AIR QUALITY ANALYSIS

LUCERNE VALLEY DESERT VIEW RANCH SOLAR GENERATION PROJECT

SAN BERNARDINO COUNTY, CALIFORNIA

LSA

October 2013

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LSA Project No. UNE1301

LSA

October 2013

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LIST OF ACRONYMS AND ABBREVIATIONS

^{o}F	degrees Fahrenheit
$\mu g/m^3$	micrograms per cubic meter
AAQS	ambient air quality standards
AB	Assembly Bill
ac	acres
APN	Assessor's Parcel Number
AQAP	Air Quality Attainment Plan
AQMP	Air Quality Management Plan
ARB	California Air Resources Board
Basin	Mojave Desert Air Basin
BHhh	dry-very hot desert climate
BWh	dry-hot desert climate
CAA	Clean Air Act
CALGreen Code	California Green Building Standards Code
Caltrans	California Department of Transportation
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	carbon monoxide
County	San Bernardino County
CVC	California Vehicle Code
EPA	United States Environmental Protection Agency
ft	feet
lbs/day	pounds per day
LSA	LSA Associates, Inc.
m	meters
MDAQMD	Mojave Desert Air Quality Management District

mg/m^3	milligrams per cubic meter
mpg	miles per gallon
mph	miles per hour
MPO	Metropolitan Planning Organization
NAAQS	national ambient air quality standards
NO	nitric oxide
NO_2	nitrogen dioxide
NO_X	oxides of nitrogen
O3	ozone
OMB	White House Office of Management and Budget
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than 2.5 microns in diameter
ppm	parts per million
PRC	Public Resources Code
RCP	Regional Comprehensive Plan
ROCs	reactive organic compounds
ROGs	reactive organic gases
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
sf	square feet
SGF	Solar Generating Facility
SIP	State Implementation Plan
SO_2	sulfur dioxide
State	State of California
tons/yr	tons per year
USGS	United States Geological Survey
VOCs	volatile organic compounds

1.0 EXECUTIVE SUMMARY

LSA Associates, Inc. (LSA) was retained by the United Engineering Group to prepare an air quality study for the proposed Lucerne Valley Desert View Ranch Solar Generation Project to be built by Silverado Power in San Bernardino County (County), California.

The air quality study provides a discussion of the proposed project, the physical setting of the project area, and the regulatory framework for air quality. The report provides data on existing air quality, evaluates potential air quality impacts associated with the proposed project, and identifies mitigation measures recommended for potentially significant impacts.

Emissions during project construction would not exceed any criteria pollutant threshold established by the Mojave Desert Air Quality Management District (MDAQMD). Compliance with MDAQMD Rules and Regulations during construction will reduce construction-related air quality impacts from fugitive dust emissions and construction equipment emissions. Standard dust suppression measures have been identified for short-term construction to meet the MDAQMD emissions thresholds. The project construction emissions would be less than significant.

Pollutant emissions from project operation would not exceed any of the MDAQMD thresholds for criteria pollutants. The project operational emissions would be less than significant.

The proposed project is consistent with the County's General Plan and Zoning Designations, which are consistent with the Southern California Association of Governments (SCAG) Regional Comprehensive Plan (RCP) Guidelines and the MDAQMD Air Quality Management Plan (AQMP). Therefore, the proposed project is consistent with the General Plan and the regional AQMP.

The evaluation was prepared in conformance with appropriate standards, utilizing procedures and methodologies in the MDAQMD California Environmental Quality Act (CEQA) *Air Quality Handbook* (MDAQMD 2007). Air quality data posted on the California Air Resources Board (ARB) and United States Environmental Protection Agency (EPA) websites are included to document the local air quality environment.

2.0 PROJECT DESCRIPTION

2.1 PROJECT LOCATION

This Solar Generating Facility (SGF) would be located in the southwestern portion of San Bernardino County approximately 6 miles due west from the unincorporated Town of Lucerne Valley and totaling 359 acres (Assessor's Parcel Numbers [APNs] 0435-083-39 and 0435-13-201). The site is also zoned Rural Living (RL) by the County. The facility would produce about 20 megawatts (MW) of renewable power. The site would be accessed by taking Milpas Drive south from Highway 18 and Desert View Road east from Milpas Drive. The project will interconnect with the Cottonwood-Savage Transmission Line adjacent to the property.

