4.1 AIR QUALITY and PUBLIC HEALTH

This section presents the methodology and results of an analysis performed to assess potential impacts of airborne emissions from the construction and routine operation of the Palen Solar Energy Generating System Project. The “Applicant” (or PSEGS) is proposing to construct and operate a 500 megawatt (MW) (gross) solar power generation facility located in eastern Riverside County, California. PSEGS will be comprised of two adjacent solar fields and associated facilities with a total combined nominal output of approximately 500 MW. PSEGS will be developed in two operational phases: each phase will consist of one solar field and power block with approximately 250 MW of electricity. Each phase will also share common facilities, including a common area containing an administration building, warehouse, evaporation ponds, maintenance complex and a meter/valve station for incoming natural gas service to the site; an onsite switchyard; and a single-circuit 230 kV generation tie-line to deliver power to the electricity grid. Other onsite facilities will include access and maintenance roads (either dirt, gravel or paved), perimeter fencing, and other ancillary security facilities.

The Project would use heliostats—elevated mirrors guided by a tracking system mounted on a pylon—to focus the sun’s rays on a solar receiver steam generator (SRSG) located atop a solar tower near the center of each solar field to create steam. Each of the 250 MW units will have a dedicated SRSG/tower, solar field/heliostat array, and a dedicated non-reheat Rankine-cycle steam turbine generator/ power block. In each plant, one Rankine-cycle steam turbine will receive steam from the SRSG to generate electricity. The solar field and power generation equipment will start each morning after sunrise and will shut down (unless augmented by the auxiliary boiler) when insolation drops below the level required to keep the turbine online. To conserve water in the site’s desert environment, each plant will use an air-cooled condenser for the main steam-cycle. A wet surface air cooler (WSAC) will be used for auxiliary equipment cooling.

Station processes are as follows:

- Installation of 500 MW (gross) solar power generation equipment, consisting of two (2) 250 MW (gross) modules and two centralized power blocks.
- Installation of two (2) auxiliary boilers, one per power block, each rated at ~249.0 MMbtu/hr, fired on natural gas.
- Installation of two (2) night preservation boilers, one per power block, each rated at ~10.0 MMbtu/hr, fired on natural gas.
- Installation of two (2) emergency fire pump systems, one per power block, each consisting of a 617 horsepower (hp) diesel-fired engine coupled to a pump assembly capable of delivering sufficient water for fire suppression purposes.
- Installation of two (2) emergency electric generator systems, one per power block, each consisting of a 3633 hp (2500 kW) diesel fired engine coupled to an electrical generation assembly for emergency power purposes.
- Installation of two (2) wet-surface air condensers units, one per power block, each to provide cooling and heat rejection from a single power block process.
- Installation of all required auxiliary support systems.
- The Project requires off-site transmission line construction.
- The Project requires off-site pipeline construction for services such as natural gas.

Additional equipment to be installed and operated, which is common to both power blocks, is as follows:

- Installation of one (1) emergency fire pump system, consisting of a 617 horsepower (hp) diesel-fired engine coupled to a pump assembly capable of delivering sufficient water for fire suppression purposes.
- Installation of one (1) emergency electric generator system, consisting of a 398 hp (250 kW) diesel fired engine coupled to an electrical generation assembly for emergency power purposes.
- Mirror washing machines and site support vehicles.

4.1.1 Affected Environment

The affected environment and relevant project details are provided in the following sections.

4.1.1.1 Site Location

The Project site is located approximately 10 miles east of Desert Center and approximately 0.5 mile north of U.S. Interstate 10 (I-10) in Riverside County, California. Access to the site is via the Corn Springs Road exit on I-10. The Project will be located on public land managed by the BLM and authorized by BLM right-of-way #CACA – 48810, consisting of approximately 5,200 acres of flat, desert terrain south of the Palen Dry Lake. The Project site is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

4.1.1.2 Project Facilities

The facility will consist of two 250 MW (gross) solar units. The Project would use heliostats—elevated mirrors guided by a tracking system mounted on a pylon—to focus the sun's rays on a solar receiver steam generator (SRSG) located atop a solar tower near the center of each solar field to create steam. Each of the 250 MW units will have a dedicated SRSG/tower, solar field/heliostat array, and a dedicated non-reheat Rankine-cycle steam turbine generator/ power block.

The Applicant is proposing to install two (2) emergency fire pump engines rated at approximately 617 hp, two (2) emergency generator sets rated at 3633 hp (2500 kW), two (2) auxiliary natural gas fired boilers each rated at ~249.0 MMbtu/hr, two (2) natural gas fired night preservation boilers rated at ~10 mmbtu/hr each, and two (2) wet-surface air condensers. In addition, the facility common area will have a separate emergency electrical generator and fir pump system. The engines will meet all applicable U.S. Environmental Protection Agency (EPA) Tier emissions standards depending upon engine size, year of manufacture, and service category.

Proposed equipment specifications, for emissions sources for both power blocks, are summarized as follows:

Auxiliary Boilers (2)

- Manufacturer: Rentech (or equivalent)
- Model: D-Type Watertube
- Fuel: Natural Gas
- Rated Heat Input: 249.0 MMbtu/hr
- Fuel consumption: ~244,118 scf/hr (Gas HHV 1020 btu/scf)
- Exhaust flow: ~74,100 acfm, at 100% load

- Exhaust temperature: ~300 degrees Fahrenheit (°F)

Night Preservation Boilers (2)

- Manufacturer: Rentech (or equivalent)
- Model: Watertube Type
- Fuel: Natural Gas
- Rated Heat Input: 10 mmbtu/hr
- Fuel Consumption: ~9,800 scf/hr
- Exhaust Flow: ~5000 acfm, at 100% load
- Exhaust temperature: ~300 degrees Fahrenheit (°F)

Fire Pump Engines (2)

- Manufacturer: Clarke (or equivalent)
- Model: JX6H-UFAD88 (or equivalent)
- Fuel: Diesel or distillate oil (15 ppmw S), 550 gal AGT
- Rated horsepower: ~617 hp
- Fuel consumption: ~34 gallons per hour (gph)
- Exhaust flow: ~4840 actual cubic feet per minute (acfm)
- Exhaust temperature: ~950 degrees Fahrenheit (°F)

Emergency Electrical Generators (2)

- Manufacturer: Caterpillar (or equivalent)
- Model: 3516C (or equivalent)
- Fuel: Diesel or distillate oil (15 ppmw S), 1500 gal AGT
- Rated horsepower: ~3633 (2500 kW)
- Fuel consumption: ~175 gph
- Exhaust flow: 19,600 acfm
- Exhaust temperature: 925 °F

Wet SAC (2)

- Manufacturer: SPX Cooling Technologies, Inc. (or equivalent)
- Number of Cells: 4
- Number of Fans: 4 (147,500 acfm each)
- Water circulation rate: 4,000 gallons per minute (gpm)
- Drift rate: <0.0005%
- Expected TDS: ~1500 ppm

Additional equipment common to both power blocks is as follows:

Fire Pump Engines (1)

- Manufacturer: Clarke (or equivalent)
- Model: JX6H-UFAD88 (or equivalent)
- Fuel: Diesel or distillate oil (15 ppmw S), 550 gal AGT
- Rated horsepower: ~617 hp
- Fuel consumption: ~34 gallons per hour (gph)

- Exhaust flow: ~4840 actual cubic feet per minute (acfm)
- Exhaust temperature: ~950 degrees Fahrenheit (°F)

Emergency Electrical Generators (1)

- Manufacturer: Caterpillar (or equivalent)
- Model: 250 kWe (or equivalent)
- Fuel: Diesel or distillate oil (15 ppmw S), 500 gal AGT
- Rated horsepower: ~398 (250 kW)
- Fuel consumption: ~20 gph
- Exhaust flow: 2,250 acfm
- Exhaust temperature: 855 °F

Mirror Washing Equipment

- Tractor-pulled crane-arm systems (diesel fuel)
- Small vehicle systems (diesel fuel)
- Three (3) – 8,000 gal AGT

The only fuels to be combusted by stationary sources on-site will be California-certified low-sulfur, low-aromatic diesel fuel used by the emergency fire pumps, the emergency generator engines, and the mirror washing equipment, and natural gas for the various boilers. Table 4.1-1 presents a fuel use summary for the facility. Fuel use values are based on the maximum heat rating of each system, fuel specifications, and maximum operational scenarios. Typical fuel analysis data is presented in Appendix 4.1A for all proposed fuels.

Table 4.1-1. Estimated Fuel Use Summary for the Project

System	Units	Per Hour	Per Day	Per Year
Auxiliary Boiler (each)	mmscf	0.2441	0.9764	313.8
Night Preservation Boiler (each)	mmscf	0.0098	0.1373	47.8
Large Fire Pump Engine (each)	gallons	34	34	6,766
Common Area FP Engine	gallons	34	34	6,766
Large Emergency Generator (each)	gallons	175	175	34,825
Common Area EG	gallons	20	20	400
MWM systems	gallons	-	-	3,212,000

Natural gas at 1020 btu/scf (HHV). Diesel fuel at 139,000 BTU/gal. See Appendix 4.1A for specific information. NG sulfur at 0.75 gr S/100 scf.

Each engine will only be tested for ~30-60 minutes on any given day (typically one day per week), and only one engine will be tested during any one 60-minute period. Maximum annual hours and fuel use for each engine is based on 199 per year.

Annual values include fuel use totals for all operating modes, while hourly and daily (except for the aux boilers) values are for normal full load firing mode only.

4.1.1.3 Climate and Meteorology

The site is located approximately 10 miles east of the Desert Center area (California), within the eastern portion of Riverside County, and experiences the following climate and meteorology patterns.

The Project site is located in the Mojave Desert Air Basin (MDAB) in California's Colorado Desert, which is a part of the larger Sonoran Desert that extends across southwest North America. The Colorado Desert region encompasses approximately seven million acres, extending from the Mexican border in the south to the higher-elevation Mojave Desert in the north and from the Colorado River in the east to the Peninsular mountain range in the west. The majority of the Colorado Desert is classified as a “low desert” and lies at a relatively low elevation, below 1,000 feet (above mean seal level), with the lowest point of the desert floor at 275 feet below sea level in the Salton Trough.

Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet, most of the region's mountains do not exceed 3,000 feet. These ranges block moist coastal air and rains, producing an arid climate.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. The mean maximum temperature in July and August exceed 100°F. In addition, the Colorado Desert, especially toward the southern portion of the region, experiences two rainy seasons per year, in the winter and late summer, while the more northerly Mojave Desert has only winter rains. During the summer, the Project Site will be generally influenced by a Pacific Subtropical High cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The Colorado Desert is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are typically weak and diffuse by the time they reach the desert. Most desert moisture arrives from infrequent warm, moist, and unstable air masses from the south.

The most significant large-scale phenomena affecting air quality in the Project area are the transport winds from the west. These prevailing winds are due to the proximity of the Colorado Desert to the coastal region; air masses pushed onshore in Southern California by differential heating are channeled through the San Gorgonio Pass into the Project area. (Palen 2009)

The climatic pattern for the Project region is a typical desert climate within the Mediterranean climate classification. The warmest month for the region is typically July, with the coldest month being December. The month with the highest precipitation is usually February. The eastern Mojave Desert region experiences a large number of days each year with sunshine, generally 345+ days per year. The region also traditionally experiences excellent visibility, *i.e.,* greater than 10 miles or more 95 percent of the time.

Representative climatic data for the Project Area was derived from the Blythe CAA Airport Station (#040927, Period of Record 7-1-1948 to 12-31-2008) located east of the Project Site. A summary of data from this site indicates the following:

- Average maximum daily temperature 87.7°F
- Average minimum daily temperature 59.7°F
- Highest mean maximum annual temperature 111.1°F
- Lowest mean minimum annual temperature 32.3°F
- Mean annual precipitation 4.02 inches

Air quality is determined primarily by the type and amount of pollutants emitted into the atmosphere, the nature of the emitting source, the topography of the air basin, and the local meteorological conditions. In the Project area, inversions and light winds can result in conditions for pollutants to accumulate in the region.

The predominant winds in the Project area are shown in Figure 5.2-1. Winds in the Project region are generally southerly (south-southeast through west-southwest) with a less frequent component of north-northwest and north winds. The annual and quarterly wind roses for the Blythe Airport Automated Surface Observing System (ASOS) site for the 2002 to 2006 calendar years are presented in Appendix 4.1B. Calm conditions occur approximately 16.03% of the time, with the average wind speed being 3.66 m/s.

Based on discussions with the South Coast Air Quality Management District (SCAQMD), meteorological data representative of the site (presented in Appendix 4.1B) can be derived from the Blythe ASOS station. As discussed in detail later, Blythe ASOS surface data were combined with Tucson, Arizona radiosonde data for 2002 to 2006 using the AERMOD meteorological processing programs and guidance documents.

4.1.2 Regulatory Environment

Although a regulatory compliance analysis is presented in Section 4.1.9, there are several SCAQMD regulations that directly affect the permitting and review process, such as the Determination of Compliance (DOC) for the Project as follows:

- New Source Review (NSR) Regulation XIII, Rule 1303 requires that Best Available Control Technology (BACT) be applied to:
- Any new Permit Unit which emits, or has the Potential to Emit, any increase of any Nonattainment Air Pollutant.
- Per Regulation XIII, Rule 1303, provide all required emissions mitigations prior to the issuance of the Permit to Construct.
- Provide an impact analysis per Regulation XIII, Rule 1303.
- Per Regulation XIII, Rule 1303, demonstrate prior to the issuance of the Authority to Construct (ATC) that all major stationary sources owned or operated by the Applicant, which are subject to emissions limitations, are either in compliance or on a schedule for compliance with all applicable emissions limitations under the Clean Air Act (CAA).
- Per Regulation XIII, Rule 1304, emergency equipment such as the proposed fire-pump systems, and emergency electrical generator systems are exempt from the districts modeling and emissions offset requirements.

