49	0.49	-	-	-	-	-
	Roller	D	0.0629	-	-	-	-	-	0.25	0.25	0.25	0.25	0.25	-	-	-	-	-
	Reed Screen	D	0.0896	-	-	-	-	-	0.54	0.54	0.54	0.54	0.54	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0001	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Dump Truck	D	0.0006	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-
	On-Site Water Truck	D	0.0006	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	Concrete Truck	D	0.0006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0006	-	-	-	-	-	0.05	0.05	0.05	0.05	0.05	-	-	-	-	-
	Construction Worker Commute	G	0.0001	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-
	Construction Combustion Emissions (lb/day)			**3.9**	**4.9**	**2.6**	**2.9**	**3.5**	**6.8**	**5.7**	**5.3**	**5.3**	**4.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
	Construction Fugitive Emissions (lb/day)			2.8	2.9	0.6	0.3	0.4	3.2	3.0	3.0	3.0	2.9	0.2	0.2	0.2	0.2	0.2
	Excavation/Pile Fugitive Emissions (lb/day)			-	-	0.5	0.7	0.7	6.0	5.5	5.5	-	-	-	-	-	-	-
	Total			**6.7**	**7.8**	**3.7**	**3.9**	**4.6**	**16.0**	**14.3**	**13.9**	**8.4**	**6.9**	**0.3**	**0.3**	**0.3**	**0.3**	**0.3**

Notes:

Table 6.2C-3F – Estimated Construction Equipment and Motor Vehicle $PM_{2.5}$ Emissions

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Combustion PM2.5 Emissions (Maximum Daily lb/day)														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0291	0.35	0.35	-	-	-	-	-	-	-	-	-	-	-	-	-
	Backhoe	D	0.0584	0.35	0.35	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compressor	D	0.0267	0.16	0.16	-	-	-	-	-	-	-	-	-	-	-	-	-
	Front-end loader	D	0.0707	0.71	0.71	-	-	-	-	-	-	-	-	-	-	-	-	-
	Compactor	D	0.0578	0.23	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-
	Excavator	D	0.0886	0.53	0.53	-	-	-	-	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.0566	0.45	0.45	-	-	-	-	-	-	-	-	-	-	-	-	-
	Roller	D	0.0578	0.23	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-
	Reed Screen	D	0.0824	0.49	0.49	-	-	-	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0001	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dump Truck	D	0.0006	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
	On-Site Water Truck	D	0.0006	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0006	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Worker Commute	G	0.0001	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0291	-	0.35	0.35	0.35	0.35	0.35	0.35	0.17	0.17	-	-	-	-	-	-
	Backhoe	D	0.0584	-	0.35	0.70	0.70	0.35	0.35	-	-	-	-	-	-	-	-	-
	Compressor	D	0.0267	-	0.16	0.32	0.64	0.64	0.64	0.48	0.32	0.32	-	-	-	-	-	-
	Front-end loader	D	0.0707	-	-	0.42	0.42	0.42	0.42	-	-	-	-	-	-	-	-	-
	15 ton crane	D	0.0566	-	-	0.34	0.34	1.02	0.68	0.68	0.68	0.68	-	-	-	-	-	-
	75 ton crane	D	0.0525	-	-	-	-	0.32	-	-	-	-	-	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0001	-	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Dump Truck	D	0.0006	-	0.03	0.06	0.06	0.03	0.03	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0006	-	-	0.15	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0006	-	-	0.03	0.03	0.03	0.03	0.03	0.03	0.03	-	0.03	0.03	0.03	0.03	0.03
	Construction Worker Commute	G	0.0001	-	0.01	0.05	0.08	0.08	0.08	0.06	0.06	0.05	0.04	0.04	0.04	0.04	0.04	0.04
Gas Line	**Construction Equipment**		lb/hr															
	Welding rigs	D	0.0291	-	-	-	-	-	0.35	0.35	0.35	0.35	0.35	-	-	-	-	-
	Backhoe	D	0.0584	-	-	-	-	-	0.35	0.35	0.35	0.35	0.35	-	-	-	-	-
	Compressor	D	0.0267	-	-	-	-	-	0.16	0.16	0.16	0.16	0.16	-	-	-	-	-
	Front-end loader	D	0.0707	-	-	-	-	-	0.71	0.71	0.71	0.71	0.71	-	-	-	-	-
	Compactor	D	0.0578	-	-	-	-	-	0.23	0.23	0.23	0.23	0.23	-	-	-	-	-
	Excavator	D	0.0886	-	-	-	-	-	0.53	0.53	0.53	0.53	0.53	-	-	-	-	-
	15 ton crane	D	0.0566	-	-	-	-	-	0.45	0.45	0.45	0.45	0.45	-	-	-	-	-
	Roller	D	0.0578	-	-	-	-	-	0.23	0.23	0.23	0.23	0.23	-	-	-	-	-
	Reed Screen	D	0.0824	-	-	-	-	-	0.49	0.49	0.49	0.49	0.49	-	-	-	-	-
	Motor Vehicles (Offsite)		lb/mile															
	On-Site Pickup Truck	G	0.0001	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Dump Truck	D	0.0006	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-
	On-Site Water Truck	D	0.0006	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	Concrete Truck	D	0.0006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0006	-	-	-	-	-	0.05	0.05	0.05	0.05	0.05	-	-	-	-	-
	Construction Worker Commute	G	0.0001	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-
	Construction Combustion Emissions (lb/day)			**3.6**	**4.5**	**2.4**	**2.6**	**3.2**	**6.2**	**5.3**	**4.9**	**4.9**	**3.7**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**
	Construction Fugitive Emissions (lb/day)			0.5	0.5	0.2	0.1	0.1	0.7	0.6	0.6	0.6	0.6	0.1	0.1	0.1	0.1	0.1
	Excavation/Pile Fugitive Emissions (lb/day)			-	-	0.1	0.1	0.1	1.3	1.2	1.2	-	-	-	-	-	-	-
	Total			**4.1**	**5.1**	**2.7**	**2.9**	**3.5**	**8.2**	**7.0**	**6.7**	**5.5**	**4.3**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**

Notes:

Table 6.2C-5A – Estimated PM_{10} entrained paved road dust emission from on-site and off-site motor vehicles

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Fugitive PM10 Emissions (Maximum Daily lb/day)														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Motor Vehicles (Offsite)**		lb/mile															
	On-Site Pickup Truck	G	0.0034	0.10	0.10	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dump Truck	D	0.0010	0.03	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-
	On-Site Water Truck	D	0.1276	2.55	2.55	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0010	0.08	0.08	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Worker Commute	G	0.0000	0.00	0.00	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	**Motor Vehicles (Offsite)**		lb/mile															
	On-Site Pickup Truck	G	0.0034	-	0.09	0.17	0.17	0.26	0.26	0.17	0.17	0.17	0.09	0.17	0.17	0.17	0.17	0.17
	Dump Truck	D	0.0010	-	0.05	0.10	0.10	0.05	0.05	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0010	-	-	0.26	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0010	-	-	0.05	0.05	0.05	0.05	0.05	0.05	0.05	-	0.05	0.05	0.05	0.05	0.05
	Construction Worker Commute	G	0.0000	-	0.00	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Gas Line	**Motor Vehicles (Offsite)**		lb/mile															
	On-Site Pickup Truck	G	0.0034	-	-	-	-	-	0.10	0.10	0.10	0.10	0.10	-	-	-	-	-
	Dump Truck	D	0.0010	-	-	-	-	-	0.06	0.06	0.06	0.06	0.06	-	-	-	-	-
	On-Site Water Truck	D	0.1276	-	-	-	-	-	2.55	2.55	2.55	2.55	2.55	-	-	-	-	-
	Concrete Truck	D	0.0010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0010	-	-	-	-	-	0.08	0.08	0.08	0.08	0.08	-	-	-	-	-
	Construction Worker Commute	G	0.0000	-	-	-	-	-	0.00	0.00	0.00	0.00	0.00	-	-	-	-	-
	Total			**2.8**	**2.9**	**0.6**	**0.3**	**0.4**	**3.2**	**3.0**	**3.0**	**3.0**	**2.9**	**0.2**	**0.2**	**0.2**	**0.2**	**0.2**