2.2 PROJECT DESCRIPTION

The Lucerne Valley Desert View Ranch project will consist of the construction and operation of the SGF. The project would be constructed in phases and operated for a period of 35 years. The SGF would comprise the following elements:

- Photovoltaic (PV) modules
- Module mounting system
- Balance of system and electrical boxes (e.g., combiner boxes, electrical disconnects)
- Electrical inverters and transformers
- Electrical alternating-current (AC) collection system, including switchgear
- Data monitoring equipment
- Access roads and chain link perimeter security fencing

The project would not require the construction of an on-site operations and maintenance (O&M) facility. A regional O&M facility to serve the SGF would be located in an existing office and/or warehouse space within San Bernardino County. The project will require a Conditional Use Permit from San Bernardino County for the construction and operation of this SGF.

3.0 SETTING

3.1 REGIONAL AIR QUALITY

The project site is located in the southwestern portion of San Bernardino County, California, which is part of the Mojave Desert Air Basin (Basin) and is under the jurisdiction of the MDAQMD. The air quality assessment for the proposed project includes estimating emissions associated with short-term construction and long-term operation of the proposed project.

A number of air quality modeling tools are available to assess the air quality impacts of projects. In addition, certain air districts such as the MDAQMD have created guidelines and requirements to conduct air quality analyses. The MDAQMD's current guidelines, which are included in its *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines* (MDAQMD, August 2011), were adhered to in the assessment of air quality impacts for the proposed project.

3.1.1 Regional Air Quality

Both the State of California (State) and the federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants. As shown in Table A, these pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), particulate matter less than 2.5 microns in diameter ($PM_{2.5}$), and lead. In addition, the State has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety.

In addition to setting out primary and secondary AAQS, the State has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM_{10}. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage One to Stage Three. An alert level is that concentration of pollutants at which initial stage control actions are to begin. An alert will be declared when any one of the pollutant alert levels is reached at any monitoring site and meteorological conditions are such that the pollutant concentrations can be expected to remain at these levels for 12 or more hours or to increase, or in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken.

Pollutant alert levels:[1]

- **O_3:** 392 micrograms per cubic meter ($\mu g/m^3$) (0.20 part per million [ppm]), 1-hour average
- **CO:** 17 milligrams per cubic meter (mg/m^3) (15 ppm), 8-hour average

[1] SCAQMD Rule 701, Attachment 2.

Table A: Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	--	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm (137 µg/m^3)		0.075 ppm (147 µg/m^3)		
Respirable Particulate Matter (PM_{10})[8]	24-Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		--		
Fine Particulate Matter ($PM_{2.5}$)[8]	24-Hour	No Separate State Standard		35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm(40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)[9]	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)	Gas Phase Chemiluminescence	0.053 ppm (100 µg/m^3)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 µg/m^3)		100 ppb (188 µg/m^3)	—	
Sulfur Dioxide (SO_2)[10]	Annual Arithmetic Mean	—	Ultraviolet Fluorescence	0.030 ppm (for certain areas)[9]	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	24-Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)[9]	—	
	3-Hour	—		—	0.5 ppm (1300 µg/m^3)	
	1-Hour	0.25 ppm (655 µg/m^3)		75 ppb (196 µg/m^3)	—	
Lead[11,12]	30-Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3	Same as Primary Standard	
	Rolling 3-Month Average[11]	—		0.15 µg/m^3		
Visibility-Reducing Particles[13]	8-Hour	See footnote 13	Beta Attenuation and Transmittance through Filter Tape	**No Federal Standards**		
Sulfates	24-Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride[11]	24-Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

Source: California Air Resources Board (June 4, 2013).

Footnotes:

1 California standards for O_3; CO (except Lake Tahoe); SO_2 (1- and 24-hour); NO_2; suspended particulate matter - PM_{10}, $PM_{2.5}$ and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than O_3, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once per year. The O_3 standard is attained when the fourth-highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m^3 is

equal to or less than 1. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, are equal to or less than the standard. Contact the EPA for further clarification and current Federal policies.