In addition, the following should be noted:

- The SCAQMD NSR rule (Regulation XIII) does not define “cargo carriers”, but rather defines “mobile source” which includes the major cargo carrier modes, i.e., roadways, waterways, rail, and air.
- For purposes of calculating potential to emit, fugitive emissions from facility paved/unpaved roads are not included for the source.
- For purposes of calculating potential to emit, secondary emissions from facility operations are not included in the sources PTE calculations, except for in-plant vehicles which are “accumulated” per Rule 1306.

As such, the operational emissions from fugitive sources are included in the source’s potential to emit calculations, while in-plant vehicle emissions are accumulated, but not counted in the facility PTE values. These emissions have been quantified and are presented in Appendix 4.1A.

4.1.3 Environmental Impacts

Potential impacts for the Project are discussed in the following sections.

4.1.3.1 Current Facility Emissions and Permit Limitations

The site is currently vacant with no known emissions sources (other than natural sources). The property is the site of the previously proposed Palen Solar Power Project (Solar Millennium) per 09-AFC-7 (August 2009). A slight level of construction activity related to the previous project has taken place at the site, i.e., primarily basic access road clearing and grading.

4.1.3.2 Facility Emissions

Installation and operation of the Project will result in a change in the emissions signature for the site. Criteria pollutant emissions from the proposed auxiliary boilers, night preservation boilers, fire pump engines, emergency generator engines, wet-SACs, and on-site mobile equipment are delineated in the following sections, while emissions of hazardous air pollutants (HAPs) are discussed in Section 4.1.12, Public Health, and quantified in Appendix 4.1A.

4.1.3.3 Normal Operations

Operation of the Project will result in emissions to the atmosphere of both criteria and toxic air pollutants. Criteria pollutant emissions will consist primarily of nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), sulfur oxides (SO_x), sub 10-micron particulate matter (PM_{10}), and sub 2.5-micron particulate matter particulate matter ($PM_{2.5}$). Air toxic pollutants will consist of a combination of toxic gases and toxic particulate matter species. Table 4.1-2 lists the pollutants that may potentially be emitted from the Project.

Table 4.1-2. Criteria and Toxic Pollutants Potentially Emitted from the Project

Criteria Pollutants	Toxic Pollutants	
NO_x	Acetaldehyde	PAHs
CO	Acrolein	Propylene
VOCs	Benzene	Propylene Oxide
SO_x	1-3 Butadiene	Toluene
$PM_{10}/PM_{2.5}$	Ethylbenzene	Xylene
Lead	Formaldehyde	Diesel Particulate Matter
	Hexane Naphthalene	Beryllium
	Copper	

4.1.3.4 Criteria Pollutant Emissions

Tables 4.1-3, 4.1-4, and 4.1-5 present data on the criteria pollutant emissions expected from the plant equipment and systems under normal operating scenarios. Table 4.1-6 presents a summary of total facility operational emissions. Table 4.1-7 delineates the potential to emit for the Project.

Table 4.1-3. Fire Pump Engine Emissions for the Project

Pollutant	Emission Factor (g/hp-hr)	Max Hourly Emissions for Each Engine (lbs)	Max Daily Emissions for Each Engine (lbs)	Max Annual Emissions for All Engines (tons)

~617 HP FP Engines (2)				
NO_x	2.6	3.53	3.53	0.70
CO	0.5	0.68	0.68	0.14
VOCs	0.1	0.14	0.14	0.027
SOx	15 ppmw S	0.007	0.007	0.0014
$PM_{10/2.5}$	0.09	0.12	0.12	0.024
~617 HP FP Engine (1) Common Area				
NO_x	2.6	3.53	3.53	0.35
CO	0.5	0.68	0.68	0.07
VOCs	0.1	0.14	0.14	0.014
SOx	15 ppmw S	0.007	0.007	0.0007
$PM_{10/2.5}$	0.09	0.12	0.12	0.012

* All particulate matter is classified as diesel particulate matter (DPM).

g/hp-hr – grams per horsepower-hour

lbs – pounds

These engines are not run during the same hour as the Emergency Generator Engines noted below. Secondly, testing is for <60 minutes only, so the maximum hourly emissions above represent the maximum daily emissions as well. Each engine is run <=199 hours per year.

Per NSPS Subpart IIII, FP engines rated at 175 to 300 hp, with rpm values greater than 2650, may comply with the engine category emissions limits for 2008.

Table 4.1-4. Emergency Generator Engine Emissions for the Project

Pollutant	Emission Factor (g/hp-hr)	Max Hourly Emissions for Each Engine (lbs)	Max Daily Emissions for Each Engine (lbs)	Max Annual Emissions for All Engines (tons)
~3633 HP EGS Engines (2)				
NO_x	0.59	4.72	4.72	0.94
CO	0.03	0.24	0.24	0.05
VOCs	0.01	0.08	0.08	0.016
SOx	15 ppmw S	0.04	0.04	0.007
$PM_{10/2.5}$	0.03	0.24	0.24	0.048
~398 HP EGS Engine (1) Common Area				
NO_x	2.97	2.6	2.6	0.26
CO	0.36	0.32	0.32	0.031
VOCs	0.1	0.09	0.09	0.009
SOx	15 ppmw S	0.001	0.001	0.0004
$PM_{10/2.5}$	0.079	0.07	0.07	0.007

* All particulate matter is classified as diesel particulate matter (DPM).

g/hp-hr – grams per horsepower-hour

lbs – pounds

These engines are not run during the same hour as the Fire Pump Engines noted above. Secondly, testing is for <60 minutes only, so the maximum hourly emissions above represent the maximum daily emissions as well. Each engine is run <=199 hours per year.

Table 4.1-5. Auxiliary Boilers, Night Preservation Boilers, and Wet-SAC Emissions for the Project

Auxiliary Boilers (2)				
Pollutant	**Max Hourly Emissions for Each Boiler (lbs)**	**Max Daily Emissions for Each Boiler (lbs)**	**Max Annual Emissions for Each Boiler (tons)**	**Max Annual Emissions for Both Boilers (tons)**
NOx	2.74	11.54	1.985	3.97
CO	4.50	25.58	4.39	8.78
VOC	1.34	7.6	1.31	2.61
SOx	0.747	2.82	0.486	0.972
PM10/PM2.5	1.25	4.774	0.82	1.64
Low plus high load emissions for daily and annual, including SU. Appendix 4.1A presents emissions data for each boiler.				
Night Preservation Boilers (2)				
NOx	0.11	1.54	0.268	0.536
CO	0.366	5.12	0.892	1.78
VOC	0.054	0.756	0.132	0.263
SOx	0.0093	0.129	0.0225	0.045
PM10/PM2.5	0.05	0.70	0.122	0.244
Emissions data at full load, 14 hours per day, 4872 hours per year each. Appendix 4.1A presents emissions data for each boiler. Annual emissions are for all operating modes.				
Wet-SAC Units (2)				
Pollutant	**TDS, mg/L**	**Max Hourly Emissions for Each WSAC (lbs)**	**Max Daily Emissions for Each WSAC (lbs)**	**Max Annual Emissions for Both WSAC (tons)**
PM_{10}/ $PM_{2.5}$	~1500	0.015	0.18	0.03

Drift fraction – 0.000005

Emissions are a total from 4 cells, assuming operational time of 12 hr/day and 2000 hrs/year (each WSAC).

Auxiliary boiler startup emissions are presented in Table 4.1-6.

Table 4.1-6 Aux Boiler Startup Emissions

Pollutant	lbs/SU*	Lbs/SU Hour**	Tons Per Year (Both Boilers)
NOx	1.37	1.54	0.48
CO	2.27	4.50	0.79
VOC	0.67	1.32	0.23
SOx	0.05	0.09	0.02
PM10/PM2.5	0.15	0.23	0.05
*SU period is 30 minutes **SU hour is 30 minutes at SU, plus 30 minutes at low load. 348 SU/yr, 174 SU hrs/yr			

Table 4.1-7 presents the emissions estimates for the mirror washing equipment and in-plant dedicated vehicles.

Table 4.1-7. Operations Mobile Source Emissions

Pollutant	lbs/hr	lbs/day	tons/year
Mirror Washing Equipment (Exhaust)			
NO_x	0.46	9.11	1.66
CO	0.20	4.01	0.73
VOCs	0.21	4.2	0.77
SO_x	0.21	4.14	0.76
PM_{10}	0.014	0.27	0.05
$PM_{2.5}$	0.014	0.27	0.05
In-Plant Support Vehicles (Exhaust)			
NO_x	0.183	4.39	0.8
CO	0.167	4.01	0.73
VOCs	0.022	0.52	0.1
SO_x	neg	0.011	0.002
PM_{10}	neg	0.234	0.043
$PM_{2.5}$	neg	0.233	0.043
Fugitive Dust Emissions from Onsite Operations Activities			
Unpaved Road Use (PM10/PM2.5)	n/a	61.1/12.95	11.14/2.4
Paved Road Use (PM10/PM2.5)	n/a	0.26/0.04	0.05/0.008

Tables 4.1-8 through 4.1-11 present the summary of emissions for the various programs such as CEQA, SCAQMD, PSD, etc.

Table 4.1-8. Summary of Facility Emissions for the Project For CEC/CEQA

Pollutant	Max, lbs/hr	Max, lbs/day	Max, tons/year
NO_x	32.5	57.96	8.42
CO	30.77	74.62	11.93
VOCs	8.85	21.29	3.43
SO_x	2.07	7.94	1.37
PM_{10}	9.75	131.10	23.68
$PM_{2.5}$	5.16	31.50	5.46

Fugitive emissions from onsite paved and unpaved roads, as well as mobile equipment exhaust emissions are included.

Table 4.1-9. Summary of Facility Emissions for the Project For SCAQMD

Pollutant	Max, lbs/hr	Max, lbs/day	Max, tons/year
NO_x	32.09	49.13	6.81
CO	30.51	68.70	10.85
VOCs	8.72	18.72	2.96

Table 4.1-9. Summary of Facility Emissions for the Project For SCAQMD

Pollutant	Max, lbs/hr	Max, lbs/day	Max, tons/year
SO_x	1.98	6.08	1.03
PM_{10}	4.31	12.41	2.01
$PM_{2.5}$	4.31	12.41	2.01

Fugitive emissions from onsite paved and unpaved roads, as well as mobile equipment exhaust emissions are not included.

Table 4.1-10. Summary of Facility Emissions for the Project For SCAQMD Offset Determination

Pollutant	Max, lbs/hr	Max, lbs/day	Max, tons/year
NO_x	9.46	26.50	4.55
CO	27.67	65.86	10.56
VOCs	8.05	17.99	2.88
SO_x	1.88	5.98	1.02
PM_{10}	3.40	11.50	1.92
$PM_{2.5}$	3.40	11.50	1.92
SCAQMD 30 Day Emissions Values, lbs/day			
NO_x	27.38		
CO	68.06		
VOCs	18.59		
SO_x	6.18		
PM_{10}	11.88		
$PM_{2.5}$	11.88		

Fugitive emissions from onsite paved and unpaved roads, as well as mobile equipment exhaust emissions are not included. Emissions from equipment exempt from offsets per Rule 1302 are not included.

Table 4.1-11. Summary of Project PSD Status

Pollutant	Max, TPY	PSD Threshold, TPY (Major/SER)	PSD Applicable
NO_x	6.81	250/40	No
CO	10.85	250/100	No
VOCs	2.96	250/40	No
SO_x	1.03	250/40	No
PM_{10}	2.01	250/15	No
$PM_{2.5}$	2.01	250/10	No
CO2e	44619	100,000	No

Emissions from the use of on-site mobile equipment are not included in Table 4.1-7, per the following:

- These emissions, per Rule 1303 are classified as “secondary” and are not to be included in the source’s potential to emit.

- Mobile sources, such as the vehicles proposed for on-site operations use are clearly exempt from the AQMD permitting regulations. Appendix 4.1A contains a delineation of the estimated mobile source on-site operational emissions.
- These vehicles, depending upon type, will be properly licensed and registered through the California Department of Motor Vehicles.
- Both the AQMD and State emissions inventories clearly anticipate and forecast emissions for motor vehicles for future years. Therefore, it is reasonable to assume these emissions are already included in the AQMD and State emissions projections and air quality planning analyses. As such, the emissions are not "new" or "un-anticipated." Appendix 4.1A presents summary data on the vehicle emissions and use growth rates for the SCAQMD.

Pursuant to District Rule 1304, the offset thresholds are applied on a facility basis at the following threshold values:

- CO 29 tons per year (tpy)
- $PM_{10/2.5}$ 4 tpy
- NOx 4 tpy
- SOx 4 tpy
- VOC 4 tpy

Based on the above noted offset thresholds, and the values in Table 4.1-7, the facility would be required to obtain offsets pursuant to Rule 1304 for NOx only. Mitigation for NOx will be accomplished by participation in the NOx RECLAIM program, i.e., ERCs for NOx will not be required. The criteria pollutant mitigation strategy for the Project is discussed in Appendix 4.1G.

Based on the values in Tables 4.1-6 and 4.1-7, the new facility will not be a "major polluting facility" per SCAQMD NSR Regulation XIII for any criteria pollutant, since the facility lies in the non-Palo Verde portion of Riverside County within the MDAB, which has the following major polluting facility emissions threshold levels:

- NOx, CO, VOC, SOx, PM10 100 tpy

Detailed emissions data on the facility are presented in Appendix 4.1A. The facility will not trigger the Prevention of Significant Deterioration (PSD) program requirements; therefore, a PSD increment and impact analysis protocol is not required (see Appendix 4.1C).

4.1.4 Greenhouse Gas Emissions

Operational emissions of greenhouse gases (GHGs) will be primarily from the combustion of fuels in the auxiliary and night preservation boilers, fire pumps, emergency generator engines, and on-site mobile equipment use. Emissions factors derived from the California Climate Action Registry General Reporting Protocol (GRP) (6/2006).