Table 6.2C-5B – Estimated $PM_{2.5}$ entrained paved road dust emission from on-site and off-site motor vehicles

	Equipment/Vehicle Type	Fuel	E.F.	Construction Equipment & Vehicle Fugitive PM2.5 Emissions (Maximum Daily lb/day)														
				1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line	**Motor Vehicles (Offsite)**		lb/mile															
	On-Site Pickup Truck	G	0.0006	0.02	0.02	-	-	-	-	-	-	-	-	-	-	-	-	-
	Dump Truck	D	0.0002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	On-Site Water Truck	D	0.0216	0.43	0.43	-	-	-	-	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0002	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-
	Construction Worker Commute	G	0.0001	0.04	0.04	-	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant	**Motor Vehicles (Offsite)**		lb/mile															
	On-Site Pickup Truck	G	0.0006	-	0.01	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.01	0.03	0.03	0.03	0.03	0.03
	Dump Truck	D	0.0002	-	0.01	0.02	0.02	0.01	0.01	-	-	-	-	-	-	-	-	-
	Concrete Truck	D	0.0002	-	-	0.04	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0002	-	-	0.01	0.01	0.01	0.01	0.01	0.01	0.01	-	0.01	0.01	0.01	0.01	0.01
	Construction Worker Commute	G	0.0001	-	0.01	0.06	0.08	0.08	0.08	0.07	0.07	0.06	0.04	0.04	0.04	0.04	0.04	0.04
Gas Line	**Motor Vehicles (Offsite)**		lb/mile															
	On-Site Pickup Truck	G	0.0006	-	-	-	-	-	0.02	0.02	0.02	0.02	0.02	-	-	-	-	-
	Dump Truck	D	0.0002	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	On-Site Water Truck	D	0.0216	-	-	-	-	-	0.43	0.43	0.43	0.43	0.43	-	-	-	-	-
	Concrete Truck	D	0.0002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Delivery Truck	D	0.0002	-	-	-	-	-	0.01	0.01	0.01	0.01	0.01	-	-	-	-	-
	Construction Worker Commute	G	0.0001	-	-	-	-	-	0.04	0.04	0.04	0.04	0.04	-	-	-	-	-
	Total			**0.5**	**0.5**	**0.2**	**0.1**	**0.1**	**0.7**	**0.6**	**0.6**	**0.6**	**0.6**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**

Table 6.2C-6A – Projected Excavation and Piling Activities

Equipment/Vehicle Type	Units	Daily Construction Fugitive PM10 & PM2.5 Activities														
		1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Gas Line Excavation	Cu. Yd.	93.00	93.00	93.00												
Gas Line Storage Pile Wind Erosion	Acres	0.25	0.25	0.25												
Power Plant Excavation	Cu. Yd.			1,500	3,500	3,500	1,500									
Power Plant Storage Pile Wind Erosion	Acres			0.20	0.30	0.30	0.20									
Water Line Excavation	Cu. Yd.						93.00	93.00	93.00							
Water Line Storage Pile Wind Erosion	Acres						0.25	0.25	0.25							
Total		**93**	**93**	**1,593**	**3,500**	**3,500**	**1,593**	**93**	**93**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Table 6.2C-6B – Estimated Excavation and Piling PM_{10} and $PM_{2.5}$ Emissions

Equipment/Vehicle Type	E.F.	Construction Fugitive PM10 Emissions (lb/day)														
		1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Gas Line Excavation	4.97E-04	0.05	0.05	0.05	-	-	-	-	-	-	-	-	-	-	-	-
Gas Line Storage Pile Wind Erosion	22.0	5.50	5.50	5.50	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant Excavation	4.97E-04	-	-	0.75	1.74	1.74	0.75	-	-	-	-	-	-	-	-	-
Power Plant Storage Pile Wind Erosion	22.0	-	-	4.40	6.60	6.60	4.40	-	-	-	-	-	-	-	-	-
Water Line Excavation	4.97E-04	-	-	-	-	-	0.05	0.05	0.05	-	-	-	-	-	-	-
Water Line Storage Pile Wind Erosion	22.0	-	-	-	-	-	5.50	5.50	5.50	-	-	-	-	-	-	-
Total		**-**	**-**	**5.1**	**8.3**	**8.3**	**10.7**	**5.5**	**5.5**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Equipment/Vehicle Type	Units	Construction Fugitive PM2.5 Emissions (lb/day)														
		1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Gas Line Excavation	1.04E-04	0.01	0.01	0.01	-	-	-	-	-	-	-	-	-	-	-	-
Gas Line Storage Pile Wind Erosion	4.6	1.15	1.15	1.15	-	-	-	-	-	-	-	-	-	-	-	-
Power Plant Excavation	1.04E-04	-	-	0.16	0.36	0.36	0.16	-	-	-	-	-	-	-	-	-
Power Plant Storage Pile Wind Erosion	4.6	-	-	0.92	1.38	1.38	0.92	-	-	-	-	-	-	-	-	-
Water Line Excavation	1.04E-04	-	-	-	-	-	0.01	0.01	0.01	-	-	-	-	-	-	-
Water Line Storage Pile Wind Erosion	4.6	-	-	-	-	-	1.15	1.15	1.15	-	-	-	-	-	-	-
Total		**-**	**-**	**1.1**	**1.7**	**1.7**	**2.2**	**1.2**	**1.2**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

Table 6.2C-7 – Estimated Surface Coating and VOC Emissions

Miscellaneous	Units	Architectural Coating VOC Emissions														
		1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Power Plant Coating	Gallons	-	-	-	-	-	-	-	-	-	-	-	-	10.00	-	-
VOC Content	(lb/gal)													2.08		
Total		**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**20.8**	**-**	**-**

Table 6.2C-8 – Potential Surface Paving and VOC Emissions

Miscellaneous	Units	Asphalt Paving VOC Emissions														
		1 - 2	3 - 4	5 - 6	7 - 8	9 - 10	11 - 12	13 - 14	15 - 16	17 - 18	19 - 20	21 - 22	23 - 24	25 - 26	27 - 28	29 - 30
Water Line Paving	sq. ft.			750	750	750	-	-	-	-	-	-	-	10	-	-
Power Plant Access Road Paving	sq. ft.															
Gas Line Paving	sq. ft.									750	750	750				
Total Paving	sq. ft.						10,000							1		
Total Paving	acres	-	-	0.02	0.02	0.02	0.23	-	-	0.02	0.02	0.02	-	0.00	-	-
VOC Emission Factor	lb/acre	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62	2.62
Total		**-**	**-**	**0.0**	**0.0**	**0.0**	**0.6**	**-**	**-**	**0.0**	**0.0**	**0.0**	**-**	**0.0**	**-**	**-**