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

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

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

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

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

[8] On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 $\mu g/m^3$ to 12.0 $\mu g/m^3$. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 $\mu g/m^3$, as was the annual secondary standard of 15 $\mu g/m^3$. The existing 24-hour PM_{10} standards (primary and secondary) of 150 $\mu g/m^3$ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

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

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

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

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

[12] The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standards are approved.

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

°C = degrees Celsius
ARB = California Air Resources Board
EPA = United States Environmental Protection Agency
$\mu g/m^3$ = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
ppm = parts per million
ppb = parts per billion

- **NO_2:** 1,130 µg/m^3 (0.6 ppm), 1-hour average; 282 µg/m^3 (0.15 ppm), 24-hour average
- **SO_2:** 525 µg/m^3 (0.2 ppm), 24-hour average
- **Particulates, measured as PM_{10}:** 350 µg/m^3, 24-hour average

Table B lists the primary health effects and sources of common air pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety,[1] these health effects will not occur unless the standards are exceeded by a large margin or for a prolonged period of time. State AAQS are more stringent than federal AAQS. Among the pollutants, O_3 and particulate matter ($PM_{2.5}$ and PM_{10}) are considered regional pollutants, while the others have more localized effects.

Table B: Summary of Health Effects of the Major Criteria Air Pollutants

Pollutant	Health Effects	Examples of Sources
Particulate matter (PM_{10}: less than or equal to 10 microns)	• Increased respiratory disease • Lung damage • Premature death	• Cars and trucks, especially diesels • Fireplaces, wood stoves • Windblown dust from roadways, agriculture, and construction
Ozone (O_3)	• Breathing difficulties • Lung damage	• Formed by chemical reactions of air pollutants in the presence of sunlight; common sources are motor vehicles, industries, and consumer products
Carbon monoxide (CO)	• Chest pain in heart patients • Headaches, nausea • Reduced mental alertness • Death at very high levels	• Any source that burns fuel such as cars, trucks, construction and farming equipment, and residential heaters and stoves
Nitrogen dioxide (NO_2)	• Lung damage	• See CO sources
Toxic air contaminants	• Cancer • Chronic eye, lung, or skin irritation • Neurological and reproductive disorders	• Cars and trucks, especially diesels • Industrial sources such as chrome platers • Neighborhood businesses such as dry cleaners and service stations • Building materials and products

Source: California Air Resources Board (2009) (http://www.arb.ca.gov/research/health/fs/fs1/fs1.htm).

The California Clean Air Act (CCAA) provides the MDAQMD and other air districts with the authority to manage transportation activities at indirect sources. Indirect sources of pollution are generated when minor sources collectively emit a substantial amount of pollution. Examples of this would be the motor vehicles at an intersection, a mall, and on highways. The MDAQMD also regulates stationary sources of pollution throughout its jurisdictional area. Direct emissions from motor vehicles are regulated by the ARB.

Climate/Meteorology. Air quality in the planning area is not only affected by various emission sources (mobile, industry, etc.), but also by atmospheric conditions such as wind speed, wind direction, temperature, rainfall, etc.

[1] http://www.epa.gov/air/criteria.html.

The Mojave Desert Air Basin is an assemblage of mountain ranges interspersed with long broad valleys that often contain dry lakes. Many of the lower mountains that dot the vast terrain rise from 1,000 to 4,000 ft above the valley floor. Prevailing winds in the Basin are out of the west and southwest. These prevailing winds are due to the proximity of the Basin to coastal and central regions and the blocking nature of the Sierra Nevada Mountains to the north; air masses pushed onshore in Southern California by differential heating are channeled through the Basin. The Basin is separated from the Southern California coastal and central California valley regions by mountains (highest elevation is approximately 10,000 ft), whose passes form the main channels for these air masses. The Mojave Desert is bordered on the southwest by the San Bernardino Mountains, separated from the San Gabriel Mountains by the Cajon Pass (4,200 ft). A lesser pass lies between the San Bernardino Mountains and the Little San Bernardino Mountains in the Morongo Valley. The Palo Verde Valley portion of the Mojave Desert lies in the low desert, at the eastern end of a series of valleys (notably the Coachella Valley), whose primary channel is the San Gorgonio Pass (2,300 ft) between the San Bernardino and San Jacinto Mountains.