- Total operational emissions of GHG (CO2e) from onsite stationary and mobile source equipment are estimated to be 44,619 tons/yr.

See Appendix 4.1A for emissions support data and calculations.

4.1.5 Hazardous Air Pollutants

See Section 4.1.12 and Appendix 4.1A for a detailed discussion and quantification of hazardous air pollutant emissions from the Project and the results of the health risk assessment (HRA). See Appendix 4.1D for the public health analysis support materials. Section 4.1.12 also discusses the need for Risk Management Plans pursuant to 40 CFR 68 and the California Accidental Release Program (CalARP) regulations.

4.1.6 Construction

Construction-related emissions are based on the following:

- The total project site acreage is 3794. Only 337.2 acres will actually be disturbed (grading, scraping, leveling, etc.) during construction. The maximum acreage to be disturbed on any single day is 34 acres.
- Moderate site preparation will be required prior to construction of the array fields, power blocks, control building foundations, support structures, and other project features.
- Construction activity is expected to last for a total of ~33 months.

Construction-related issues and emissions at the Project site are consistent with issues and emissions encountered at any construction site. Compliance with the provisions of the following permits (as incorporated in the CEC Conditions of Certification) will generally result in minimal site emissions: (1) grading permit, (2) Storm Water Pollution Prevention Plan (SWPPP) requirements (construction site provisions), (3) use permit, (4) building permits, and (5) the SCAQMD ATC permit, which will require compliance with the provisions of all applicable fugitive dust rules that pertain to the site construction phase. An analysis of construction site emissions is presented in Appendix 4.1E. This analysis incorporates the following mitigation measures or control strategies:

- The Applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.
- All unpaved roads and disturbed areas in the Project and laydown construction sites will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on an average schedule of every three-four hours during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- On-site vehicle speeds will be limited to less than or equal to 15 miles per hour (mph) on unpaved areas within the Project construction site.
- The construction site entrance(s) will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.
- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.

- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction SWPPP to prevent runoff to roadways.
- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.
- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air-filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.
- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or treated with appropriate dust suppressant compounds.
- All vehicles used to transport solid bulk material on public roadways and have the potential to cause visible emissions will be covered, or the materials will be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of two feet will be required on all bulk materials transport.
- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.
- Disturbed areas will be re-vegetated or covered with gravel or other dust suppressant material as soon as practical and restored in accordance with BLM requirements.

To mitigate exhaust emissions from construction equipment, the Applicant is proposing the following:

- The Applicant will work with the construction contractor to use, to the extent feasible, EPA/Air Resources Board (ARB) Tier II/Tier III engine compliant equipment for equipment over 100 hp.
- Ensure periodic maintenance and inspections per the manufacturer's specifications.
- Reduce idling time through equipment and construction scheduling.
- Use California low sulfur diesel fuels (<=15 ppmw S).

Based on the temporary nature and the time frame for construction, the Applicant believes these measures will reduce construction emissions and impacts to levels that are less than significant. Use of these mitigation measures and control strategies will ensure the site does not cause any violations of existing air quality standards as a result of construction-related activities. Appendix 4.1E presents the evaluation of construction related emissions. Appendices 4.1B and 4.1E present data on the construction related temporary ambient air quality impacts.

Table 4.1-12 presents data on the regional air quality significance thresholds currently being implemented by the SCAQMD.

Table 4.1-12. SCAQMD CEQA Significance Thresholds

Pollutant	Construction, lbs/day	Operation, lbs/day
Carbon Monoxide	550	550
Oxides of Nitrogen	100	55
Volatile Organic Compounds	75	55

Oxides of Sulfur	150	150
Particulate Matter (PM10)	150	150
Source: SCAQMD, Localized Significance Threshold Methodology, June 2003.		

A comparison of construction and operational emissions (in Appendices 4.1A and 4.1E) to the significance values in Table 4.1-8 indicates the following:

- On-site construction emissions will exceed the daily significance thresholds for NOx and VOC only.
- Operational emissions are not expected to exceed the daily significance thresholds for any pollutant.

A conformity analysis per the Code of Federal Regulations (40 CFR Parts 6 and 51), and SCAQMD Regulation XIX is not required since the project is located in an area which has a status of "unclassified/attainment" for all federal air quality standards.

4.1.7 Best Available Control Technology Evaluation

4.1.7.1 Proposed Facility Control Technologies

Table 4.1-13 presents the proposed BACT levels and technologies for the new boilers, fire pumps emergency generator engines, and wet-SACs.

Table 4.1-13. BACT for the Project Boilers, Fire Pump and Emergency Generator Engines, and Wet-SACs

Pollutant	BACT Emissions Level	BACT System(s)	Meets Current BACT Requirements
Emergency Generator IC Engines (3633 bhp)			
NO_x	2.6 g/hp-hr	Engine Design	Yes
CO	2.6 g/hp-hr	Engine Design	Yes
VOCs	0.3 g/hp-hr	Engine Design and Low Aromatic Fuel	Yes
SO_x	Fuel S <= 15 ppmw S	Fuel S <= 15 ppmw S	Yes
PM_{10}/ $PM_{2.5}$	0.07 g/hp-hr	Engine design and ultra low sulfur diesel (ULSD)	Yes
Emergency Generator IC Engine (398 bhp)			
NO_x	2.7 g/hp-hr	Engine Design	Yes
CO	2.6 g/hp-hr	Engine Design	Yes
VOCs	0.3 g/hp-hr	Engine Design and Low Aromatic Fuel	Yes
SO_x	Fuel S <= 15 ppmw S	Fuel S <= 15 ppmw S	Yes
PM_{10}/ $PM_{2.5}$	0.15 g/hp-hr	Engine design and ultra low sulfur diesel (ULSD)	Yes
Emergency Fire Pump Engines (~617 bhp)			
NO_x	2.6 g/hp-hr	Engine Design	Yes
CO	0.5 g/hp-hr	Engine Design	Yes
VOCs	0.1	Engine Design and Low Aromatic Fuel	Yes
SO_x	Fuel S <= 15 ppmw S	Fuel S <= 15 ppmw S	Yes
PM_{10}/ $PM_{2.5}$	0.09 g/hp-hr	Engine design and ultra low sulfur diesel	Yes

Table 4.1-13. BACT for the Project Boilers, Fire Pump and Emergency Generator Engines, and Wet-SACs

Pollutant	BACT Emissions Level	BACT System(s)	Meets Current BACT Requirements
		(ULSD)	
Auxiliary Boilers (240 mmbtu/hr)			
NO_x	9 ppm, 0.0110 lb/mmbtu	ULNB, FGR, GCP, Natural Gas	Yes
CO	50 ppm, 0.0366 lb/mmbtu	ULNB, FGR, GCP, Natural Gas	Yes
VOCs	12.6 ppm, 0.0054 lb/mmbtu	ULNB, FGR, GCP, Natural Gas	Yes
SO_x	0.33 g S/100 scf, 0.000924 lb/mmbtu	ULNB, FGR, GCP, Natural Gas	Yes
PM_{10}/ $PM_{2.5}$	0.33 g S/100 scf, 0.005 lb/mmbtu	ULNB, FGR, GCP, Natural Gas	Yes
ppm at 3% O2 dry, VOC as CH4			
Night Preservation Boilers (15 mmbtu/hr)			
NO_x	9 ppm, 0.0110 lb/mmbtu	LNB, FGR, GCP, Natural Gas	Yes
CO	50 ppm, 0.0366 lb/mmbtu	LNB, FGR, GCP, Natural Gas	Yes
VOCs	12.6 ppm, 0.0054 lb/mmbtu	LNB, FGR, GCP, Natural Gas	Yes
SO_x	0.33 g S/100 scf, 0.000924 lb/mmbtu	LNB, FGR, GCP, Natural Gas	Yes
PM_{10}/ $PM_{2.5}$	0.33 g S/100 scf, 0.005 lb/mmbtu	LNB, FGR, GCP, Natural Gas	Yes
ppm at 3% O2 dry, VOC as CH4			
Wet-SACs			
PM_{10}/ $PM_{2.5}$	0.015 lb/hr per WSAC	Drift Eliminators at 0.0005%	Yes
ULNB = ultra low NOx burners, FGR-flue gas recirc, GCP-good combustion practices, see Appendix 4.1A for boiler specifications, etc.			

Based on the above data, the proposed emissions levels for the new boilers, fire pumps, emergency generator engines, and wet-SACs meet the BACT requirements of the SCAQMD.

4.1.8 Air Quality Impact Analysis

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

Potential air quality impacts were evaluated based on air quality dispersion modeling, as described in herein. All input and output modeling files are contained on a CD-ROM disk provided to CEC Staff under separate cover. All modeling analyses were performed using the techniques and methods as discussed with the SCAQMD.

4.1.8.1 Dispersion Modeling – Primary Model Selection

For modeling the potential impact of the Project in terrain that is both below and above stack top (defined as simple terrain when the terrain is below stack top and complex terrain when it is above stack top), the EPA guideline model AERMOD (version12345) was used as well as the latest versions of the AERMOD preprocessors to determine surface characteristics (AERSURFACE version13016), process meteorological data (AERMET version12345), and determine receptor elevations and hill slope factors (AERMAP version11103). The purpose of the AERMOD modeling analysis was to evaluate compliance with California and Federal air quality standards.

The surface meteorological data processed for AERMOD were five recent years (2002 to 2006) of Automated Surface Observing Systems (ASOS) data from Blythe Airport. Due to its proximity, the Blythe Airport data are considered to be representative of dispersion conditions for the Project site. These five years of surface data were selected because they are the most recent five years available at the time of the data processing that also met the minimum 90 percent data recovery rate requirement (for each calendar year) after combining with concurrent upper-air data. ASOS surface data for Blythe Airport were downloaded from the National Climatic Data Center (NCDC) website in the hourly Integrated Surface Data (ISD) format and then combined with upper-air data from Tucson, Arizona (upper air sounding data were downloaded from the NOAA/RAOB website for the same time period and processed by AERMET).

AERMOD input data options are listed below. Use of these options follows the EPA's modeling guidance. Default model option1 for temperature gradients, wind profile exponents, and calm processing, which includes final plume rise, stack-tip downwash, and elevated receptor terrain heights option, and all sources were modeled as rural sources.

4.1.8.2 Additional Model Selections

Several other EPA models and programs were used to quantify pollutant impacts on the surrounding environment based on the emission sources operating parameters and their locations. The models used were Building Profile Input Program for PRIME (BPIP-PRIME, current version 04274), which was used to determine building dimensions input into AERMOD. Due to the relatively short release heights for all the facility stacks and distance to nearby water bodies, no inversion breakup or shoreline fumigation impacts would be expected to occur.

4.1.8.3 Good Engineering Practice Stack Height Analysis

Formula Good Engineering Practice (GEP) stack heights were calculated by BPIP-PRIME based on the Project site plans as around 262 meters in the Power Blocks for the fire pumps, auxiliary boilers, night preservations boilers and two of the four wet-surface air condenser cells in each power block (due to the 228.6 meter high solar tower) and 91.45 meters for the emergency generator and the other two wet-surface air condenser cells (due to the 36.58 meter high air cooled condenser). In the common area, GEP stack heights were calculated by BPIP-PRIME as 36.58 meters for the emergency generator and firepump (due to the 14.63 meter high mechanical/maintenance/electrical

[1] To reduce run times for the area source modeled for fugitive dust and the large number of point sources modeled for mobile combustion source equipment, the TOXICS keyword was used for modeling construction impacts as well as operational impacts when including mirror washing and other onsite vehicles, modeled as area sources for unpaved areas or line sources for paved areas.

shop). All of the design stack heights are less than the calculated formula-GEP stack heights, thus downwash effects were included in the modeling analysis.

BPIP-PRIME was used to generate the wind-direction-specific building dimensions for input into AERMOD.

4.1.8.4 Receptor Grid Selection and Coverage

Receptor elevations were determined from the U.S. Geological Survey (USGS) Digital Elevation Model (DEM) data using the 7.5-minute format DEM data for the surrounding nine USGS quads. Receptor spacing in the DEM data was 10-meters (between grid nodes) for the USGS quad containing the project (Sidewinder Well) and 30-meter spacing for the surrounding eight quads. Since DEM data coordinates are referenced to UTM North American Datum 1927 (NAD27), Zone 11, AERMOD modeling was performed for NAD27 coordinates generated by AERMAP. Except for fence line receptors, the receptor locations were placed at DEM nodes appropriate for the grid spacing (receptor x,y locations are in whole meters with integer intervals equal to the receptor spacing).

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

- 50-meter resolution from the Project fence line and extending outwards in all directions at least 500 meters from the Project fence line. This is called the downwash receptor grid. In addition, receptors were placed at approximate 50-meter intervals along the Project fence line.
- 200-meter resolution extending outwards from the edge of the downwash grid to 200 meters from the Project fence line in all directions. This is referred to as the intermediate receptor grid.
- 500-meter resolution extending outwards from the edge of the intermediate grid to 10 kilometers from the center of the Project in all directions. This is referred to as the coarse receptor grid.
- 50-meter resolution around any location on the intermediate or coarse grids where a maximum impact is modeled. This is referred to as a refined receptor grid. In the modeling analyses, all overall maximum impacts occurred in the downwash receptor grid, so no refined receptor grids were required.

Concentrations within the facility fence line were not calculated. Receptor locations and DEM data files were input into AERMAP (version11103) to calculate receptor elevations and hill height scales (and fenceline receptor heights) as per EPA guidance.