Table 6.2C-9 – Maximum Daily Construction Emissions

	Equipment/Vehicle Type	Summary of Maximum Daily Emissions (lb/day)					
		CO	VOC	NOX	SOX	PM10	PM2.5
Water Line	**Construction Equipment**						
	Welding rigs	-	-	-	-	-	-
	Backhoe	-	-	-	-	-	-
	Compressor	-	-	-	-	-	-
	Front-end loader	-	-	-	-	-	-
	Compactor	-	-	-	-	-	-
	Excavator	-	-	-	-	-	-
	15 ton crane	-	-	-	-	-	-
	Roller	-	-	-	-	-	-
	Reed Screen	-	-	-	-	-	-
	Motor Vehicles (Offsite)						
	On-Site Pickup Truck	-	-	-	-	-	-
	Dump Truck	-	-	-	-	-	-
	On-Site Water Truck	-	-	-	-	-	-
	Concrete Truck	-	-	-	-	-	-
	Delivery Truck	-	-	-	-	-	-
	Construction Worker Commute	-	-	-	-	-	-
Power Plant	**Construction Equipment**						
	Welding rigs	3.80	-	3.39	0.00	0.38	0.35
	Backhoe	2.25	-	4.19	0.00	0.38	0.35
	Compressor	7.04	-	5.92	0.01	0.70	0.64
	Front-end loader	3.86	-	8.31	0.01	0.46	0.42
	15 ton crane	5.97	-	13.21	0.01	0.74	0.68
	75 ton crane	-	-	-	-	-	-
	Motor Vehicles (Offsite)						
	On-Site Pickup Truck	0.96	0.07	0.10	0.00	0.01	0.01
	Dump Truck	0.28	-	1.78	0.00	0.03	0.03
	Concrete Truck	-	-	-	-	-	-
	Delivery Truck	0.28	0.06	1.78	0.00	0.03	0.03
	Construction Worker Commute	13.46	0.73	1.43	0.01	0.08	0.08
Gas Line	**Construction Equipment**						
	Welding rigs	3.80	-	3.39	0.00	0.38	0.35
	Backhoe	2.25	-	4.19	0.00	0.38	0.35
	Compressor	1.76	-	1.48	0.00	0.17	0.16
	Front-end loader	6.43	-	13.85	0.01	0.77	0.71
	Compactor	1.77	-	3.63	0.00	0.25	0.23
	Excavator	3.30	-	6.18	0.01	0.58	0.53
	15 ton crane	3.98	-	8.81	0.01	0.49	0.45
	Roller	1.77	-	3.63	0.00	0.25	0.23
	Reed Screen	3.36	-	6.35	0.01	0.54	0.49
	Motor Vehicles (Offsite)						
	On-Site Pickup Truck	0.38	-	0.04	0.00	0.00	0.00
	Dump Truck	0.33	-	2.14	0.00	0.04	0.04
	On-Site Water Truck	0.11	-	0.71	0.00	0.01	0.01
	Concrete Truck	-	-	-	-	-	-
	Delivery Truck	0.44	-	2.85	0.00	0.05	0.05
	Construction Worker Commute	7.05	-	0.75	0.00	0.04	0.04
Others	Construction Fugitive Emissions					3.17	0.66
	Excavation/Pile Fugitive Emissions					10.69	2.24
	Architectural Coatings Emissions		20.83				
	Asphalt Paving Emissions		0.00				
	Total (lb/day)	**74.63**	**21.69**	**98.11**	**0.11**	**20.64**	**9.13**
	Significance Thresholds	550	75	100	150	150	55
	Exceed Significance Threshold?	No	No	No	No	No	No

APPENDIX 6.2-D – COMMISSIONING AND OPERATIONAL EMISSION ESTIMATES

OPERATIONAL EMISSION CALCULATIONS

Estimated criteria pollutant emissions for this Project are provided in this appendix. Estimated emissions are based on the project design parameters, proposed permit limits, and maximum plant operating levels.

Emissions from the LM6000 turbines are due to the combustion of natural gas. Emission levels for NO_X, CO, PM_{10}, VOC, and ammonia (NH_3) slip were obtained from GE for normal operations. The post-controlled NOx emission rate is estimated using a conservative 90% control efficiency for the SCR system. The turbine systems are designed to meet 2.5 ppm NOx and 6 ppm CO, respectively, at 15 percent O_2. Ammonia slip will not exceed 10 ppm, and VOC will not exceed 2 ppm.

1.0 Equipment and Operating Parameters

The following is a list of equipment with potential emissions proposed for the Project.

1. Turbine 1, GE, LM6000PC-SPRINT, 50.0 MW, natural gas-fired, with selective catalytic reduction (SCR) and oxidation catalyst system, and a continuous NOx emission monitoring system (CEMS).
2. Turbine 2, GE, LM6000PC-SPRINT, 50.0 MW, natural gas-fired, with selective catalytic reduction (SCR) and oxidation catalyst system, and a continuous NOx emission monitoring system (CEMS).
3. Black-start engine generator, Caterpillar, G3516B LE, 1,818 BHP natural gas-fired.
4. Emergency fire pump engine generator, National Diesel Corp., BF6M2012C, 173 BHP diesel-fired.

<u>SDAPCD Permit Exempt Equipment</u>

- Natural gas compressors
- Ammonia storage tank
- Chiller and cooling tower
- Water demineralization system

<u>Facility Operating Parameters</u>

The proposed commissioning, startup (SU) and operating limits for the Project are outlined as follows:

1. One-time commissioning – 400 hours total
   - 200 hours per unit with emissions controlled initially at the turbine only (approximately 25 ppmvd NO_X and 25 ppmvd CO, both corrected to 15% O_2) for the commissioning of the turbines and each SCR and oxidation catalyst system.
2. Annual operation (two turbines combined) – 6,400 hours total
   - 5,960 hours of fully controlled emissions
   - 40 hours of emissions controlled at the turbine only for annual maintenance and testing
   - 500 collective start-ups (SU) composed of 10 minutes of uncontrolled emissions and 30 minutes of linearly increasing controlled emissions
   - 500 collective shutdowns (SD) composed of 8 minutes of uncontrolled emissions when ammonia injection is shut down.
3. Back-up equipment testing emissions
   - Diesel-driven fire pump tested weekly for 30 minutes
   - Black Start generator tested monthly for one (1) hour
   - Each combustion turbine, to the extent not operated in the previous two weeks, will be started once per month and operated for one (1) hour

2.0 Normal Operations

Normal operations consist of periods when the LM6000 turbine is operating at full load under controlled conditions with water injection, SCR, and oxidation catalyst operating normally. GE provided guaranteed hourly emission rates, in pounds per hour (lb/hr), for NO_X, CO, PM_{10}, and VOC for the design case at an ambient temperature of 86°F at the project site. This guarantee reflects that average normal operating condition for the Project. The guaranteed hourly rates of SO_2 and PM_{10} do not vary by ambient temperature.

AP-42 emission factors were used to calculate SO_2 maximum hourly emission rates using the AP-42 emission factor and maximum fuel flow rate. Detailed emission calculations for criteria pollutants during normal operations are shown below.

To ensure PM_{10} emission rates are not underestimated, it is assumed that all of the SO_2 will react with excess ammonia (ammonia slip) to form ammonium sulfate, which will exist as fine particulate matter (PM_{10}). Based on the relative masses of ammonium sulfate and SO_2, approximately two pounds of ammonium sulfate is formed for every pound of SO_2 released.

The table below summarizes the maximum hourly emission rates for all criteria pollutants for the LM6000 turbine during normal operations.

Table 6.2D-1 - LM6000 Turbine Maximum Hourly Emissions during Normal Operations

Pollutant	Maximum Emission Rate (lb/hr)	Basis
NO_x	3.98	Vendor Guarantee with minimum SCR control efficiency of 90%
CO	5.81	Vendor Guarantee with minimum oxidation catalyst efficiency of 75% on CO
PM_{10}	3.00	Vendor Guarantee with margin for ammonium sulfate formation by SCR
VOC	1.11	Vendor Guarantee with minimum oxidation catalyst efficiency of 66% on VOC
SO_2	0.83	Based on total sulfur content of < 0.75 grain/100 ft^3 in natural gas

3.0 Startup/Shutdown Operations

SU/SD NO_X and CO emission calculations for the LM6000 turbine were performed using SU and SD emission profiles provided by GE. The total emissions of NO_X and CO during a SU or SD were divided by the duration of each event to obtain the maximum hourly emission rates. SU will take approximately 10 minutes to achieve full load conditions, with the SCR and oxidation catalyst controlling emissions at their guaranteed control efficiencies. Emission estimates for NO_X and CO were provided by GE for each phase of the 10-minute SU sequence, ranging from uncontrolled to fully controlled emissions. These SU emissions, along with normal operation emission rates, were used to estimate the maximum hourly emission rates of NO_X and CO during a typical SU sequence.

The oxidation catalyst is expected to be functional after about 6.5 minutes into the SU sequence, at which time VOC emissions will be controlled by the oxidation catalyst. Uncontrolled VOC emission rates provided by GE were used for the first 6.5 minutes of the SU sequence, with controlled emission rates occurring thereafter.