During the summer, the Basin is generally influenced by a Pacific subtropical high cell that sits off the coast, inhibiting cloud formation and encouraging daytime solar heating. The Basin is rarely influenced by cold air masses moving south from Canada and Alaska, as these frontal systems are 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 Basin averages between 3 and 7 inches of precipitation per year (from 16 to 30 days with at least 0.01 inch of precipitation). The Basin is classified as a dry-hot desert climate (BWh), with portions classified as dry-very hot desert (BWhh), to indicate that at least 3 months have maximum average temperatures over 100.4 degrees Fahrenheit (^{o}F).

Snow is common above 5,000 ft in elevation, resulting in moderate snowpack and limited spring runoff. Below 5,000 ft, any precipitation normally occurs as rainfall. Pacific storm fronts normally move into the area from the west, driven by prevailing winds from the west and southwest. During late summer, moist high-pressure systems from the Pacific Ocean collide with rising heated air from desert areas, resulting in brief, high-intensity thunderstorms that can cause high winds and localized flash flooding. During the fall and winter months, strong, dry Santa Ana winds from the northeast can cause rapid temperature variations of significant magnitude.

The climatological station closest to the site with a temperature history is the Victorville station.[1] The annual average maximum temperature recorded for the last 95 years at this station is 77.5°F, and the annual average minimum is 43.9°F. January and December are typically the coldest months in this area of the Basin.

The Hesperia station (which is closer, but has no temperature history) has a precipitation history for the project area. Average rainfall measured at this station in the past varied from 1.26 inches in January to 0.48 inch or lower between April and October, with an average annual total of 6.72 inches. Patterns in monthly and yearly rainfall totals are unpredictable due to fluctuations in the weather.

[1] Western Regional Climatic Center, at Web site: wrcc.dri.edu, 2010.

3.1.2 Description of Global Climate Change and Its Sources

Global climate change (GCC) is the observed increase in the average temperature of the Earth's atmosphere and oceans along with other substantial changes in climate (such as precipitation or wind) that last for an extended period of time. The term "global climate change" is often used interchangeably with the term "global warming," but "global climate change" is preferred to "global warming" because it helps convey that there are other changes in addition to rising temperatures.

Climate change refers to any change in measures of weather (such as temperature, precipitation, or wind) lasting for an extended period (decades or longer). Climate change may result from natural factors, such as changes in the sun's intensity; natural processes within the climate system, such as changes in ocean circulation; or human activities, such as the burning of fossil fuels, land clearing, or agriculture. The primary observed effect of GCC has been a rise in the average global tropospheric[1] temperature of 0.36°F per decade, determined from meteorological measurements worldwide between 1990 and 2005. Climate change modeling shows that further warming could occur, which would induce additional changes in the global climate system during the current century. Changes to the global climate system, ecosystems, and the environment of California could include higher sea levels, drier or wetter weather, changes in ocean salinity, changes in wind patterns, or more energetic aspects of extreme weather, including droughts, heavy precipitation, heat waves, extreme cold, and increased intensity of tropical cyclones. Specific effects in California might include a decline in the Sierra Nevada snowpack, erosion of California's coastline, and seawater intrusion into the Sacramento River Delta.