4.1.8.5 Meteorological Data Selection

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

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

Surface characteristics were determined with AERSURFACE using Land Use/Land Cover (LULC) data in accordance with EPA guidance documents ("*AERMOD Implementation Guide,"* 1/09/08; and "*AERSURFACE User's Guide*," EPA-454/B-08-001, 1/08) as described below. AERSURFACE uses USGS National Land Cover Data 1992 archives (NLCD92) to determine the midday albedo, daytime Bowen ratio, and surface roughness length representative of the surface meteorological station. ***Bowen ratio*** is based on a simple unweighted geometric mean while ***albedo*** is based on a simple unweighted arithmetic mean for the 10x10 km square area centered on the selected location (*i.e.,* no direction or distance dependence for either parameter). ***Surface roughness length*** is based on an inverse distance-weighted geometric mean for upwind distances up to one (1) km from the selected location. The circular surface roughness length area (1-km radius) can be divided into any number of sectors as appropriate (EPA guidance recommends that no sector be less than 30º in width). For this analysis, only one 360-degree sector was used. Both the monitoring location and Project site are predominantly rural with desert shrub land surface characteristics.

Given the location of the ASOS data relative to the Project site, Blythe Airport data were considered the most representative. These data were then processed using AERMET (Version13016) based on one 360-degree sector for roughness lengths.

As part of the AERMET input requirements, Albedo, Bowen Ratio, and Surface Roughness must be classified by month/season. These values were calculated with AERSURFACE for the meteorological data location (33.61822ºN, 114.71581ºW, NAD83 geographic coordinates) based on arid conditions, no snow cover during the winter season, and an airport location. Based on discussions with SCAQMD, all months were tabulated into an annual average based on their seasonal defaults (December through February as winter, March through May as spring, etc.) for an arid region with average surface moisture. This gave an annual average surface roughness of 0.094 meters, an albedo of 0.22 and a Bowen ratio of 2.51.

For these reasons as discussed above, the Blythe ASOS meteorological data selected for the Project are expected to satisfy the definition of representative meteorological data. Thus, it is our assessment the meteorological data collected at the Blythe Airport ASOS site are identical to the dispersion conditions at the Project site and to the regional area. Based on the representativeness, the ASOS data were then processed using AERMET (Version 13016) based on one 360 degree sector for roughness lengths.

4.1.8.6 Background Air Quality

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

The criteria pollutants are those that have been demonstrated historically to be widespread and have a potential to cause adverse health impacts. EPA developed comprehensive documents detailing the basis of, or criteria for, the standards that limit the ambient concentrations of these pollutants. The State of California has also established AAQS that further limit the allowable concentrations of certain criteria pollutants. Review of the established air quality standards is undertaken by both EPA and the State of California on a periodic basis. As a result of the periodic reviews, the standards have been updated and amended over the years following adoption.

Each Federal or State AAQS is comprised of two basic elements: (1) a numerical limit expressed as an allowable concentration, and (2) an averaging time which specifies the period over which the concentration value is to be measured. Table 4.1-14 presents the current Federal/National and California/State AAQS.

Table 4.1-14. State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
Ozone	1-hr	0.09 ppm (180 µg/m^3)	-
	8-hr	0.070 ppm (137 µg/m^3)	0.075 ppm (147 µg/m^3) (3-year average of annual 4^{th}-highest daily maximum)
Carbon Monoxide	8-hr	9.0 ppm (10,000 µg/m^3)	9 ppm (10,000 µg/m^3)

Table 4.1-14. State and Federal Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards Concentration	National Standards Concentration
	1-hr	20 ppm (23,000 μg/m^3)	35 ppm (40,000 μg/m^3)
Nitrogen dioxide	Annual Average	0.030 ppm (57 μg/m^3)	0.053 ppm (100 μg/m^3)
	1-hr	0.18 ppm (339 μg/m^3)	100 ppb (188 μg/m^3)
Sulfur dioxide			
	24-hr	0.04 ppm (105 μg/m^3)	
	3-hr	-	0.5 ppm (1300 μg/m^3)**
	1-hr	0.25 ppm (655 μg/m^3)	75 ppb (196 μg/m^3) (3-yr average of 99th percentiles)
Respirable particulate matter (10 micron)	24-hr	50 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	20 μg/m^3	-
Fine particulate matter (2.5 micron)	Annual Arithmetic Mean	12 μg/m^3	15.0 μg/m^3 (3-yr average)
	24-hr	-	35 μg/m^3 (3-yr average of 98th percentiles)
Sulfates	24-hr	25 μg/m^3	-
Lead	30-day	1.5 μg/m^3	-
	Rolling 3 Month Avg.	-	0.15 μg/m^3

μg/m^3 -- micrograms per cubic meter
ppm—parts per million
*not applicable in certain areas (not applicable to this project)
**secondary standard, not used in impact analysis
Source: CARB website, table updated 6/7/12.

Table 4.1-15 presents the form and design values for the standards noted above.

Table 4.1-15 Form and Design Values of AAQS

Pollutant and Averaging Time	NAAQS	SAAQS
Ozone 1-Hour	Not to be exceeded more than once per year, averaged over 3 years	Not to be exceeded. Lead and sulfate state AAQS are never to be equaled or exceeded.
Ozone 8-Hour	Annual 4th high 8 hour average, averaged over 3 years	
CO 1-Hour CO 8-Hour	Not to be exceeded more than once per year	
NO_2 1-Hour	3 year average of annual 98th percentile of the daily maximum 1 hour values	
NO_2 Annual	Not to be exceeded	
SO_2 1-Hour	3-year average of annual 99th	

	percentile of the daily maximum 1 hour values	
SO_2 3-Hour	Not to be exceeded more than once per year	
PM10 24-Hour	Not to be exceeded more than once per year, averaged over 3 years	
PM2.5 24-Hour	3 year average of annual 98th percentile of the daily 24 hour values	
PM2.5 Annual	Annual average values, averaged over 3 years	
Lead 3-Month Rolling Average	High rolling 3 month average over 3 years	

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

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

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

Particulate Matter (PM10 and PM2.5)—PM_{10} consists of particulate matter that is 10 microns or less in diameter (a micron is one millionth of a meter), and fine particulate matter, $PM_{2.5}$, consists of particulate matter 2.5 microns or less in diameter. Both PM_{10} and $PM_{2.5}$ represent fractions of particulate matter, which can be inhaled into the air passages and the lungs and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, combustion, and atmospheric photochemical reactions. Some of these operations, such as demolition and construction activities, contribute to increases in local PM_{10} concentrations, while others, such as vehicular traffic, affect regional PM_{10} concentrations.

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

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

SO_2 and NO_2 emissions can be oxidized in the atmosphere to eventually form sulfates and nitrates, which contribute to acid rain. Large power plants with high emissions of these substances from the use of coal or oil are subject to emissions reductions under the Phase I Acid Rain Program of Title IV of the 1990 CAA Amendments. Power plants, with individual equipment capacity of 25 MW or greater that use natural gas or other fuels with low sulfur content, are subject to the Phase II Program of Title IV. The Phase II program requires plants to install Continuous Emission Monitoring Systems (CEMS) in accordance with 40 CFR Part 75 and report annual emissions of SO_x and NO_x. The acid rain program provisions do not apply to the Project.

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

The most current and representative criteria pollutant air quality monitoring sites to the Project site are the stations located within the South Coast Air Basin, i.e., Blythe, Indio, Palm Springs, Banning, and Riverside (Magnolia and Rubidoux). The following monitoring stations were not used to establish background values due to distance between the site and the monitoring location, and the differences in wind flow regimes potentially affecting background air quality:

- Niland-Imperial County (~38 miles)
- Brawley-Imperial County (~53 miles)
- El Centro-Imperial County (~66 miles)
- Calexico-Imperial County (~73 miles)
- Victorville-San Bernardino County (~132 miles)

The Riverside stations (Magnolia and Rubidoux) were used to supplement the CO and SO2 data. These stations are essentially urban monitoring values and will therefore represent conservative background values for use in a remote desert area.

Table 4.1-16 presents the SCAQMD attainment status (for the project site and region) and ambient monitoring data for these sites for the most recent three-year period (2009-2011) is summarized in Table 4.1-17. Monitoring data for year 2012 was not yet complete at the time of AFC preparation. Data from these sites are a reasonable representation of background air quality for the Project site and impact area.

Table 4.1-16. SCAQMD Attainment Status Table (Project Site/Region)

Pollutant	Averaging Time	Federal Status	State Status
Ozone	1-hr	n/a	NA
Ozone	8-hr	UNC/ATT	NA
CO	All	UNC/ATT	UNC
SO_2	All	UNC/ATT	ATT
NO_2	All	UNC/ATT	ATT
PM_{10}	All	UNC	NA
$PM_{2.5}$	All	UNC/ATT	UNC/ATT

ATT -- attainment
NA—non-attainment
UNC/ATT-unclassified-attainment
Source: CARB AQ Status Maps, website, 08/2012.

Table 4.1-17 Air Quality Values for Most Recent 3 Years

Pollutant	Site	Averaging Time	2009	2010	2011
Ozone, ppm	Blythe	1 Hr State	.072	.072	.066
	Indio		.097	.10	.099
	Palm Springs		.12	.114	.124
Ozone, ppm	Blythe	8 Hr Fed	.059	.065	.060
	Indio		.085	.084	.085
	Palm Springs		.097	.092	.092
PM10, ug/m3	Indio	24 Hr State	132	107	120.4*
	Palm Springs		140	144.8	86.1*
PM10, ug/m3	Indio	24 Hr Fed	132	107	56*
	Palm Springs		140	37	42
	Banning		99	55	51
PM10, ug/m3	Indio	Annual AM State	32.7	28.8	32.6
	Palm Springs		20.4	19.4	21.7
PM2.5, ug/m3	Indio	24 Hr Fed	17	14	16
	Palm Springs		15	13	13

PM2.5, ug/m3	Indio	Annual AM State	7.8	6.8	7.1
	Palm Springs		6.6	5.9	6.0
PM2.5, ug/m3	Indio	Annual AM Fed	7.8	6.9	7.1
	Palm Springs		6.6	5.9	6.0
CO, ppm	Palm Springs	8 Hr State	.67	.56	.65
	Riverside Magn		1.75	1.73	1.49
CO, ppm	Palm Springs	1 Hr State	-	-	-
	Riverside Magn		-	-	-
CO, ppm	Palm Springs	8 Hr Fed	.7	.5	.6
	Riverside Magn		1.8	1.7	1.5
CO, ppm	Palm Springs	1 Hr Fed	2.3	1.6	3.0
	Riverside Magn		2.5	2.5	3.1
NO2, ppm	Banning	1 Hr State	.056	.066	.061
	Palm Springs		.048	.046	.045
NO2, ppm	Banning	1 Hr Fed	.053	.053	.050
	Palm Springs		.039	.039	.039
NO2, ppm	Banning	Annual AM	.011	.012	.010
	Palm Springs		.008	.009	.008
SO2, ppm	Rubidoux	Annual AM	.001	.001	.000
	Rubidoux	24 Hr	.003	.005	.001
	Rubidoux	24 Hr Fed	.003	.005	.001
	Rubidoux	1 Hr	.006	.01	.017

* For 2011, the first high and second high PM10 data were exceptional events with Indio at 375.9 ug/m3 and 323 ug/m3, respectively and Palm Springs at 265.7 ug/m3.

Table 4.1-18 shows the background air quality values based upon the data presented in Table 4.1-14, and the form and design of each standard as delineated in Table 4.1-16.

Table 4.1-18. Background Air Quality Values

Pollutant and Averaging Time	Background Value, $\mu g/m^3$
Ozone – 1-hr	248
Ozone – 8-hr	184
PM_{10} – 24-hr (State/Federal)	144.8/140.0
PM_{10} – Annual	32.7
$PM_{2.5}$ – 24-hr (Federal)	15.7
$PM_{2.5}$ – Annual (State/Federal)	7.8/7.3
CO – 1-hr (State/Federal)	3543
CO – 8-hr (State/Federal)	1944/2000

NO_2 – 1-hr (State/Federal)	124.3/97.8
NO_2 – Annual	22.6
SO_2 – 1-hr	28.6
SO_2 – 3-hr	NA
SO_2 – 24-hr	13.1

Based on monitoring data by pollutant per Table 4.1-17 and the standard form per Table 4.1-15.

4.1.8.7 Impacts on Class II Areas

Pollutant impacts due to normal operations for the facility sources can occur due to wet-surface air condenser (PM_{10} and $PM_{2.5}$ only), testing of the emergency generator or fire pump engines, and boiler operations (all criteria pollutants). Testing of the emergency generators will not occur on the same hour as testing of the fire pump engines. Testing of the engines may occur concurrent with boiler operations. So 1-hour impacts were modeled for two different source groups (i.e., all emergency generators for both power blocks and the common area operating with all the other project equipment other than the firepumps for the first source group and all firepumps and other project equipment other than the emergency generators as the second source group). All other short-term (3-hour, 8-hour, and 24-hour) and long-term annual impacts were modeled for all sources operating concurrently (*i.e.,* engine testing operations were not restricted to different days for each group of engines).

In addition to modeling the traditional point sources, modeling analyses were performed to include tailpipe and fugitive dust emissions from onsite mobile sources during project operations. This includes light-duty trucks, primarily traveling on paved roads and in the power blocks and common area, and heavy-duty diesel mirror washing trucks, primarily traveling in the unpaved areas of the site. Onsite paved roads totaling 37602 square meters were modeled as line sources (a new AERMOD option), that included the perimeter paved road for the power blocks and common area. Onsite mobile source and fugitive dust emissions for the unpaved areas where the mirrors will be located (totaling 14470756 square meters) were modeled as a single area source.

4.1.8.8 Refined Analysis

Facility sources, consisting of the emergency generators, fire pumps, boilers, and wet-surface air condensers, were modeled in the analysis for comparisons with Significant Impact Levels (SILs) and CAAQS/NAAQS, as necessary.