SD will last approximately eight minutes. Emission estimates for NOx and CO were provided by GE for this SD sequence. These SD emissions, along with normal operation emission rates, were used to estimate the maximum hourly emission rates of NOx and CO during a typical SD sequence. The oxidation catalyst is expected to be functional for the first 2.5 minutes of the SD sequence, at which time VOC emissions will be controlled by the oxidation catalyst. Uncontrolled VOC emission rates provided by GE were used for the balance of the SD sequence.

Emissions of PM_{10} and SO_2 during SU/SD are not expected to be any higher than those for normal operations since these pollutant emission rates are strictly a function of the quantity of natural gas burned. Therefore, normal operation emissions are presented during SU/SD conditions for PM_{10} and SO_2.

Table 6.2D-2 below summarizes the maximum hourly emission rates for all criteria pollutants for the LM6000 turbine during SU/SD conditions.

Table 6.2D-2 - LM6000 Turbine Maximum Hourly Emissions during SU/SD Conditions

Base Load Emissions Per Turbine		NOx	CO	VOC	PM10	SO_2
Steady State Uncontrolled (lb/hr)		39.75	24.20	3.32	3.00	0.83
Steady State Controlled (lb/hr)		3.98	5.81	1.11	3.00	0.83
Start/Stop Emissions Per Turbine	Minutes	NOx	CO	VOC	PM10	SO_2
Startup Emissions (lb/event)	10	3.00	5.60	1.10	0.67	0.14
Warm-up Emissions (lb/event)	30	10.93	7.50	1.11	1.50	0.41
Shutdown Emissions (lb/event)	8	2.20	3.70	0.60	0.53	0.11
Startup Emissions / Hour / Turbine	Hour	NOx	CO	VOC	PM10	SO_2
Startup	0.167	3.00	5.60	1.10	0.67	0.14
Warm-up	0.500	10.93	7.50	1.11	1.50	0.41
Steady State Controlled	0.333	1.33	1.94	0.37	1.00	0.28
Total Hourly Emission / Turbine	1.000	15.26	15.04	2.58	3.17	0.83
Shutdown Emissions / Hour / Turbine	Hour	NOx	CO	VOC	PM10	SO_2
Steady State Controlled	0.867	3.45	5.04	0.96	2.60	0.72
Shutdown	0.133	2.20	3.70	0.60	0.53	0.11
Total Hourly Emission / Turbine	1.000	5.65	8.74	1.56	3.13	0.83

(1) Steady state uncontrolled emissions are based upon the GE performance data
(2) Steady state controlled emissions are based on projected emission control efficiency
(3) SU and SD emissions are based on GE data at ISO conditions
(4) Warm-up emissions are based on linear emission reduction ramp
(5) Calculations are based upon the annual average ambient temperature of 72 °F
(6) VOC emissions are based on 40% of GE calculated HC emissions (balance being exempt)

4.0 Commissioning

Commissioning of the LM6000 turbines is anticipated to take no more than 200 hours each. It is likely the units will not be operated without the SCR system for more than 25 hours. Emission estimates with just water injection control for NO_X, CO, and VOC were used to calculate peak hourly rates for these pollutants. Emissions of PM_{10} and SO_2 are not expected to be any higher than those for normal operations since these pollutant emission rates are strictly a function of the quantity of natural gas burned. Therefore, normal operation emissions are presented during commissioning for PM_{10} and SO_2.

Table 6.2D-3 summarizes the total emissions during commissioning for the LM6000 turbine.

Table 6.2D-3 - LM6000 Turbine Commissioning Emission Rates

Commissioning Emissions (lbs)	Hours	NOx	CO	VOC	PM10	SO_2
Max. Hourly Commissioning Emissions (lb/hr)		39.75	24.2	3.32	3	0.83
Total Commission Period (lb)	**400**	**15,900**	**9,680**	**1,328**	**1,200**	**332**
	Tons	**8.0**	**4.8**	**0.7**	**0.6**	**0.2**

5.0 Annual Emission Rates

5.1 Turbine Systems

Based on the emission data provided by the equipment supplier and the project operating parameters of the facility, the criteria pollutants emission during normal operation at various intervals are estimated and summarized in Table 6.2D-4 below.

	Both Turbines (Collectively)
• Maximum daily start-ups:	6
• Maximum daily shut-downs:	6
• Total annual start-ups:	500
• Total annual shut-downs:	500
• Total annual operating hours:	6,400 hours

Table 6.2D-4 - Estimated Normal Operating Emissions (2 Turbines)

Maximum Hourly Emissions	Hours	NOx	CO	VOC	PM10	SO_2
Startup Event	0.167	3.00	5.60	1.10	0.67	0.14
Warm-up Event	0.500	10.93	7.50	1.11	1.50	0.41
Steady State	1.333	5.31	7.75	1.48	4.00	1.11
Total Maximum Hourly (lb/hr)	**2.00**	**19.24**	**20.85**	**3.69**	**6.17**	**1.66**
Maximum Daily Emissions	Hours	NOx	CO	VOC	PM10	SO_2
Startup Event	1.00	18.00	33.60	6.60	4.02	0.84
Warm-up Event	3.00	65.58	45.00	6.66	9.00	2.46
Shutdown Event	0.80	13.20	22.20	3.60	3.18	0.66
Steady State Controlled	27.20	108.26	158.03	30.19	81.60	22.58
Total Maximum Daily (lb/day)	**32.00**	**205.04**	**258.83**	**47.05**	**97.80**	**26.54**
Maximum Annual Emissions	Hours	NOx	CO	VOC	PM10	SO_2
Startup Event	83.33	1,500	2,800	550	335	70
Warm-up Event	250.00	5,465	3,750	555	750	205
Shutdown Event	66.67	1,100	1,850	300	265	55
Steady State Uncontrolled	40	1,590	968	133	120	33
Steady State Controlled	5,960	23,721	34,628	6,616	17,880	4,947
Total Maximium Annual Daily (lb/yr)	**6,400**	**33,376**	**43,996**	**8,153**	**19,350**	**5,310**
	Tons	**16.69**	**22.00**	**4.08**	**9.68**	**2.66**

5.2 Black Start Generator

The black start Caterpillar ICE will operate only during black start conditions, and only for routine testing and maintenance. Black starts are anticipated to occur two times per year. Routine testing and maintenance will occur on a monthly basis. The Caterpillar ICE will operate 30 minutes during each maintenance event, 12 events per year, for a total of 7 hours per year of operation. For the purposes of these calculations the operations are characterized as 14 hours per year of operation, with each operational hour consisting of one-half hour of operation and one-half hour of non-operation.

Controlled emission guarantees for the Caterpillar Black start ICE were obtained from Caterpillar for NO_X and CO. Guaranteed emission rates of total hydrocarbon were obtained from Caterpillar and are assumed to be 100 percent VOC. AP-42 Fifth Edition, Section 3.2, dated August 2000, emission factors were used to calculate SO_2 and PM_{10} emission rates.

The maximum fuel flow rate to the Caterpillar ICE is 10.5 MMBtu per hour for standby power, using heat exchanger cooling. The fuel flow rate was converted to standard cubic feet (scf) per hour using a heat content of 1,050 Btu/scf (10,020 scf/hr).

A sample calculation for maximum hourly NO_X emission rates are provided below. CO and VOC emission calculations are identical with the exception of the emission factors.

> Maximum Hourly (NO_X) = guaranteed NO_X rate (g/bhp-hr) X engine rating (bhp) / 453.6 g/lb X 30/60 minutes
>
> Maximum Hourly (NO_X) = 0.5 (g/bhp-hr) X 1,449 (bhp) / 453.6 g/lb X 30/60 minutes = 0.797 lb/hr

Annual emissions were calculated assuming 14 one-half hour operating events per year. A sample calculation of annual NO_X emissions is provided below. The calculations of emissions for the remaining criteria pollutants are identical with the exception of the hourly emission rate.