Greenhouse gases (GHGs) are present in the atmosphere naturally, are released by natural sources, or are formed from secondary reactions taking place in the atmosphere. The gases that are widely seen as the principal contributors to human-induced GCC are:[2]

- Carbon dioxide (CO_2)
- Methane (CH_4)
- Nitrous oxide (N_2O)
- Hydrofluorocarbons (HFCs)
- Perfluorocarbons (PFCs)
- Sulfur hexafluoride (SF_6)

Over the last 200 years, human activities have caused substantial quantities of GHGs to be released into the atmosphere. These extra emissions are increasing GHG concentrations in the atmosphere, and enhancing the natural greenhouse effect, which is believed to be causing global warming. While GHGs produced by human activities include naturally-occurring GHGs such as CO_2, CH_4, and N_2O, some gases like HFCs, PFCs, and SF_6 are completely new to the atmosphere. Certain other gases, such as water vapor, are short-lived in the atmosphere as compared to these GHGs that remain in the atmosphere for substantial periods of time, contributing to climate change in the long term. Water

[1] The troposphere is the zone of the atmosphere characterized by water vapor, weather, winds, and decreasing temperature with increasing altitude.

[2] The GHGs listed are consistent with the definition in Assembly Bill (AB) 32 (Government Code 38505), as discussed later in this section.

vapor is generally excluded from the list of GHGs because it is short-lived in the atmosphere and its atmospheric concentrations are largely determined by natural processes, such as oceanic evaporation. For the purpose of this analysis, the term "GHGs" will refer collectively to the six gases listed above.

These gases vary considerably in terms of Global Warming Potential (GWP), which is a concept developed to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The GWP is based on several factors, including the relative effectiveness of a gas to absorb infrared radiation and the length of time that the gas remains in the atmosphere ("atmospheric lifetime"). The GWP of each gas is measured relative to CO_2, the most abundant GHG. The definition of GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to the ratio of heat trapped by one unit mass of CO_2 over a specified time period. GHG emissions are typically measured in terms of metric tons[1] of "CO_2 equivalents" (CO_2e). Table 2.C shows the GWPs for each type of GHG. For example, SF_6 is 22,800 times more potent as a contributor to global warming than CO_2.

Table C: Global Warming Potential of Greenhouse Gases

Gas	Atmospheric Lifetime (Years)	Global Warming Potential (100-year Time Horizon)
Carbon Dioxide (CO_2)	50–200	1
Methane (CH_4)	12	25
Nitrous Oxide (N_2O)	114	298
Fluoroform (HFC-23)	270	14,800
s,s,s,2-tetrafluoroethane (HFC-134a)	14	1,430
Difluoroethane (HFC-152a)	1.4	124
PFC: Tetrafluoromethane (CF_4)	50,000	7,390
PFC: Hexafluoroethane (C_2F_6)	10,000	12,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Source: IPCC, 2007. *Climate Change 2007: The Physical Science Basis*. Contribution of Working Group I to the Fourth Assessment Report of the IPCC.
HFC = hydrofluorocarbons
IPCC = Intergovernmental Panel on Climate Change
PFC = perfluorocarbons

Air Pollution Constituents and Attainment Status. The ARB coordinates and oversees both State and federal air pollution control programs in California. The ARB oversees activities of local air quality management agencies and maintains air quality monitoring stations throughout the State in conjunction with the EPA and local air districts. The ARB has divided the State into 15 air basins based on meteorological and topographical factors of air pollution. Data collected at these stations are used by ARB and EPA to classify air basins as attainment, nonattainment, nonattainment-transitional, or unclassified, based on air quality data for the most recent 3 calendar years compared with the AAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA. The air quality data are also used to monitor progress in attaining air quality standards. Table D lists the attainment status for the criteria pollutants in the Basin.

[1] A metric ton is equivalent to approximately 1.1 tons.

Table D: Attainment Status for the MDAQMD Portion of the Mojave Desert Air Basin

Criteria Pollutant	Federal Designation	State Designation
1-hour ozone (O_3)	Revoked June 2005	Nonattainment: Moderate
8-hour ozone (O_3)	Nonattainment: Moderate	Nonattainment
Carbon monoxide (CO)	Attainment	Attainment
PM_{10}	Nonattainment: Moderate	Nonattainment
$PM_{2.5}$	Unclassified/attainment	Nonattainment
Lead (Pb)	Attainment	Attainment
Sulfur dioxide (SO_2)	Attainment/unclassified	Attainment/unclassified
Nitrogen dioxide (NO_2)	Attainment/unclassified	Attainment/unclassified