Testing times for the emergency generators and firepumps were limited to 30 minutes per hour, , one test per day. However, for CO and SO_2 1-hour impacts, hourly emissions were conservatively based on 60 minutes/hour of testing and 3-hour, 8-hour, and 24-hour SO_2, CO, and PM impacts were conservatively based on 60 minutes/day of testing. This is reflected in the emissions table given below, where only the hourly NOx emissions for 1-hour impacts account for 30 minutes/hour of testing, As noted above, testing of the fire pump engines would not occur on the same hour as testing of the emergency generators, so 1-hour impacts for these two source groups were modeled separately and the maximum reported. For short-term averaging times, the maximum hourly auxiliary boiler and night preservation boilers emissions were modeled for all hours of the day. For annual averages, the tons/year emissions shown earlier were modeled for 14 hours per day for the night preservation boilers (5 PM through 5 AM) and 12 hours per day for the auxiliary boilers and wet-surface air condensers (6 AM through 6 PM). Mobile sources, when modeled, were modeled for 8 hours per day (8 AM through 4 PM) for both short-term and annual averaging times. The modeling input information for each pollutant and averaging period are shown in Table 4.1-19.

Table 4.1-19. Stack Parameters and Emission Rates for Refined AERMOD Modeling

Each Emissions Source or Device	Release Height (m)	Stack Temp. (Kelvins)	Exhaust Velocity (m/s)	Stack Diameter (m)	Emission Rates (g/s) or (g/s/m^2)			
					NO_X	SO_2	CO	$PM_{10/2.5}$
Averaging Period: 1-hour for Normal Operating Conditions								
Aux Boilers (each)	36.58	422.04	15.84	1.6764	0.3452	0.0941	0.5645	-
Night Boilers (each)	36.58	422.04	20.70	0.3810	0.0139	1.17E-3	0.0461	-
Power Block EGs (each)	6.10	769,26	45.64	0.5080	0.2977[a]	4.56E-3	0.0303	-
Common Area EG	6.10	730.37	42.77	0.1778	0.1642[a]	5.22E-4	0.0398	-
Fire Pumps (each)	6.10	783.15	70.44	0.2032	0.2228[a]	8.87E-4	0.0857	-
Paved Roads	0.00	-	-	-	1.33E-7	1.06E-9	6.57E-7	-
Unpaved Area	0.00	-	-	-	3.47E-9	7.17E-12	1.79E-9	-
Averaging Period: 3-hours for Normal Operating Conditions								
Aux Boilers (each)	36.58	422.04	15.84	1.6764	-	0.0941	-	-
Night Boilers (each)	36.58	422.04	20.70	0.3810	-	1.17E-3	-	-
Power Block EGs (each)	6.10	769,26	45.64	0.5080	-	1.52E-3	-	-
Common Area EG	6.10	730.37	42.77	0.1778	-	1.74E-4	-	-
Fire Pumps (each)	6.10	783.15	70.44	0.2032	-	2.96E-4	-	-
Paved Roads	0.00	-	-	-	-	1.06E-9	-	-
Unpaved Area	0.00	-	-	-	-	7.17E-12	-	-
Averaging Period: 8-hours for Normal Operating Conditions								
Aux Boilers (each)	36.58	422.04	15.84	1.6764	-	-	0.5645	-
Night Boilers (each)	36.58	422.04	20.70	0.3810	-	-	0.0461	-
Power Block EGs (each)	6.10	769,26	45.64	0.5080	-	-	0.0038	-
Common Area EG	6.10	730.37	42.77	0.1778	-	-	0.0050	-
Fire Pumps (each)	6.10	783.15	70.44	0.2032	-	-	0.0107	-
Paved Roads	0.00	-	-	-	-	-	6.57E-7	-
Unpaved Area	0.00	-	-	-	-	-	1.79E-9	-
Averaging Period: 24-hours for Normal Operating Conditions								
Aux Boilers (each)	36.58	422.04	15.84	1.6764	-	0.0941	-	0.1575
Night Boilers (each)	36.58	422.04	20.70	0.3810	-	1.17E-3	-	6.30E-3
Power Block EGs (each)	6.10	769,26	45.64	0.5080	-	1.90E-4	-	1.26E-3
Common Area EG	6.10	730.37	42.77	0.1778	-	2.17E-5	-	3.64E-4
Fire Pumps (each)	6.10	783.15	70.44	0.2032	-	3.69E-5	-	6.42E-4
WSAC (per cell)	3.66	Ambient+5.56	12.43	2.6924	-	-	-	4.73E-4
Paved Roads	0.00	-	-	-	-	1.06E-9	-	1.01E-7/ 2.79E-8

Table 4.1-19. Stack Parameters and Emission Rates for Refined AERMOD Modeling

Each Emissions Source or Device	Release Height (m)	Stack Temp. (Kelvins)	Exhaust Velocity (m/s)	Stack Diameter (m)	Emission Rates (g/s) or (g/s/m^2)			
					NO_X	SO_2	CO	$PM_{10/2.5}$
Unpaved Area	0.00	-	-	-	-	7.17E-12	-	5.33E-8/ 1.14E-8
Averaging Period: Annual for Normal Operating Conditions								
Aux Boilers (each)	36.58	422.04	15.84	1.6764	0.0948	-	-	0.0432
Night Boilers (each)	36.58	422.04	20.70	0.3810	0.0132	-	-	6.01E-3
Power Block EGs (each)	6.10	769,26	45.64	0.5080	0.0135	-	-	6.88E-4
Common Area EG	6.10	730.37	42.77	0.1778	0.0075	-	-	1.98E-4
Fire Pumps (each)	6.10	783.15	70.44	0.2032	0.0101	-	-	3.50E-4
WSAC (per cell)	3.66	Ambient+5.56	12.43	2.6924	-	-	-	2.16E-4
Paved Roads	0.00	-	-	-	1.33E-7	-	-	1.01E-7/ 2.79E-8
Unpaved Area	0.00	-	-	-	3.47E-9	-	-	5.33E-8/ 1.14E-8

[a]Hourly NOx emissions reflect 30 minutes/hour of testing. All other EG/FP emissions and impacts are based on 60 minutes/hour and 60 minutes/day of testing.

4.1.8.9 Normal Operations Impact Analysis

In order to determine the magnitude and location of the maximum impacts for each pollutant and averaging period, the AERMOD model was used. Table 4.1-20 summarizes maximum modeled concentrations for each criteria pollutant and associated averaging periods when modeling just the traditional point sources (boilers, emergency generators, firepumps, and wet-surface air condensers). Table 4.1-21 summarized the maximum modeled impacts when modeling those sources together with the onsite mobile sources. For these impact analyses, the maximum short-term impacts for all five years are used for comparison to all CO, SO_2, PM10, and PM2.5 standards and the 1-hour NO_2 CAAQS. The maximum 5-year average of the 98th percentile 1-hour NO_2 impacts was used for comparison to the 1-hour NO_2 NAAQS. NO_2 impacts were calculated from modeled NOx impacts using the Ambient Ratio Method (ARM) and USEPA default ratios; namely, multiplying 1-hour NOx impacts by 80% and annual NOx impacts by 75%. In order to assess the significance of the modeled concentrations, the maximum concentrations were modeled and compared to the Class II PSD SILs. All modeled facility pollutant concentrations with the exception of 1-hour NO_2 concentrations are less than the SILs for those pollutants. Maximum combined impacts (modeled plus background) exceed the AAQS only when background concentrations already exceed the applicable standards (in this case, only the PM_{10} 24-hour and annual California AAQS). Facility impacts alone are less than the SILs for PM10, so no significant contribution to background exceedances would be attributed to the proposed facility emissions. The minor impacts of the proposed facility emissions, both with and without onsite mobile source emissions, is demonstrated by the fact that facility impacts are less than the SILs for all pollutants and averaging times other than 1-hour NO_2.

The maximum impacts for NO_2 (1-hour and annual averages), CO (1-hour and 8-hour averages), SO_2 (1-hour, 3-hour, 24-hour, and annual averages), and PM_{10}/$PM_{2.5}$ (24-hour and annual averages) occurred in the immediate vicinity of the facility either on the fence line or within the downwash grid in the 50-meter-spaced receptor areas. Therefore, no additional 50-meter-spaced refined receptor grids in the coarse or intermediate receptor grid areas were required.

Table 4.1-20. Air Quality Impact Summary for Normal Operating Conditions for Facility Impacts without Onsite Mobile Sources

Pollutant	Avg. Period	Modeled Concentration (µg/m³)	Background (µg/m³)	Total (µg/m³)	SIL (µg/m³)	CAAQS/NAAQS	
						(µg/m³)	(µg/m³)
NO_2	1-hr CAAQS	95.9	124.3	220.2	-	339	-
	1-hr NAAQS	81.8	97.8	179.6	7.5	-	188
	Annual	0.37	22.6	22.97	1	57	100
PM_{10}	24-hr	0.26	144.8*	145.1	5	50	150
	Annual	0.02	32.7	32.7	1	20	-
$PM_{2.5}$	24- hr	0.26	15.7	16.0	1.2	-	35
	Annual	0.02	7.8	7.8	0.3	12	15.0
CO	1- hr	41.3	3543	3584	2000	23,000	40,000
	8- hr	2.9	2000	2003	500	10,000	10,000
SO_2	1- hr	1.21	28.6	29.8	7.8	655	196
	3- hr	0.50	28.6	29.1	25	-	1,300
	24- hr	0.14	13.1	13.2	5	105	-

Table 4.1-21. Air Quality Impact Summary for Normal Operating Conditions for Facility Impacts with Onsite Mobile Sources

Pollutant	Avg. Period	Modeled Concentration (µg/m³)	Background (µg/m³)	Total (µg/m³)	SIL (µg/m³)	CAAQS/NAAQS	
						(µg/m³)	(µg/m³)
NO_2	1-hr CAAQS	95.9	124.3	220.2	-	339	-
	1-hr NAAQS	82.0	97.8	179.8	7.5	-	188
	Annual	0.42	22.6	23.0	1	57	100
PM_{10}	24-hr	1.73	144.8*	146.5	5	50	150
	Annual	0.31	32.7	33.0	1	20	-
$PM_{2.5}$	24- hr	0.46	15.7	16.2	1.2	-	35
	Annual	0.07	7.8	7.9	0.3	12	15.0
CO	1- hr	47.5	3543	3590	2000	23,000	40,000
	8- hr	6.0	2000	2006	500	10,000	10,000

SO_2	1- hr	1.21	28.6	29.8	7.8	655	196
	3- hr	0.50	28.6	29.1	25	-	1,300
	24- hr	0.15	13.1	13.3	5	105	-

* First high modeled and maximum background was used.

Facility stacks are too short to be subject to inversion breakup fumigation. Shoreline fumigation impacts were not assessed for the same reason and because the site is not located within three kilometers of a major body of water.

Based on the above modeling results, emissions from the Project will not significantly affect the ambient air quality of the area.

4.1.8.10 Impacts on Soils, Vegetation, and Sensitive Species

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

- No soils, vegetation, or sensitive species were identified in the Project area, which are recognized to have any known sensitivity to the types or amounts of air pollutants expected to be emitted by the facility.
- The facility emissions are expected to be in compliance with all applicable air quality rules and regulations.
- The facility impacts are not predicted to result in violations of existing air quality standards, nor will the emissions cause an exacerbation of an existing violation of any quality standard.

4.1.9 Compliance with Laws, Ordinances, Regulations, and Statutes (LORS)

Table 4.1-22 presents a listing of local, State, and Federal air quality LORS deemed applicable to the Project. Conformance and/or compliance for each identified LORS are noted in the table.

Table 4.1-22. Laws, Ordinances, Regulations, and Standards

Applicable LORS	LORS Requirement Summary	LORS Compliance/Conformance
	Federal LORS[1]	
Title 40 CFR, Parts 51 and 52	Prevention of Significant Deterioration for new and modified major stationary sources.	The facility will not be a major stationary source per the PSD regulations. PSD will not apply.
Title 40 CFR, Parts 51 and 52	New Source Review for new and modified major stationary sources.	The facility will be subject to the local air district NSR rules and review process, including but not limited to, BACT determination, offset analysis, air quality impact assessment, etc. See AQMD Rule XIII.
Title 40 CFR, Parts 71-75	Acid Rain program provisions applicable to NOx and SOx emissions compliance, reporting, monitoring, and record keeping.	The AQMD DOC will discuss the final applicability of the Title IV provisions. The facility is not expected to be subject to the Title IV provisions. See AQMD Rule 1210.
Title 40 CFR, Part 70	Federal operating permits requirements.	The Title V application forms are included with the District permitting applications in Appendix 4.1I.
Title 40 CFR, Part 60	New Source Performance Standards (NSPS) Subparts Db, Dc, IIII	The facility will work with SCAQMD staff to assess final NSPS Subpart applicability during the DOC review. The facility will comply with all compliance and operational limits, reporting, and record keeping requirements in the final applicable NSPS. See AQMD Rule IX.
Title 40 CFR, Part 63	National Emissions Standards for Hazardous Air Pollutants (NESHAPs), Subparts (none identified)	The facility will work with SCAQMD staff to assess final NESHAPs Subpart applicability during the DOC review. The facility will comply with all compliance and operational limits, reporting, and record keeping requirements in the final applicable NESHAPs. See AQMD Regulation X.
	State LORS[2]	
Air Toxics Hot Spots Program HSC 44300-44384	Requires preparation and submittal of air toxics plans and reports to the AQMD on the District delineated schedule per the HSC provisions.	The facility will comply with all submittals, plans and reports, as required by the SCAQMD upon a determination of program applicability by the AQMD.
CCR 1752, 2300-2309	Requires the CEC decision on the AFC to consider air quality compliance and protection of the environment.	The SCAQMD will issue a DOC prior to the CEC approval of the AFC. The DOC will contain the AQMD's compliance requirements and conditions. The CEC certification and approval will also contain numerous conditions relating to compliance limits, procedures, reporting, monitoring, and record keeping.