> Annual (NO_X) = hourly emission rate (lb/hr) X 14 hr/yr
>
> Annual (NO_X) = 0.797 (lb/hr) X 14 hr/yr / 2,000 lb/ton = 11.16 lb/yr

A summary of emission for the black start engine is provided in Table 6.2D-5 below.

Table 6.2D-5 - Black Start Engine Generator Maximum Hourly Emissions

Parameters					
Made & Model	Caterpillar G3516B LE				
Rated Horsepower	1,449	BHP			
Maximum Engine Power	1,818	BHP			
Total Efficiency	79.7	%			
Fuel Consumption	7,261	Btu/bhp-hr			
Exhaust Flow Rate	11,923	ACFM			
Exhaust Temperature	974	°F			
Stack Diameter	1.50	Feet			
Stack Height (12 ft building + 3 ft stack)	15	Feet			
Test Frequency	14	per Year			
Test Duration	1	Hour			
Expected Annual Non-Emergency Usage	14	Hours/Year			
Black Start Engine Generator	NOx	CO	VOC	PM10	SO2
Emission Factor (g/HP/hr)	0.50	2.50	5.40		
Emision Rates (lb/hr)	0.797	3.985	8.607	0.055	0.005
Annual Emissions (lb/yr)	**11.16**	**55.79**	**120.50**	**0.77**	**0.07**

(1) PM10 & SO2 emission factors from EPA AP-42.

(2) PM10 emission rate includes filterable and condensable emissions.

5.3 Emergency Fire Pump Engine

An emergency diesel fuel fire water pump engine from National Diesel Corp. or a comparable supplier will be utilized at the facility. Other than for emergency response, the equipment will only be operated for testing and maintenance reason. It is anticipated that the engine will be operated for 30 minutes for each maintenance event on a weekly basis. For the purposes of these calculations the operations are characterized as 52 hours per year of operation, with each operational hour consisting of one-half hour of operation and one-half hour of non-operation.

The emission calculations are similar to those for the black start generator. Table 6.2-34 summarizes the annual average emission rates of criteria pollutants for the Caterpillar ICE.

Table 6.2D-6 - Estimated Planned Operation Emissions (Emergency Fire Pump Engine Generator)

Parameters						
Made & Model	National Diesel Corporation (NDC) - BF6M2012C					
Rated Horsepower	173	BHP				
Exhaust Flow Rate	1,000	ACFM				
Exhaust Temperature	950	°F				
Stack Diameter	0.33	Feet				
Stack Height (8 ft building + 4 ft stack)	12	Feet				
Test Frequency	52	Weeks/Year				
Test Duration	30	Minutes				
Expected Annual Non-Emergency Usage	26	Hours/Year				
Emergency Water Pump	NOx		CO	VOC	PM10	SO2
Emission Factor (g/HP/hr)	3.90		0.40	0.10	0.09	0.15
Emision Rates (lb/hr)	0.74		0.08	0.02	0.02	0.029
Annual Emissions (lb/yr)	**19.30**		**1.98**	**0.49**	**0.45**	**0.74**

5.4 Operational Emissions Summary

For modeling purpose, emission for each proposed source at the various averaging intervals are provided in the table below. Air modeling methodology and results are described in Appendix 6.2-E.

Table 6.2D-7 – Facility Emission Summary

Maximum 1-Hour Emissions	NOx	CO	VOC	PM10	SO2
Turbine 1 (lb/hr)	39.75	24.20			0.83
Turbine 2 (lb/hr)	3.98	5.81			0.83
Black Start Generator (lb/hr)	-	-			-
Fire Pump (lb/hr)	-	-			-
Maximum Average 3-Hour Emissions	NOx	CO	VOC	PM10	SO2
Turbine 1 (lb/hr)					0.83
Turbine 2 (lb/hr)					0.83
Black Start Generator (lb/hr)					0.002
Fire Pump (lb/hr)					0.010
Maximum Average 8-Hour Emission Rate	NOx	CO	VOC	PM10	SO2
Turbine 1 (lb/hr)		17.68			
Turbine 2 (lb/hr)		17.68			
Black Start Generator (lb/hr)		0.498			
Fire Pump (lb/hr)		0.010			
Maximum Average 24-Hour Emission Rate	NOx	CO	VOC	PM10	SO2
Turbine 1 (lb/hr)				2.03	0.55
Turbine 2 (lb/hr)				2.03	0.55
Black Start Generator (lb/hr)				2.29E-03	2.08E-04
Fire Pump (lb/hr)				7.14E-04	1.19E-03
Average Annual Emission Rate	NOx	CO	VOC	PM10	SO2
Turbine 1 (lb/hr)	1.91	2.51	0.47	1.10	0.30
Turbine 2 (lb/hr)	1.91	2.51	0.47	1.10	0.30
Black Start Generator (lb/hr)	1.27E-03	6.37E-03	1.38E-02	8.79E-05	7.99E-06
Fire Pump (lb/hr)	2.20E-03	2.26E-04	5.65E-05	5.08E-05	8.47E-05

6.2-E. E

APPENDIX 6.2-E – AIR DISPERSION MODELING APPROACH

APPENDIX 6.2-E - AIR DISPERSION MODELING APPROACH

The purpose of air dispersion modeling is to demonstrate that criteria air pollutant emissions from the Project will not cause or contribute significantly to a violation of a state or national ambient air quality standard. Although the modeling methodology for both criteria and *non-criteria* pollutants (i.e. hazardous air pollutants, "HAP" or toxic air contaminants, "TAC") is described here, the emissions and potential impacts of *non-criteria* pollutants are discussed presented in Section 6.16, Public Health.

The criteria pollutant modeling addresses emissions from both the commissioning and the eventual steady state operation of the facility. Impacts from construction activities include fugitive dust from grading and excavating disturbed areas, and emissions associated with products of combustion from diesel- and gasoline-fueled construction equipment. These emissions are temporary and were shown to have less than significant impact. The impacts from operations are associated with the natural gas combustion with the two turbines and the periodic testing of the black-start engine and the diesel-fired emergency fire pump engine.

Separate modeling analyses were performed for the Project commissioning and operational emissions because these activities will occur at and for different time periods and durations. The air quality impacts modeling approaches applied to this Project are discussed below.

1.0 Model and Model Option Selections

The modeling for this Project was conducted using the EPA-approved American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) developed by the American Meteorological Society and Environmental Protection Agency. On November 9, 2005, EPA started recommending AERMOD in place of the previously EPA-recommended Industrial Source Complex Short Term 3 (ISCST3) model.

The EPA-approved AERMOD model is a steady-state Gaussian plume model that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, including treatment of both surface and elevated sources, and both simple and complex terrain. The model can account for settling and deposition of both dry and wet particulates. It accommodates multiple sources and source types, including area, line, and volume source types. It handles downwash effects and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for a wide range of averaging times (from one hour to one year).

The basic model equation used in AERMOD assumes that the concentrations of emissions within a plume can be characterized by a Gaussian (statistical) distribution around the centerline of the plume. Gaussian dispersion models are approved by EPA for regulatory use and are based on conservative assumptions (i.e., the models tend to over predict actual impacts by assuming steady-state conditions, no pollutant loss through conservation of mass, no chemical reactions). This modeling tool is used to determine if ambient air quality standards would be exceeded, and

whether a more accurate and sophisticated modeling procedure would be warranted to refine the impact determination.

There are two input data processors that are regulatory components of the AERMOD modeling system: AERMET, a meteorological data preprocessor that incorporates air dispersion based on planetary boundary layer turbulence structure and scaling concepts, and AERMAP, a terrain data preprocessor that incorporates complex terrain using USGS Digital Elevation Data.

1.1 Modeling for Criteria Pollutants

For modeling criteria pollutants, AERMOD was applied with two years of actual meteorological data collected near the Project site. Using the most stringent and conservative assumptions, the modeling was completed to determine the maximum ground-level impacts of the Project. The results were combined with the background concentration and compared with state and federal ambient air quality standards and PSD significance levels.