Source: California Air Resources Board (2013) (http://www.arb.ca.gov/desig/desig.htm).
MDAQMD = Mojave Desert Air Quality Management District
PM_{10} = particulate matter less than 10 microns in diameter
$PM_{2.5}$ = particulate matter less than 2.5 microns in diameter

Ozone. O_3 (smog) is formed by photochemical reactions between NO_X and reactive organic gases (ROGs) rather than being directly emitted. O_3 is a pungent colorless gas typical of Southern California smog. Elevated O_3 concentrations result in reduced lung function, particularly during vigorous physical activity. This health problem is particularly acute in sensitive receptors such as the sick, the elderly and young children. O_3 levels peak during summer and early fall. The entire Basin is designated as a nonattainment area for the State 1-hour and 8-hour O_3 standards. The EPA has classified the portion of the Basin in which the project is located as moderate nonattainment for the 8-hour O_3 standard.

Carbon Monoxide. CO is formed by the incomplete combustion of fossil fuels, almost entirely from automobiles. It is a colorless, odorless gas that can cause dizziness, fatigue, and impairment to central nervous system functions. The entire Basin is designated as in attainment for federal and State CO standards.

Nitrogen Oxides. NO_2, a reddish brown gas, and nitric oxide (NO), a colorless, odorless gas, are formed from fuel combustion under high temperature or pressure. These compounds are referred to as nitrogen oxides, or NO_X. NO_X is a primary component of the photochemical smog reaction. It also contributes to other pollution problems, including a high concentration of fine particulate matter, poor visibility, and acid deposition (i.e., acid rain). NO_2 decreases lung function and may reduce resistance to infection. The entire Basin is designated as an in attainment or unclassified area for federal and State NO_2 standards.

Sulfur Dioxide. SO_2 is a colorless, irritating gas formed primarily from incomplete combustion of fuels containing sulfur. Industrial facilities also contribute to gaseous SO_2 levels. SO_2 irritates the respiratory tract, can injure lung tissue when combined with fine particulate matter, and reduces visibility and the level of sunlight. The entire Basin is in attainment or unclassified with both federal and State SO_2 standards.

Lead. Lead is found in old paints and coatings, plumbing, and a variety of other materials. Once in the blood stream, lead can cause damage to the brain, nervous system, and other body systems. Children are highly susceptible to the effects of lead. The entire Basin is in attainment for the federal and State standards for lead.

Particulate Matter. Particulate matter is the term used for a mixture of solid particles and liquid droplets found in the air. Coarse particles, PM_{10}, are derived from a variety of sources, including windblown dust and grinding operations. Fuel combustion and resultant exhaust from power plants and diesel buses and trucks are primarily responsible for fine, $PM_{2.5}$, particle levels. Fine particles can also be formed in the atmosphere through chemical reactions. PM_{10} can accumulate in the respiratory system and aggravate health problems such as asthma. The EPA's scientific review concluded that $PM_{2.5}$, which penetrates deeply into the lungs, is more likely than PM_{10} to contribute to the health effects listed in a number of recently published community epidemiological studies at concentrations that extend well below those allowed by the current PM_{10} standards. These health effects include premature death and increased hospital admissions and emergency room visits (primarily the elderly and individuals with cardiopulmonary disease); increased respiratory symptoms and disease (children and individuals with cardiopulmonary disease such as asthma); decreased lung functions (particularly in children and individuals with asthma); and alterations in lung tissue and structure and in respiratory tract defense mechanisms. The portion of the Basin in which the project is located is a nonattainment area for federal and State PM_{10} standards. The portion of the Basin in which the project is located is an unclassified/attainment area for federal $PM_{2.5}$ and a nonattainment area for State $PM_{2.5}$ standards.

Reactive Organic Compounds. Reactive organic compounds (ROCs, also known as ROGs and volatile organic compounds [VOCs]) are formed from the combustion of fuels and the evaporation of organic solvents. ROCs are not defined as criteria pollutants, but are a prime component of the photochemical smog reaction. Consequently, ROCs accumulate in the atmosphere more quickly during the winter when sunlight is limited and photochemical reactions are slower.