17 CCR 93115	ATCM for Stationary CI Engines, established emissions and operational requirements for diesel fueled stationary CI engines.	The emissions and impact sections of the air quality and public health analyses of the AFC establish compliance with the provisions of the ATCM. Also see the BACT determination in Appendix 4.1F.
California Global Warming Solutions Act-2006 (AB 32)	State-wide regulation for measures to reduce GHG emissions by 2020 to 1990 levels.	The facility will comply with all applicable provisions of AB 32 including, but not limited to, GHG emissions reporting, GHG cap-and-trade program, etc.
GHG Performance Standard (SB 1368)	Establishes the GHG emissions performance stds based on emissions of GHG per unit of power output.	The facility processes will comply with the performance standards, as applicable.
Local SCAQMD LORS[3]		
Regulation XIII-NSR	Requires pre-construction review for all proposed new or modified stationary sources. Review includes a BACT determination, mitigation analysis, air quality impact analysis, etc.	The air quality analysis presented in the AFC air section and Appendices 4.1A through 4.1I fulfill the filing and analysis requirements of NSR. The SCAQMD will issue a DOC with conditions insuring compliance with all provisions of the NSR rule.
Regulation XIV-Rule 1401-Toxics NSR	Requires pre-construction review for all proposed new or modified stationary sources emitting toxic pollutants. Establishes risk significance levels and review procedures.	The public health analysis presented in Section 5.15, Public Health and Appendices 4.1A through 4.1I fulfill the filing and analysis requirements of toxics NSR. The SCAQMD will issue a DOC with conditions ensuring compliance with all provisions of the toxics NSR rule.
Regulation XXX-Title V	Implements the provisions of the federal operating permits program and the requirements of the CAA Title V.	The Title V application forms are included with the District permitting applications in Appendix 4.1I.
Regulation XXXI-Acid Rain Permit Program	Implements the provisions of the federal Acid Rain Program. See rule provisions Subpart A-I.	If Title IV is deemed applicable per the AQMD DOC, the DOC will contain conditions insuring compliance with all applicable provisions of 40 CFR 71-75, including but not limited to permit application filing, monitoring, reporting, record keeping, etc.
Rule 401-Visible Emissions	Limits visible emissions from applicable processes to values no darker than Ringelmann #1 for periods greater than 3 minutes in any hour.	SCAQMD DOC will ensure compliance with Rule 401. Use of solar technology and clean fuels will also insure compliance.
Rule 402-Nuisance	Prohibits emissions in quantities that would adversely affect public health, other businesses, or property.	The facility is not expected to use or operate any equipment or process that would have the capability to cause a public nuisance.
Rule 403-Fugitive Dust	Limits fugitive PM emissions from construction and construction related activities.	The SCAQMD DOC conditions coupled with the facility proposed mitigation measures should insure compliance

		with the provisions of Rule 403. See also Appendix 4.1G.
Rule 404-Particulate Matter	Limits PM concentration in exhaust from boilers, heaters, IC engines, etc.	Use of clean fuels and application of BACT in the boilers and IC engines will insure compliance with this rule.
Rule 409-Combustion Contaminants	Limits PM emissions from combustion sources.	Use of clean fuels in the boilers and IC engines will insure compliance with this rule. See Appendix 4.1A.
Rule 429-Nox Exemptions for Startup/Shutdown	Provides NOx emissions exemptions for boiler subject to Rule 1146 for periods of startup and shutdown.	Use of clean fuel in the boilers (natural gas) and application of BACT will insure compliance with this rule.
Rule 431-Sulfur Content of Fuels (431.1-431.3)	Limits the sulfur content of fuels combusted in stationary sources.	Use of clean fuels (natural gas and low sulfur fuel oil) in the boilers and IC engines will insure compliance with this rule. See Appendix 4.1A.
Rule 433-Natural Gas Quality	Applies to all natural gas distribution system operators that convey natural gas to end users within the District.	The provisions of this regulation do not apply to the proposed facility.
Rule 442-Organic Solvents	Limits emissions of VOC from materials or processes using VOC containing products.	Normal operation of the facility is not expected to use amounts of materials that would result in emissions above the prohibitory rule limits.
Rule 463-Storage of Organic Liquids	Limits VOC emissions from the storage and transfer of VOC containing materials.	The facility will only store diesel fuel for the emergency engines, and a small amount of degreasing solvent for the maintenance shop. All such materials will be stored and used in compliance with the rule provisions.
Rule 474-Fuel Burning Equipment-NOx	Limits NOx emissions from non-mobile fuel burning equipment.	Use of clean fuels (natural gas) in the boilers and implementation of BACT for NOx will insure compliance with this rule. This rule does not apply to the emergency engines.
Regulation IX-NSPS	New Source Performance Standards (NSPS) Potentially applicable Subparts: Db, Dc, IIII	The facility will work with SCAQMD staff to assess final NSPS Subpart applicability during the DOC review. The facility will comply with all compliance and operational limits, reporting, and record keeping requirements in the final applicable NSPS.
Rule 1110.2-Gaseous and Liquid Fueled Engines	Limits NOx, VOC, and CO emissions from gaseous and liquid fueled IC engines.	The use of clean liquid fuels (CA LS diesel) in the emergency engines, coupled with low use rates, and certified Tier 4 engines will insure compliance with this rule.
Rule 1121-NOx Control from NG Fired Water Heaters	Limits NOx emissions from natural gas fired residential type water heaters.	The facility control/administration building may have such a heater. This heater will nto exceed the standards set by the rule.

Rule 1146-NOx Emissions from IIC Boilers and Process Heaters	Limits NOx from boilers, steam generators, and heaters rated at greater than 5 mmbtu/hr.	The boilers will comply with the NOX limits, reporting, and compliance plans requirements. The rule limits do not apply during startup and shutdown per Rule 429.
Rule 1171-Solvent Cleaning Operations	Limits VOC, TAC, and SODS emissions from solvent use in cleaning operations activities.	The facility will comply with the rule provisions by purchasing and using approved solvents, in approved manners. The facility may also use non-VOC solvents.
Regulation XIX-Federal Conformity	Implements the General Conformity requirements of 40 CFR Parts 6 and 51.	Due to the attainment/unclassified status of the project region a conformity analysis is not required.
Regulating agencies with respect to Federal LORS are EPA, and the SCAQMD with EPA oversight. In some instances, the SCAQMD has been granted program authority (via rule adoption or MOU) to act in the place of EPA. These instances are noted in the Local LORS. Regulating agencies with respect to State LORS are the SCAQMD with CARB oversight, and the CEC. Regulating agency with respect to Local LORS is the SCAQMD with either CARB and/or EPA oversight. The Determination of Compliance (DOC) issued by the SCAQMD will contain conditions insuring compliance with all adopted air quality related LORS (local rules, federal rules for which the AQMD has authority to implement and enforce, and state rules for which the AQMD has authority to implement and enforce.		

4.1.10 Involved Agencies and Agency Contacts

Table 4.1-23 presents data on the following: (1) air quality agencies that may or will exercise jurisdiction over air quality issues resulting from the proposed power plant, (2) the most appropriate agency contact for the Project, (3) contact address and phone information, and (4) the agency involvement in required permits or approvals.

Table 4.1-23. Agencies, Contacts, Jurisdictional Involvement, Required Permits for Air Quality

Agency	Contact	Jurisdictional Area	Permit Status
California Energy Commission (CEC)	Assigned Project Manager 1516 Ninth Street Sacramento, CA 95814	Primary reviewing and certification agency.	Will certify the facility under the energy siting regulations and CEQA. Certification will contain a variety of conditions pertaining to emissions and operation.
SCAQMD	Mohzen Nazemi Deputy EO 21865 E. Copley Dr. Diamond Bar, CA 91765 (909) 396-2662	Prepares Determination of Compliance (DOC) for CEC, Issues SCAQMD Permit to Construct (PTC) and Permit to Operate (PTO), Primary air regulatory and enforcement agency.	DOC will be prepared subsequent to AFC submittal. The AFC contains the AQMD permitting application forms. The AFC plus these forms will constitute the required AQMD permitting application.
California Air Resources Board (CARB)	Mike Tollstrup Chief, Project Assessment Branch 1001 I Street, 6th Floor Sacramento, CA 95814 (916) 322-6026	Oversight of AQMD stationary source permitting and enforcement program	CARB staff may provide comments on applicable AFC sections affecting air quality and public health. CARB staff will also have opportunity to comment on draft ATC.
Environmental Protection Agency, Region IX	Gerardo Rios Chief, Permits Section USEPA-Region 9 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974	Oversight of all AQMD programs, including permitting and enforcement programs	USEPA Region 9 staff will receive a copy of the DOC. USEPA Region 9 staff will have opportunity to comment on draft ATC.

4.1.11 Permit Requirements and Permit Schedule

A Permit to Construct (PTC) application is required in accordance with the SCAQMD rules. Appendix 4.1I contains the required SCAQMD permitting application forms. These forms in conjunction with the AFC constitute the required air district permitting application. The SCAQMD will issue a Determination of Compliance (DOC) which is equivalent to a standard PTC. Upon the completion of construction the SCAQMD will issue a PTO in conjunction with the CEC. Table 4.1-24 presents the best estimate of the permitting schedule pertaining to air quality issues.

Table 4.1-24. Air Quality Permitting Schedule

Permit Type	Permit Agency	Schedule for Submittal/Review*
Permit to Construct	SCAQMD	See Appendix 4.1I. AFC is the ATC application per Rule 1306.
Permit to Operate	SCAQMD	Issued by SCAQMD subsequent to the completion of construction, commissioning, and start-up.
Preliminary Determination of Compliance (PDOC)	SCAQMD	Approximately 90 days after AFC submittal.
Final Determination of Compliance (FDOC)	SCAQMD	Approximately 180 days after AFC submittal.
Title IV Acid Rain	SCAQMD/EPA	Not Required.
Title V Operating Permit	SCAQMD	Title V application forms will be submitted as part of the AFC submittal along with the other pertinent District permitting forms.

*all schedule timing values are best estimates.

4.1.12 Public Health

This section presents the methodology and results of a human health risk assessment (HRA) performed to assess potential impacts and public exposure associated with airborne emissions from the routine operation of the Palen Solar Energy Generating System Project (PSEGS or the Project).

Air will be the dominant pathway for public exposure to chemical substances released by the Project. Emissions to the air will consist primarily of combustion by-products produced by the auxiliary boilers, night-time preservation boilers, and the diesel-fired emergency fire pumps and electrical generator engines. Emissions from the Wet SACs as well as fugitive losses from the various support systems will also be assessed. Potential health risks from facility-wide emissions will occur almost entirely by direct inhalation. To be conservative, additional pathways were included in the health risk modeling, *i.e.,* soil ingestion, dermal exposure, mother's milk exposure. However, direct inhalation is considered the most likely exposure pathway. The HRA was conducted in accordance with guidance established by the California Office of Environmental Health Hazard Assessment (OEHHA) and the California Air Resources Board (CARB).

Emissions with established California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS), including nitrogen oxides (NO_x), carbon monoxide (CO), sulfur oxides (SO_x), and fine particulate matter (PM_{10}/$PM_{2.5}$), are addressed in Section 4.1, Air Quality. However, some discussion of the potential health risks associated with these substances is presented in this section. Human health risks associated with the potential accidental release of stored acutely hazardous materials are discussed in the Hazardous Materials Handling section.

4.1.12.1 Affected Environment

The Project site is located in eastern Riverside County, approximately 37 miles west of Blythe, California. The site lies north of and approximately adjacent to Interstate 10 (I-10) at the Chuckwalla Valley/Corn Springs Road exit. The site is open desert land and is situated in the Chuckwalla Valley. The Palen Mountains lie to the north-northeast, the McCoy Mountains lie to the east. Desert Center, Ca. lies to the west approximately 9.5 miles. The Chuckwalla Mountains lie to the south and southwest.

The site is situated in census tract 469 (Riverside County). Figure 4.1D-1 (Appendix 4.1D) shows the site and surrounding census tracts. The 2010 Census Data indicates a population value of 2,043 individuals for Tract 469. Presently, it is estimated that less than 200 individuals live within a 6-mile radius of the plant site.

According to the Auer land use classification scheme, a three-kilometer radius boundary around the site yields an overwhelming rural/desert classification. This is consistent with the current land use and zoning designation for the site.

Sensitive receptors are defined as groups of individuals that may be more susceptible to health risks due to chemical exposure. Schools, both public and private, day care facilities, convalescent homes, and hospitals are of particular concern. There were no sensitive receptors identified within a 6-mile radius of the site. Several residential and worker receptors were identified within the regional area of the Project site and are listed in Table 4.1-25.

Table 4.1-25. Residential and Worker Receptors Within the Regional Area of the Project

Receptor ID	Receptor Type	UTM Coordinates (E/N), m	Elevation, Ft (amsl)
Res1	Residential	663279, 3731200	547
Res2	Residential	671277, 3731139	608
Res3	Residential	662726, 3731944	531
Res4	Residential	660412, 3729285	743
Wrk1	Worker	656712, 3729799	801
Wrk2	Worker	656391, 3729993	792
Wrk3	Worker	655577, 3736169	523
Wrk4	Worker (Airport)	654590, 3736110	541
Wrk5	Worker (Radio Tower)	662419, 3728213	718
Wrk6	Worker (Radio Tower)	662353, 3728203	725
Wrk7	Worker (Radio Tower)	662364, 3728143	727
Wrk8	Worker	662276, 3728405	716

All coordinates from Google Earth (center location of each receptor location).

Based on a 6-mile radius area search. The nearest school is located approximately 10 miles west of the site.

Air quality and health risk data presented by CARB in the 2009 Almanac of Emissions and Air Quality for the State shows that over the period from 1990 through 2008, the average concentrations for the top 10 toxic air contaminants (TACs) have been substantially reduced, and the associated health risks for the State are showing a steady downward trend as well. This same trend is expected to have occurred in the South Coast Air Basin (SCAB). CARB-estimated emissions inventory values for the top 10 TACs for 2008 are presented in Table 4.1-26 for the air basin and the State. The Applicant has not identified, nor is the Applicant aware of, any public health studies prepared by the local health department or the air district, related to respiratory illnesses, cancers, or related diseases concerning the local area within a six-mile radius of the proposed Project site.