Since the topography surrounding the Project site contains dramatic variations in elevations heights, EPA guidelines recommend AERMOD for this terrain condition. Plume impaction on elevated terrain, such as on the slopes of nearby hills, will cause high ground-level concentrations, especially under stable atmospheric conditions. Another dispersion condition that can cause high ground-level concentrations is caused by building downwash. A stack plume can be down-washed when wind speeds are high and a sufficiently tall building or structure is in close proximity to the emission stack. This can result in building wake effects where the plume is drawn down toward the ground by the lower pressure region that exists in the downwind side of the building or structure. In accordance with the air quality impact analysis guidelines developed by EPA, CARB and SDAPCD, the ground-level impact analysis therefore incorporated the following considerations: 1) impacts in a complex terrain and 2) aerodynamic effects (downwash) due to nearby building(s) and structures.

1.2 Modeling for Class I Area Impacts

Class I (specifically the Agua Tibia Wilderness Area) air quality increment analysis was also conducted with the AERMOD model since the Agua Tibia Wilderness receptors, as predetermined by the National Park Service, are located within 50 kilometers from the proposed Project location. Pursuant to EPA Guidelines, steady-state Gaussian plume models are considered accurate and useful for distances within 50 kilometers. As expected for this Project, the modeled air quality impacts on the Agua Tibia Wilderness were below the SDAPCD air quality increment thresholds or the San Diego DPLU increment threshold of 1 $\mu g/m^3$. Since the Agua Tibia Wilderness is nearest to the Project site, impacts to the other wildernesses (Cucamonga Wilderness, Joshua Tree Wilderness, San Gabriel Wilderness, San Gorgonio Wilderness, and San Jacinto Wilderness) are also not expected to exceed the SDAPCD air quality increment thresholds.

1.3 Modeling for Non-Criteria Pollutants

For health risk assessment, modeling was conducted using the Hotspots Analysis and Reporting Program (HARP) Version 1.3 software published by CARB. HARP was designed to support the health risk assessment needs of various agencies in California. The HARP software consists of an air emission inventory module, an air dispersion module and a risk evaluation module. The HARP dispersion module is based on the EPA Industrial Source Complex Short Term Version 3 (ISCST3) air dispersion model.

Although ISCST3 has been used and recommended by EPA dating back to 1979, as discussed above EPA transitioned its air dispersion modeling software recommendation on November 9, 2005 to AERMOD. With this development, the California Air Resource Board (CARB) recently issued a beta version of a file converter to accept AERMOD results into its HARP risk evaluation module. However, since this file converter has not been finalized and officially endorsed, and the associated methodology not formalized or recognized by OEHHA, a conservative approach is taken for this HRA by using the most currently approved CARB HARP software which uses ISCST3 instead of AERMOD air dispersion results.

2.0 Meteorological and Terrain Data

2.1 Gregory Canyon Meteorological Data

AERMOD uses hourly meteorological data composed of surface and upper air data to characterize plume dispersion. The San Diego Air Pollution Control District (SDAPCD) provided two years of meteorological data collected in Gregory Canyon. The meteorological data was collected as part of an application to the SDAPCD for a proposed nearby landfill site. The meteorological group at the SDAPCD reviewed and approved the data prior to making them accessible for this Project. The data is composed of onsite surface data, surface data from Miramar station no. 93107, and upper air (sounding) data from Miramar station No. 72293. Surface data from Miramar was incorporated to fill any missing hours from onsite surface data collected by the Gregory Canyon Landfill project. Onsite surface air data was processed along with Miramar's surface and upper air data using the AERMET data processor.

Gregory Canyon is located approximately 1 mile west of the proposed Project site. Since the meteorological data was collected near the Project site, it can be considered as site specific data. Pursuant to EPA Guidelines (Guideline on Air Quality Models, 50 CFR Part 51, Appendix W.), a facility has the option of using 5 years of National Weather Service meteorological data or at least 1 year of site specific data. The two years of meteorological data gathered in Gregory Canyon meet the latter requirement. The nearest meteorological stations monitored by the National Climate Data Center (NCDC) and SDAPCD are approximately 14.5 miles west (Camp Pendleton) and 16.5 miles south (Escondido) of the Project site. Meteorological data from these two stations would not be as ideal as the Gregory Canyon data.

Terrain features were derived from the U.S. Geological Survey (USGS) 30-meter Digitized Elevation Map (DEM) data and 7.5-minute quadrangle maps of the area including Temecula,

Pechanga, Bonsall, and Pala. Since the elevation heights in the terrain files (DEM) are identified in 1927 Datum (NAD27) UTM coordinates, all modeling references were standardized to NAD27 UTM Zone 11 coordinates.

2.2 Escondido Meteorological Data

For the risk assessment portion of the analysis in Section 6.16 – Public Health where the CARB HARP software was utilized, meteorological data from the Escondido meteorological station (Surface Station No. 72293, Upper Air Station No. 3190) suitable for direct input to ISCST3 were obtained from, and recommended by, the SDAPCD. Consistent with SDAPCD Guidelines, three years of meteorological data were used in the modeling analysis. These were for the years 1998, 1999 and 2000. Wind roses for each year used in the analysis are provided in Appendix 6.2-A.

3.0 Receptor Locations

The receptor grids used for modeling ambient air quality impacts and health risk assessment are based on the following criteria:

- 25-meter spacing along the property line and extending from the property line out to 100 meters beyond the property line.
- 100-meter spacing within 1 km of Project sources for any locations not covered by the 25-meter grid.
- 500-meter spacing within 1 to 5 km of Project sources.
- 1,000-meter spacing within 5 to 10 km of Project sources.
- Receptors at any nearby "sensitive" locations (schools, hospitals, etc.) in the area (HRA only).

A detailed Project aerial photo with Universal Transverse Mercator (UTM) coordinates in NAD27 will be used to illustrate the modeled results. The CAAQS and NAAQS will apply to all locations outside the applicant's property boundary, i.e. where public access is not under the control of the applicant. The CAAQS and NAAQS are not evaluated on the property controlled by the applicant. The air within a facility's property is not considered ambient air relative to the facility emissions.

4.0 Building Wake Effects

The effect of building wakes (i.e., downwash) on the stack plumes was evaluated for the turbines, black-start engine, and emergency diesel fire water pump emissions (downwash is not applicable to area sources; i.e., construction emissions) in accordance with USEPA guidance (USEPA 1985). Direction-specific building data were generated for stacks below good engineering practice (GEP) stack height using USEPA's Building Profile Input Program – Prime (BPIP-Prime) (Version 98086; USEPA 1995b). Six buildings and two water tanks were

identified in the Project layout to be included in the downwash analysis and they include the following:

- Raw water tank
- Demineralized water tank
- Turbine inlet 1
- Turbine inlet 2
- SCR/Catalyst housing 1
- SCR/Catalyst housing 2
- Chiller
- Service building

For the purposes of modeling, a stack height beyond what is required by GEP is not allowed. However, this requirement does not place a limit on the actual constructed height of a stack. GEP as used in modeling is the height necessary to assure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies, or wakes that may be created by the source itself, nearby structures, or nearby terrain obstacles. In addition, the GEP modeling restriction assures that any required regulatory control measure is not comprised by the effect of that portion of the stack that exceeds the GEP. EPA guidance for determining GEP stack height indicates that GEP is the greater of 65 meters or H_g, where H_g is calculated as follows:

$$H_g = H + 1.5L$$

where:

H_g = Good Engineering Practice stack height, measured from the ground-level elevation at the base of the stack

H = height of nearby structure(s) measured from the ground-level elevation at the base of the stack

L = lesser dimension, height or maximum projected width, of nearby structures(s)

In using this equation, the guidance document indicates that both the height and width of the structure are determined from the frontal area of the structure, projected onto a plane perpendicular to the direction of the wind.

For the new turbine stack, the nearby (influencing) structure is a service building which is 20 feet high, 100 feet long, and 50 wide. Thus H = 20 and L = 50 feet, and $H_g = 20 + 1.5(50) = 95$ feet. The proposed stack height of 80 feet does exceed GEP stack height of 95 feet, and consequently satisfies the EPA requirement.