Table 4.1-26. Top Ten Toxic Air Contaminants

TAC	Statewide Year 2008 Emissions (tons/yr)	SCAB Year 2008 Emissions (tons/yr)	SCAB Predicted Cancer Risk, per 10^6
Acetaldehyde	9103	2022	5
Benzene	10794	3006	44
1,3 Butadiene	3754	673	54
Carbon tetrachloride	4.04	1	ND
Chromium 6	0.61	0	16
Para-Dichlorobenzene	1508	637	ND
Formaldehyde	20951	4923	26
Methylene Chloride	6436	3516	2
Perchloroethylene	4982	2151	2
Diesel Particulate Matter	35884	8300	ND

ND = no data

4.1.12.2 Environmental Consequences

4.1.12.2.1 Significance Criteria

Cancer Risk

Cancer risk is the probability or chance of contracting cancer over a human life span (assumed to be 70 years). Carcinogens are not assumed to have a threshold below which there would be no human health impact. In other words, any exposure to a carcinogen is assumed to have some probability of causing cancer; the lower the exposure, the lower the cancer risk (*i.e.*, a linear, no-threshold model). Under various state and local regulations, an incremental cancer risk greater than 10 in a million due to a project is considered to be a significant impact on public health. For example, the 10 in a million risk level is used by the Air Toxics Hot Spots (California Health and Safety Code [CHSC] 44300 et seq.) program and California's Proposition 65 as the public notification level for air toxic emissions from existing sources.

Non-Cancer Risk

Non-cancer health effects can be classified as either chronic or acute. In determining the potential health risks of non-cancerous air toxics, it is assumed there is a dose of the chemical of concern below which there would be no impact on human health. The air concentration corresponding to this dose is called the Reference Exposure Level (REL). Non-cancer health risks are measured in terms of a hazard quotient, which is the calculated exposure of each contaminant divided by its REL. Hazard quotients for pollutants affecting the same target organ are typically summed with the resulting totals expressed as hazard indices for each organ system. A hazard index of less than 1.0 is considered to be an insignificant health risk. For this HRA, all hazard quotients were summed regardless of target organ. This method leads to a conservative, upper-bound assessment. RELs used in the hazard index calculations were those published in the CARB/OEHHA listings dated May 2012 (see Appendix 4.1D).

Chronic toxicity is defined as adverse health effects from prolonged chemical exposure, caused by chemicals accumulating in the body, i.e. typically over a lifetime of seventy years. Because chemical accumulation to toxic levels typically occurs slowly, symptoms of chronic effects usually do not appear until long after exposure commences. The lowest no-effect chronic exposure level for a non-carcinogenic air toxic is the chronic REL. Below this threshold, the body is capable of eliminating or detoxifying the chemical rapidly enough to prevent its accumulation. The chronic hazard index was calculated using the hazard quotients calculated with annual concentrations.

Acute toxicity is defined as adverse health effects caused by a brief chemical exposure over periods ranging from 1 to 8 hours. For most chemicals, the air concentration required to produce acute effects is higher than the level required to produce chronic effects because the exposure duration is shorter. Because acute toxicity is predominantly manifested in the upper respiratory system at threshold exposures, all hazard quotients are typically summed to calculate the acute hazard index. Average short-term modeled concentrations are divided by acute RELs to obtain a hazard index for health effects caused by relatively high, short-term exposure to air toxics.

4.1.12.3 Construction Phase Impacts

The construction phase of the Project is expected to take approximately 33 months. No significant public health effects are expected during the construction phase. Strict construction practices that incorporate safety and compliance with applicable Laws, Ordinances, Regulations, and Standards (LORS) will be followed. In addition, mitigation measures to reduce air emissions from construction impacts will be implemented as described in Section 4.1, Air Quality.

Temporary emissions from construction-related activities are discussed in Appendix 4.1E. Ambient air modeling for particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), CO, sulfur dioxide (SO_2), and NO_x was performed as described in Section 4.1. Construction-related emissions are temporary and localized, resulting in no long-term impacts to the public.

Small quantities of hazardous waste may be generated during the construction phase of the Project. Hazardous waste management plans will be in place so the potential for public exposure is minimal. Refer to the Waste Management section, for more information. No acutely hazardous materials (AHMs) will be used or stored on-site during construction (see the Hazardous Materials Handling section). To ensure worker safety during construction, safe work practices will be followed (see Worker Safety section).

4.1.12.4 Operational Phase Impacts

Environmental consequences potentially associated with the operation of the Project are potential human exposure to chemical substances emitted to the air. The human health risks potentially associated with these chemical substances were evaluated in a HRA. The chemical substances potentially emitted to the air from the proposed Project boilers, diesel engines, wet SACs, and other miscellaneous support systems are listed in Table 4.1-27.

Table 4.1-27 Chemical Substances Potentially Emitted to the Air From the Project

Criteria Pollutants	Noncriteria Pollutants (Toxic Pollutants)	
Particulate Matter	Diesel Particulate Matter	Toluene
Carbon Monoxide	Acetaldehyde	Xylene
Sulfur Oxides	Acrolein	Arsenic
Nitrogen Oxides	Benzene	Cadmium
Volatile Organic Compounds	1-3 Butadiene	Chromium
Lead	Ethylbenzene	Copper
	Formaldehyde	Nickel
	Hexane	Manganese
	Naphthalene	Selenium
	PAHs	Mercury
	Propylene	Zinc
	Propylene Oxide	Biphenyl

Emissions of criteria pollutants will adhere to NAAQS and CAAQS as discussed in Section 4.1, Air Quality. The Project will also include emission control technologies necessary to meet the required emission standards specified for criteria pollutants under SCAQMD rules. Offsets will be required even though the Project will not be a major source. Finally, air dispersion modeling results (presented in Section 4.1) show emissions will not result in concentrations of criteria pollutants in air that exceed ambient air quality standards (either NAAQS or CAAQS). These standards are intended to protect the general public with a wide margin of safety. Therefore, the Project is not anticipated to have a significant impact on public health from emissions of criteria pollutants.

Potential impacts associated with emissions of toxic pollutants to the air from the proposed Project were addressed in a HRA, presented in Appendix 4.1D. The HRA was prepared using guidelines developed by OEHHA and CARB, as implemented in the latest version of the Hotspots Analysis and Reporting Program (HARP) model (Version 1.4f).

4.1.12.5 Public Health Impact Study Methods

Emissions of toxic pollutants potentially associated with the Project were estimated using emission factors approved by CARB and the U.S. Environmental Protection Agency (EPA). Concentrations of these pollutants in air potentially associated with Project emissions were estimated using the HARP dispersion modeling module. Modeling allows the estimation of both short-term and long-term average concentrations in air for use in a HRA, accounting for site-specific terrain and meteorological conditions. Health risks potentially associated with the estimated concentrations of pollutants in air were characterized in terms of excess lifetime cancer risks (for carcinogenic substances), or comparison with reference exposure levels for non-cancer health effects (for non-carcinogenic substances).

Health risks were evaluated for a hypothetical maximum exposed individual (MEI) located at the maximum impact receptor (MIR). The hypothetical MEI is an individual assumed to be located at the MIR location, which is assumed (for purposes of this worst-case analysis) to be a residential receptor where the highest concentrations of air pollutants associated with Project emissions are predicted to occur, based on the air dispersion modeling. Human health risks associated with emissions from the proposed Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely that there would be significant impacts in any location in the vicinity of the Project. The highest off-site concentration location represents the MIR/MEI.

Health risks potentially associated with concentrations of carcinogenic air pollutants were calculated as estimated excess lifetime cancer risks. The excess lifetime cancer risk for a pollutant is estimated as the product of the concentration in air and a unit risk value. The unit risk value is defined as the estimated probability of a person contracting cancer as a result of constant exposure to an ambient concentration of 1 microgram per cubic meter ($\mu g/m^3$) over a 70-year lifetime. In other words, it represents the increased cancer risk associated with continuous exposure to a concentration in air over a 70-year lifetime. Evaluation of potential non-cancer health effects from exposure to short-term and long-term concentrations in air was performed by comparing modeled concentrations in air with the RELs. A REL is a concentration in air at or below which no adverse health effects are anticipated. RELs are based on the most sensitive adverse effects reported in the medical and toxicological literature. Potential non-cancer effects were evaluated by calculating a ratio of the modeled concentration in air and the REL. This ratio is referred to as a hazard quotient. The unit risk values and RELs used to characterize health risks associated with modeled concentrations in air were obtained from the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (CARB, 2012), and are presented in Appendix 4.1D. Emissions of toxic and/or hazardous pollutants for the various processes are presented in Appendix 4.1A.

4.1.12.6 Characterization of Risks from Toxic Air Pollutants

The excess lifetime cancer risk associated with concentrations in air estimated for the Project MIR location is estimated to be 4.03 x 10^{-6}. Excess lifetime cancer risks less than 10 x 10^{-6} (with T-BACT) are unlikely to represent significant public health impacts that require additional controls of facility emissions. Risks higher than 1 x 10^{-6} may or may not be of concern, depending upon several factors. These include the conservatism of assumptions used in risk estimation, size of the potentially exposed population, and toxicity of the risk-driving chemicals. Health effects risk thresholds are listed in Table 4.1-28. Risks associated with pollutants potentially emitted from the Project are presented in Table 4.1-29. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 4.1D. As described previously, human health risks associated with emissions from the proposed Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely there would be significant impacts in any other location in the vicinity of the Project.

Table 4.1-28. Significant Health Effect Threshold Levels for SCAQMD

Risk Category	Risk Threshold
Cancer Risk	>1.0 x 10^{-6} without TBACT >10 x 10^{-6} with TBACT
Chronic Hazard Index	>1.0
Acute Hazard Index	>1.0
Cancer Burden	>0.5

Per Rule 1401 SCAQMD

Table 4.1-29. Project HRA Summary

	Facility (Boilers, Engines, Wet SACs)	
Risk Category	**MIR Project Values**	**Applicable Significance Threshold**
Cancer Risk	4.03 E-06	See Table 4.1-28
Chronic Hazard Index	0.00253	
Acute Hazard Index	0.000108	
Cancer Burden[1]	0.0	
MIR Receptor #: 353, 664307mE, 3728120mN		

* No acute REL has been established for diesel PM.

[1] The 1 x 10E-6 isopleth radius is located ~6,000 ft. from the site center. There are no populated areas within this radius; therefore the cancer burden is 0.0.

Cancer risks potentially associated with facility emissions were also assessed in terms of cancer burden. Cancer burden is a hypothetical upper-bound estimate of the additional number of cancer cases that could be associated with emissions from the Project. Cancer burden is calculated as the worst-case product of excess lifetime cancer risk (at the 1×10^{-6} cancer risk level and isopleth distance) and the number of individuals at that risk level. The 1×10^{-6} isopleth radius occurs at approximately 6000 feet from the grid center. At this distance, there are no impacted populations. The calculated cancer burden for the Project is therefore 0.

As described previously, human health risks associated with emissions from the Project are unlikely to be higher at any other location than at the location of the MIR. Therefore, the risks for all of these individuals would be lower (and in most cases, substantially lower) than 4.03×10^{-6}. The estimated cancer burden was 0.0, indicating emissions from the Project would not be associated with any increase in cancer cases in the previously defined population. As stated previously, the methods used in this calculation considerably overstate the potential cancer burden, further suggesting that Project emissions are unlikely to represent a significant public health impact in terms of cancer risk.

The acute and chronic non-cancer hazard quotients associated with concentrations in air are shown in Table 4.1-29. The acute and chronic non-cancer hazard quotients for all target organs fall well below 1.0. As described previously, a hazard quotient less than 1.0 is unlikely to represent significant impact to public health. Further description of the methodology used to calculate health risks associated with emissions to the air is presented in Appendix 4.1D. As described previously, human health risks associated with emissions from the proposed Project are unlikely to be higher at any other location than at the location of the MIR. If there is no significant impact associated with concentrations in air at the MIR location, it is unlikely there would be significant impacts in any other location in the vicinity of the Project.

Detailed risk and hazard values are provided in the HARP output presented in Appendix 4.1D (electronic files on CD). No specific health related studies were identified which pertain to the local Project area for any identified toxic air pollutant or identified specific population. The various MATES studies prepared by the SCAQMD are targeted at the major district urban areas, not the eastern desert regions where the project is located.

The estimates of excess lifetime cancer risks and non-cancer risks associated with chronic or acute exposures fall below thresholds used for regulating emissions of toxic pollutants to the air.

Historically, exposure to any level of a carcinogen has been considered to have a finite risk of inducing cancer. In other words, there is no threshold for carcinogenicity. Since risks at low levels of exposure cannot be quantified directly by either animal or epidemiological studies, mathematical models have estimated such risks by extrapolation from high to low doses. This modeling procedure is designed to provide a highly conservative estimate of cancer risks based on the most sensitive species of laboratory animal for extrapolation to humans. In other words, the assumption is that humans are as sensitive as the most sensitive animal species. Therefore, the true risk is not likely to be higher than risks estimated using unit risk factors and is most likely lower, and could even be zero.

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

The estimated lifetime cancer risks to the maximally exposed individual located at the Project MIR are well below the 10×10^{-6} significance level (with T-BACT). These risk estimates were calculated using assumptions that are highly health conservative. Evaluation of the risks associated with the Project emissions should consider that the conservatism in the assumptions and methods used in risk estimation considerably overstate the risks from Project emissions. Based on the results of this HRA, there are no significant public health impacts anticipated from emissions of toxic pollutant to the air from the Project.

4.1.12.7 Hazardous Materials

Hazardous materials will be used and stored at the Project site. The hazardous materials stored in significant quantities on-site and descriptions of their uses are presented in the Hazardous Materials section. Use of chemicals at the Project will be in accordance with standard practices for storage and management of hazardous materials. Normal use of hazardous materials, therefore, will not pose significant impacts to public health. While mitigation measures will be in place to prevent releases, accidental releases that migrate off-site could result in potential impacts to the public.