For regulatory applications, a building is considered sufficiently close to a stack to cause wake effects when the downwind distance between the stack and the nearest part of the building is less than or equal to five times the lesser of the height or the projected width of the building.

Building dimensions for the buildings analyzed as downwash structures were obtained from plot plans. The building dimensions were analyzed using the BPIP-Prime to calculate 8 wind-direction-specific building heights and projected building widths for use in building wake calculations.

5.0 Air Dispersion Modeling

In lieu of a screening analysis conducted to identify which operating mode for the turbines results in worst-case ambient air impacts, AERMOD model was used to model worst-case conditions for all three operating modes across the load ranges of 100%, 75% and 50%. Each operating mode assumed operation of the emission sources at the anticipated schedule and loads.

Inputs required by AERMOD include the following:

- Model options
- Meteorological data
- Terrain data
- Receptor data
- Source data

The regulatory default option was selected and the modeling was conducted in rural mode. Standard AERMOD control parameters were used, including stack tip downwash, non-screening mode, non-flat terrain, and sequential meteorological data check. Stack-tip downwash, which adjusts the effective stack height downward following the methods of Briggs (1972) for cases where the stack exit velocity is less than 1.5 times the wind speed at stack top, were selected per EPA guidance.

Table 6.2E-1 – Facility Modeling Results (All Scenarios, All Years - μg/m^3)

Pollutant	Averaging Period	Back-ground (μg/m³)	Background Basis	2002 100% Load Increment (μg/m³)	2002 75% Load Increment (μg/m³)	2002 50% Load Increment (μg/m³)	2003 100% Load Increment (μg/m³)	2003 75% Load Increment (μg/m³)	2003 50% Load Increment (μg/m³)
NO2	1-Hour	150.5	Escondido, H3Y	87.39	75.64	66.18	112.10	94.35	82.16
NO2	Annual	33.9	Escondido, H3Y	0.64	0.58	0.56	0.74	0.66	0.63
CO	1-Hour	7,214.0	Escondido, H2Y	265.37	265.25	265.22	345.43	345.26	345.18
CO	8-Hour	4,135.0	Escondido, H3Y	62.64	56.64	55.12	61.77	56.71	53.37
SO2	1-Hour	110.0	San Diego 12th St., H2Y	7.35	6.31	5.26	9.36	7.80	6.53
SO2	24-Hour	52.4	San Diego 12th St., H2Y	1.38	1.33	1.20	1.23	1.18	1.01
SO2	3-Hour	23.6	San Diego 12th St., H2Y	4.45	4.52	4.62	4.02	3.82	4.10
SO2	Annual	10.5	San Diego 12th St., H2Y	0.11	0.09	0.07	0.12	0.10	0.07
PM10	24-Hour	57.0	Escondido, 2006	2.71	2.95	3.34	2.55	2.73	3.15
PM10	Annual	27.5	Escondido, 2006	0.38	0.40	0.46	0.43	0.46	0.52
PM2.5	24-Hour	67.3	Escondido, 2006	2.71	2.95	3.34	2.55	2.73	3.15
PM2.5	Annual	11.5	Escondido, 2006	0.38	0.40	0.46	0.43	0.46	0.52

The modeling results shown in Table 6.2E-1, Facility Modeling Results All Scenarios, All Years, were used to identify the operating condition and meteorological data that led to the highest

predicted ground-level concentration per pound of pollutant emitted for each averaging time. The resulting worst-case turbine operating conditions are summarized in Table 6.2E-2 below.

Table 6.2E-2 – Worst-Case Modeling Conditions

POLLUTANT	AVERAGING PERIOD	WORST-CASE CONDITIONS
NO2	1-Hour	Year 2003, 100% Load
NO2	Annual	Year 2003, 100% Load
CO	1-Hour	Year 2003, 100% Load
CO	8-Hour	Year 2002, 100% Load
SO2	1-Hour	Year 2003, 100% Load
SO2	24-Hour	Year 2002, 100% Load
SO2	3-Hour	Year 2002, 50% Load
SO2	Annual	Year 2003, 100% Load
PM10	24-Hour	Year 2002, 50% Load
PM10	Annual	Year 2002, 50% Load
PM2.5	24-Hour	Year 2002, 50% Load
PM2.5	Annual	Year 2002, 50% Load

The modeling results from the worst case conditions identified above are then to used demonstrate that air emissions from the Pala Facility will not cause or contribute to a NAAQS/CAAQS violation; and will not cause a significant health risk impact. Emissions from the black-start engine and the emergency diesel fire water pump were also included in this analysis. Emission rates and modeling parameters used for the black-start engine and the diesel fire water pump are provided in Appendix 6.2-D.

6.0 Modeling Results – Compliance with Ambient Air Quality Standards

Air dispersion modeling is performed to evaluate the maximum increase in ground-level pollutant concentrations resulting from the Project emissions, and to compare the maximum predicted impacts, including background pollutant levels, with applicable short-term and long-term NAAQS. The impacts from commissioning activities and plant operations were analyzed separately because they will occur during different time periods. The same 2-year Gregory Canyon meteorological data are used in the modeling to evaluate both commissioning and operational impacts. In each case, AERMOD predicted the increases in criteria pollutant concentrations at all receptor concentrations due to Project emissions only. Next, the maximum incremental increases for each pollutant and averaging time were added to the maximum background concentrations, based on air quality data collected at the most representative monitoring stations during the last 3 years (i.e., 2004 through 2006). These background concentrations are presented and discussed in Section 6.2.3.1, Air Quality Background Concentrations. The resulting total pollutant concentrations were then compared with the most stringent CAAQS or NAAQS.

APPENDIX 6.2-F – BACT ASSESSMENT

BACT ASSESSMENT

The BACT assessment conducted for the combustion turbines for the Project considered all NOx and CO control technologies currently proposed or in use on natural-gas-fired combustion turbines (>50 MMBtu/hour heat input). To identify feasible emission limits, several information sources were consulted, including the following:

U.S. EPA BACT/Lowest Achievable Emission Rate Clearinghouse (U.S. EPA 1985) and updates

CARB BACT Clearinghouse database and CARB BACT Guidelines for Power Plants (Adopted 7/22/99)

Recent California Energy Commission (CEC) Applications for Certification

Table 1 lists selected recent NOx BACT proposals and determinations for natural-gas-fired advanced technology combustion turbines similar in size to the proposed turbines. Nearly all recent simple cycle turbine projects in California involving turbines of similar size to those proposed for this Project have had a NOx BACT level of 2.5 ppm dry volume (ppmvd) (at 15 percent oxygen [O_2]), to be achieved by means of either low-NOx burners or water injection coupled with the use of SCR with ammonia injection. The combustion turbines in this Project will achieve the BACT concentration of 2.5 ppmvd at 15 percent O_2 using water injection and SCR.

Similarly, most recent simple cycle turbine projects have been approved with a CO emissions limit of 6 ppmvd and a ROC emissions limit of 2 ppmvd (both at 15 percent O_2), based on the use of an oxidation catalyst. The combustion turbines in this Project will achieve the BACT concentration for ROC to achieve the same levels. Exclusive use of natural gas fuel has been determined to be BACT for SOx and PM_{10} in all other comparable projects for several years.

U.S. EPA Region IX guidance stipulates a BACT emissions limit for NOx of 2.5 ppmvd (at 15 percent O_2) for a 1-hour average. U.S. EPA stipulates 2 ppmvd (at 15 percent O_2) for a 3-hour average.

Name	Loca-tion	Rating	Make & Model	Emission Limit	Control(s)	Permit Date
Kings River	CA	40+ each, 2 Turbine, 97 MW total	GE LM6000 PC SPRINT	3.0 ppm	Water Injection & SCR	5/04
Modesto Electric	CA	40+ each, 2 Turbines, 95 MW total	GE LM6000 PC SPRINT	2.5 ppm	Water Injection & SCR	2/04
Riverside Energy	CA	40+ each, 2 Turbines, 96 MW total	GE LM6000 PC SPRINT NxGen	2.5 ppm	Water Injection & SCR	12/04
Niland	CA	40+ each, 2 Turbines, 95 MW total	GE LM6000 PD SPRINT	2.5 ppm	Dry Low NOx & SCR	10/06

1.0 Assessment of NOx Control Technologies

Based on a review of materials described above, the following NOx control technologies were evaluated to determine whether they are able to achieve BACT NOx levels in practice:

DLE and Goal Line SCONOx™

DLE and SCR with ammonia injection

1.1 SCONOx™

SCONOx™ is a new NOx reduction system produced by Goal Line Environmental Technologies (now distributed by EmeraChem) for gas turbine applications within an exhaust temperature range significantly below the design operating parameters of the simple cycle LM6000 proposed for the Project. This system uses a coated catalyst to oxidize both NOx and CO and thereby reduce plant emissions. As demonstrated by an initial installation on several gas turbines where energy is recovered from the exhaust gas to produce steam, SCONOx™ is capable of achieving NOx emission concentrations of 2 ppm based on a maximum inlet concentration of 25 ppm, and 90 percent CO reduction based on a maximum inlet concentration of 50 ppm. However, the SCONOx™ technology has not been sufficiently demonstrated on higher exhaust temperature simple cycle peaking gas turbines such as those proposed for the Project.

The SCONOx™ system consists of a catalyst that is installed in the flue gas at a point where the temperature is between 280°F and 650°F. The proposed combustion turbines operate between 837°F and 956°F; therefore, the SCONOx™ application is not appropriate for this high-temperature technology. CO emissions are reduced in SCONOx™ by the oxidation of CO to CO_2. A two-step process reduces the NOx emissions. First, NOx emissions are oxidized to NO_2 and then adsorbed onto the catalyst. In the second step, a proprietary regenerative gas is passed through the catalyst periodically. This gas desorbs the NO_2 from the catalyst and reduces it to N2. The system does not use ammonia as a reagent; rather, it uses natural gas as the basis for a proprietary catalyst regeneration process.

Potential advantages of the SCONOx™ process include:

No ammonia. The SCONOx™ process does not use ammonia. This eliminates the ammonia storage and transportation safety issues and the potential for ammonia slip or ammonia-based particulate formation.

Carbon monoxide reduction. SCONOx™ will reduce CO emissions as well as NOx emissions.

Potential disadvantages of the SCONOx™ process include:

Not suitable for exhaust temperatures of simple cycle gas turbine peaking applications. SCONOx™ has been primarily installed on co-generation or combined cycle systems where the exhaust gas temperature is reduced by recovering energy to produce steam. The proposed Project will be a simple cycle peaking operation. As such, there will be no steam production, which is

required to produce the SCONOx™ regeneration gas. In addition, peaking units require more rapid SU and more frequent load changes than typical cogeneration systems. The main concerns are the damper systems that would be required with SCONOx™ for the units and assuring proper regeneration gas distribution. The effectiveness and longevity of these damper systems have not been demonstrated on simple cycle gas turbines, and their cost of replacement would be substantial.

Catalyst "washing." A proprietary catalyst washing system must be used and an on-line catalyst washing system design has not yet been fully developed. If an on-line catalyst washing system is not used, then the facility must be shut down for cleaning.

High capital and operating cost. SCONOx™ is significantly more expensive than SCR with ammonia injection primarily due to the higher cost of initial and replacement catalyst. The SCONOx™ catalyst is a precious metal catalyst, which is very expensive. Because the low NOx emission rates attainable on gas turbines in co-generation/combined cycle systems with SCONOx™ have not been sufficiently demonstrated as "achieved in practice" on simple cycle gas turbine applications and due to the other factors discussed above, SCONOx™ does not represent BACT for this Project at this time.

1.2 SCR with Ammonia Injection

SCR with ammonia injection systems for reduction of NOx emissions have been widely used in simple cycle gas turbine applications for many years and are considered a proven technology. SCR systems are commercially available from several vendors, unlike SCONOx™, which is available from a single vendor. The SCR process involves the injection of ammonia into the flue gas stream via an ammonia injection grid upstream of a catalyst. The ammonia reacts with the NOx gases in the presence of the catalyst. The catalyst is not regenerated and requires periodic replacement. SCR vendors typically offer a 3-year guarantee on catalyst life. SCR with ammonia injection systems have been used in numerous simple cycle applications including LM6000 Class units.

1.3 Dry Low Emissions Combustors

Water injection, steam injection, and Dry Low Emissions (DLE) combustion technologies are available and used to control LM6000 exhaust gas NOx emissions. For this Project, water injection will be used to lower the temperature in the combustion zone and reduce NOx formation. Virtually all gas turbine manufacturers are continuing to research and improve on these advanced combustion technologies because they represent the most cost-effective NOx reduction approach for some turbine users. Exploring NOx control through combustor design is attractive because there is essentially only one source of NOx formation in natural gas combustion as opposed to two sources with liquid or solid fuels. The source of NOx emission from natural gas turbines is the thermal NOx formation reaction, which is very dependent on combustor design. This reaction converts natural atmospheric nitrogen and oxygen to NOx at the high temperatures of combustion. Water injection results in NOx emission rates of 25 ppmvd (at 15 percent O_2) or less.

The Project will use water injection and SCR and ammonia injection designed to achieve a NOx emission limit of 2.5 ppm (at 15 percent O_2) on a 1-hour average. As noted in the table above, this level of NOx is at or below other recent and similar projects and is considered to be BACT for this Project.

1.4 Other Technologies

Technologies that cannot achieve a NOx emissions limit of 2.5 ppmvd (at 15 percent O_2) in practice were not considered. These technologies include SCR without DLE and DLE without SCR.

2.0 ASSESSMENT OF CO CONTROL TECHNOLOGIES

The proposed Project will be guaranteed to achieve 6 ppm (at 15 percent O_2) over a 1-hour average with natural gas fuel and use of a CO oxidation catalyst (except during SU and SD).

The following CO control technologies are evaluated:

- Combustion design/control
- Oxidizing catalyst

2.1 Combustion Design/Control

Gas turbine combustion technology has significantly improved over recent years with respect to lowering CO emissions. For some installations, the turbines have been guaranteed by the manufacturer to achieve a CO rate of 9 ppm (at 15 percent O_2) without post-combustion control technologies under a wide range of operating conditions (60 percent to 100 percent load) and ambient conditions (15°F to 115°F).

2.2 Oxidizing Catalyst

CO oxidizing catalysts have been used with natural-gas-fired turbines for over a decade when uncontrolled CO emission levels are unacceptably high. CO catalysts operate at elevated temperatures within the exhaust stream. CO oxidizing catalysts can be considered technically feasible for use in simple cycle peaking applications. Thus, installation of a CO oxidizing catalyst on the turbines is considered to be BACT for this Project.

3.0 ASSESSMENT OF ROC CONTROL TECHNOLOGIES

The proposed BACT level of 5 ppmvd (at 15 percent O_2) for ROC control with water injection, SCR, and an oxidation catalyst is consistent with the most stringent level among recent BACT determinations for simple cycle gas turbines and is therefore considered to be BACT for this Project.

4.0 ASSESSMENT OF SO2 AND PM10 CONTROL TECHNOLOGIES

Sulfur dioxide and PM_{10} emissions will be controlled through the use of clean-burning pipeline quality natural gas. This control technology has been widely and uniformly implemented for control of SO_2 and PM_{10} emissions from combustion turbines in California and throughout the United States, and is considered to be BACT for this Project.

5.0 ASSESSMENT OF AMMONIA SLIP CONTROL TECHNOLOGIES

The proposed BACT level of 5 ppmvd (at 15 percent O_2) is the most rigorous control requirement that has been imposed to date on any gas turbine power plant project in California, and is thus considered to represent an appropriate BACT level for this Project.

APPENDIX 6.2-G – AERMOD INPUTS AND OUTPUTS FILES

(Due to size of these files, they are provided electronically on the CD version of this application)