The California Accidental Release Program regulations (CalARP) and Code of Federal Regulations (CFR) Title 40 Part 68 under the Clean Air Act (CAA) establish emergency response planning requirements for acutely hazardous materials. These regulations require preparation of a Risk Management Plan (RMP), which is a comprehensive program to identify hazards and predict the areas that may be affected by a release of a program listed hazardous material.

4.1.12.8 Operation Odors

The Project is not expected to emit any substances that could cause odors.

4.1.12.9 Electromagnetic Field Exposure

Because the electric transmission line (required for the project interconnect) does not travel through residential areas, and based on recent findings of the National Institute of Environmental Health Sciences (NIEHS, 1999), electromagnetic field (EMF) exposures are not expected to result in a significant impact on public health. The NIEHS report to the U.S. Congress found “the probability that EMF exposure is truly a health hazard is currently small. The weak epidemiological associations and lack of any laboratory support for these associations provide only marginal scientific support that exposure to this agent is causing any degree of harm” (NIEHS, 1999).

4.1.12.10 Legionella

In addition to being a source of potential toxic air contaminants, the possibility exists for bacterial growth to occur in the cooling towers and similar processes, including Legionella. Legionella is a bacterium that is ubiquitous in natural aquatic environments and is also widely distributed in man-made water systems. It is the principal cause of legionellosis, otherwise known as Legionnaires' disease, which is similar to pneumonia. Transmission to people results mainly from inhalation or aspiration of aerosolized contaminated water. Untreated or inadequately treated cooling systems, such as industrial cooling towers and building heating, ventilating, and air conditioning systems, have been correlated with outbreaks of legionellosis.

Legionella can grow symbiotically with other bacteria and can infect protozoan hosts. This provides Legionella with protection from adverse environmental conditions, including making it more resistant to water treatment with chlorine, biocides, and other disinfectants. Thus, if not properly maintained, cooling water systems and their components can amplify and disseminate aerosols containing Legionella.

The State of California regulates recycled water for use in cooling towers in Title 22, Section 60303, California Code of Regulations. This section requires that, in order to protect workers and the public who may come into contact with cooling tower mists, chlorine or another biocide must be used to treat the cooling system water to minimize the growth of Legionella and other micro-organisms. This regulation does not, at this time, apply to the Project since it intends to use well water (not reclaimed water) for cooling purposes.

The EPA published an extensive review of Legionella in a human health criteria document. In 1999, the EPA noted Legionella may propagate in biofilms (collections of microorganisms surrounded by slime they secrete, attached to either inert or living surfaces) and aerosol-generating systems such as cooling towers can aid in the transmission of Legionella from water to air. The EPA has inadequate quantitative data on the infectivity of Legionella in humans to prepare a dose-response evaluation. Therefore, sufficient information is not available to support a quantitative characterization of the threshold infective dose of Legionella. Thus, the presence of even small numbers of Legionella bacteria presents a risk, however small, of disease in humans.

In 2000, the Cooling Tower Institute (CTI) issued its own report and guidelines for the best practices for control of Legionella. The CTI found that 40 to 60 percent of industrial cooling towers tested were found to contain Legionella. To minimize the risk from Legionella, the CTI noted that consensus recommendations included minimization of water stagnation, minimization of process leads into the cooling system that provide nutrients for bacteria, maintenance of overall system cleanliness, application of scale and corrosion inhibitors as appropriate, use of high-efficiency mist eliminators on cooling towers, and overall general control of microbiological populations. Good preventive maintenance is very important in the efficient operation of cooling towers and other evaporative equipment. Preventive maintenance includes having effective drift eliminators, periodically cleaning the system if appropriate, maintaining mechanical components in working order, and maintaining an effective water treatment program with appropriate biocide concentrations. The efficacy of any biocide in ensuring that bacteria, and in particular Legionella growth, is kept to a minimum is contingent upon a number of factors including, but not limited to, proper dosage amounts, appropriate application procedures, and effective monitoring.

In order to ensure Legionella growth is kept to a minimum, thereby protecting both nearby workers as well as members of the public, an appropriate biocide program and anti-biofilm agent monitoring program would be prepared and implemented for this project. These programs would ensure proper levels of biocide and other agents are maintained within the wet SAC water at all times, periodic measurements of Legionella levels are conducted, and periodic cleaning is conducted to remove bio-film buildup. These mitigation measures would reduce the chances of Legionella growing and dispersing to insignificant (RSA, 2008).

4.1.12.11 Summary of Impacts

Results from the air toxics HRA based on emissions modeling indicate there will be no significant incremental public health risks from construction or operation of the Project. Results from criteria pollutant modeling for routine operations indicate potential ambient concentrations of NO_2, CO, SO_2, and PM_{10} will not significantly impact air quality (see Section 4.1). Potential concentrations are below the Federal and California standards established to protect public health, including the more sensitive members of the population.

4.1.12.12 Cumulative Impacts

The HRA for the Project indicates the maximum cancer risk will be approximately 4.03×10^{-6}, versus the SCAQMD significance threshold of >10 in one million at the point of maximum exposure to air toxics from power plant emissions utilizing TBACT. This risk level is considered to be insignificant. Non-cancer chronic and acute effects will also be less than significant. A cumulative risk impact analysis is not proposed at this time because of the following:

- Low project operational emissions levels of air toxic substances.
- Insignificant risk resulting from project operations.
- Lack of an established background or baseline risk value for the Project impact area. The toxics monitoring data compiled by CARB is designed to provide air quality data in support of general population exposures. The data do not provide information on localized impacts, often referred to as near-source or neighborhood exposures.
- The CARB toxics air contaminant monitoring network does not include any monitoring sites within the project impact region, *i.e.,* the sites currently operating in the most recent 3 to 5 period are confined to the major urban areas. The closest monitoring sites would be those located in the South Coast AQMD (Los Angeles urban area). These sites would not represent ambient concentrations of toxic substances in remote desert areas such as the Project site.
- CEC staff indicates, based on their review of numerous modeling studies, that unless a significantly sized source of HAPs is located within 0.5 miles of the proposed new source, it is highly unlikely that the cumulative emissions of the sources will result in any significant health related impacts. There are no significant sources (existing or proposed) of HAPs within 0.5 miles

of the project site, therefore a cumulative analysis of health risk impacts is not warranted at this time.

4.1.12.13 Mitigation Measures

4.1.12.13.1 Criteria Pollutants

Emissions of criteria pollutants will be minimized by applying Best Available Control Technology (BACT) to the Project. BACT for the boilers, fire pumps, emergency generator engines, and wet SACs is delineated in Appendix 4.1F.

The proposed Project location is in an area designated by the federal air agencies as unclassified/attainment for ozone and PM2.5, and unclassified for PM10. Pursuant to SCAQMD New Source Review (NSR) Rule, offsets are required for the Project for NOx only (see Appendix 4.1G for details on the NOx mitigation strategy). Therefore, further mitigation of emissions is not required to protect public health.

4.1.12.13.2 Toxic Pollutants

Emissions of toxic pollutants to the air will be minimized through the use of T-BACT at the proposed Project. Emissions from tanks storing liquid organic chemicals will be minimized through the use of one or a combination of the following:

- Use of small-capacity, fixed roof tanks
- Use of low vapor pressure organic substances
- Use of exempt compounds
- Use of vapor balance and/or vapor recovery systems on a case-by-case basis as deemed appropriate

Legionella Mitigation Measure: The proposed Project will develop and implement a wet SAC treatment plan to ensure the potential for bacterial growth in cooling water is kept to a minimum. The treatment plan will be consistent with the Cooling Technology Institute's "Best Practices for Control of Legionella" guidelines and will include periodic sampling and testing for the presence of Legionella bacteria in the cooling tower water (RSA, 2008).

4.1.12.14 Hazardous Materials

Mitigation measures for hazardous materials are presented below and discussed in more detail in the Hazardous Materials section. Potential public health impacts from the use of hazardous materials are only expected to occur as a result of an accidental release. The plant has many safety features designed to prevent and minimize impacts from the use and accidental release of hazardous materials. The Project site will include the following design features:

- Curbs, berms, and/or secondary containment structures will be provided where accidental release of chemicals may occur.
- A fire-protection system will be included to detect, alarm, and suppress a fire, in accordance with applicable LORS.
- Construction of all storage systems will be in accordance with applicable construction standards and LORS.

If required, a RMP for the Project will be prepared prior to commencement of Project operations. The RMP will estimate the risk presented by handling affected materials at the Project site. The RMP will include a hazard analysis, off-site consequence analysis, seismic assessment, emergency response plan, and training procedures. The RMP process will accurately identify and propose adequate mitigation measures to reduce the risk to the lowest possible level.

A safety program will be implemented and will include safety training programs for contractors and operations personnel, including instructions on: (1) the proper use of personal protective equipment (PPE), (2) safety operating procedures, (3) fire safety, and (4) emergency response actions. The safety program will also include programs on safely operating and maintaining systems that use hazardous materials. Emergency procedures for Project personnel include power plant evacuation, hazardous material spill cleanup, fire prevention, and emergency response.

Areas subject to potential leaks of hazardous materials will be paved and bermed. Incompatible materials will be stored in separate containment areas. Containment areas will be drained to either a collection sump or holding or neutralization tanks. Also, piping and tanks exposed to potential traffic hazards will be additionally protected by traffic barriers.

The facility will consult with its legal counsel on issues surrounding Proposition 65, and will comply with all signage, notifications, and reporting requirements per the statute requirements during construction and operation.

4.1.12.15 Laws, Ordinances, Regulations, and Standards (LORS)

An overview of the regulatory process for public health issues is presented in this section. The relevant LORS that affect public health and are applicable to the Project are identified in Table 4.1-30. The conformity of the Project to each of the LORS applicable to public health is also presented in this table. Table 4.1-30 summarizes the primary agencies responsible for public health, as well as the general category of the public health concern regulated by each of these agencies.

Table 4.1-30. Laws, Ordinances, Regulations, and Standards for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
Federal Clean Air Act Title III	Public exposure to air pollutants	USEPA Region 9 CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. Emissions of criteria pollutants will be minimized by applying BACT to the Project. Minor increases in emissions of criteria pollutants are not required to be offset. Section 4.1.12 and Appendices 4.1A and 4.1D.
Health and Safety Code 25249.5 et seq. (Safe Drinking Water and Toxic Enforcement Act of 1986—Proposition 65)	Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed thresholds that require exposure warnings. Section 4.1.12 and Appendices 4.1A and 4.1D.

Table 4.1-30. Laws, Ordinances, Regulations, and Standards for Public Health

LORS	Public Health Concern	Primary Regulatory Agency	Project Conformance
40 CFR Part 68 (Risk Management Plan) and CalARP Program Title 19	Public exposure to acutely hazardous materials	USEPA Region 9 Riverside County Department of Health Services Riverside County Fire Department	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank. A RMP (if required) will be prepared prior to commencement of Project operations. Section 4.1.12 and Appendices 4.1A and 4.1D.
Health and Safety Code Sections 25531 to 25541	Public exposure to acutely hazardous materials	Riverside County Department of Health Services CARB SCAQMD	A vulnerability analysis will be performed to assess potential risks from a spill or rupture from any affected storage tank. Section 4.1.12 and Appendices 4.1A and 4.1D.
CHSC 25500-25542	Hazmat Inventory	State Office of Emergency Services and Riverside County Department of Environmental Health	Prepare all required HazMat plans and inventories, distribute to affected agencies. See Hazardous Materials section.
CHSC 44300 et seq.	Air Toxics Hot Spots Program	SCAQMD	Participate in the inventory and reporting program at the District level. Section 4.1.12 and Appendices 4.1A and 4.1D.
SCAQMD Rule 1401	Toxics NSR	SCAQMD	Application of BACT and T-BACT, preparation of HRA. Section 4.1.12 and Appendices 4.1A, 4.1D, and 4.1F.
CHSC 25249.5	Proposition 65	OEHHA	Comply with all signage and notification requirements. See Hazardous Materials section.
Health and Safety Code Sections 44360 to 44366 (Air Toxics "Hot Spots" Information and Assessment Act—AB 2588)	Public exposure to toxic air contaminants	CARB SCAQMD	Based on results of HRA as per CARB/OEHHA guidelines, toxic contaminants do not exceed acceptable levels. Section 4.1.12 and Appendices 4.1A and 4.1D.

4.1.12.16 Permits Required and Schedule

Agency-required permits or submittals related to public health include the SCAQMD Permit to Construct/Permit to Operate, and potentially a Risk Management Plan. These requirements are discussed in detail in Sections 4.1 (Air Quality), and the Hazardous Materials Handling section respectively. The estimated permit schedule is presented in Section 4.1.

4.1.12.17 Involved Agencies and Agency Contacts

Table 4.1-31 provides contact information for agencies involved with Public Health.

Table 4.1-31. Summary of Agency Contacts for Public Health

Public Health Concern	Primary Regulatory Agency	Regulatory Contact
Public exposure to hazardous or toxic air pollutants	EPA Region 9	Gerardo Rios Chief, Permits Section EPA-Region 9 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974
	CARB	Mike Tollstrup 1001 1 Street, 19th Floor Sacramento, CA 95814 (916) 322-6026
	SCAQMD	Tom Chico Planning-Rule Development 21865 E. Copley Dr. Diamond Bar, CA. 91765 (909) 396-3149
Public exposure to chemicals known to cause cancer or reproductive toxicity	OEHHA	Cynthia Oshita or Susan Long P.O. Box 4010 Sacramento, CA 95812-4010 (916) 445-6900
Public exposure to acutely hazardous materials	EPA Region 9	Gerardo Rios Chief, Permits Section EPA-Region 9 75 Hawthorne Street San Francisco, CA 94105 (415) 947-3974
	Riverside County EH Dept. Hazmat Division Indio Office	Jim Ray 47-950 Arabia Street, Suite A Indio, CA 92201 (760) 863-8976

4.1.13 Air Quality Section References

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