Sulfates. Sulfates occur in combination with metal and/or hydrogen ions. In California, emissions of sulfur compounds occur primarily from the combustion of petroleum-derived fuels (e.g., gasoline and diesel fuel) that contain sulfur. This sulfur is oxidized to SO_2 during the combustion process and subsequently converted to sulfate compounds in the atmosphere. The conversion of SO_2 to sulfates takes place comparatively rapidly and completely in urban areas of California due to regional meteorological features. The entire Basin is in attainment for the State standard for sulfates.

Hydrogen Sulfide. Hydrogen sulfide (H_2S) is a colorless gas with the odor of rotten eggs. It is formed during bacterial decomposition of sulfur-containing organic substances. Also, it can be present in sewer gas and some natural gas and can be emitted as the result of geothermal energy exploitation. In 1984, an ARB committee concluded that the ambient standard for H_2S is adequate to protect public health and to significantly reduce odor annoyance. The entire Basin is unclassified for the State standard for hydrogen sulfide.

Visibility-Reducing Particles. Visibility-reducing particles consist of suspended particulate matter, which is a complex mixture of tiny particles that consists of dry solid fragments, solid cores with liquid coatings, and small droplets of liquid. These particles vary greatly in shape, size, and chemical composition, and can be made up of many different materials such as metals, soot, soil, dust, and salt. The statewide standard is intended to limit the frequency and severity of visibility impairment due to regional haze. The entire Basin is unclassified for the State standard for visibility-reducing particles.

3.1.3 Local Air Quality

The MDAQMD maintains ambient air quality monitoring stations throughout the Basin. The air quality monitoring station within the Basin that is closest to the site is the Hesperia station. However, this monitoring station only provides data for the 1-hour and 8-hour ozone levels and the 24-hour PM_{10} levels. The second closest monitoring station that is in the same air basin and is at a similar altitude, thus providing air data similar to the project site, is the Victorville station. The criteria pollutants monitored at these stations[1] are illustrated in Table E.

3.1.4 Regulatory Settings

Federal Regulations/Standards. Pursuant to the federal Clean Air Act (CAA) of 1970, the EPA established national ambient air quality standards (NAAQS). The NAAQS were established for six major pollutants, termed "criteria" pollutants. Criteria pollutants are defined as those pollutants for which the federal and State governments have established AAQS, or criteria, for outdoor concentrations in order to protect public health.

Data collected at permanent monitoring stations are used by the EPA to classify regions as "attainment" or "nonattainment," depending on whether the regions met the requirements stated in the primary NAAQS. Nonattainment areas are imposed with additional restrictions as required by the EPA.

The EPA has designated SCAG as the Metropolitan Planning Organization (MPO) responsible for ensuring compliance with the requirements of the CAA for the Basin.

The EPA established new national air quality standards for ground-level O_3 and fine particulate matter in 1997. On May 14, 1999, the Court of Appeals for the District of Columbia Circuit issued a decision ruling that the CAA, as applied in setting the new public health standards for O_3 and particulate matter, was unconstitutional as an improper delegation of legislative authority to the EPA. On February 27, 2001, the U.S. Supreme Court upheld the way the government sets air quality standards under the CAA. The court unanimously rejected industry arguments that the EPA must consider financial cost as well as health benefits in writing standards. The justices also rejected arguments that the EPA took too much lawmaking power from Congress when it set tougher standards for O_3 and soot in 1997.

[1] ARB and MDAQMD, 2010.

Table E: Ambient Air Quality Data Monitored at the Hesperia and Victorville Monitoring Stations

Pollutant	Standard	2010	2011	2012
Carbon Monoxide (CO) – measured at the Victorville Street station				
Maximum 1-hour concentration (ppm)		15.9	1.9	2.1
Number of days exceeded:	State: > 20 ppm	0	0	0
	Federal: > 35 ppm	0	0	0
Maximum 8-hour concentration (ppm)		5.17	1.51	1.83
Number of days exceeded:	State: ≥ 9.0 ppm	0	0	0
	Federal:≥ 9 ppm	0	0	0
Ozone (O_3) – measured at the Hesperia station				
Maximum 1-hour concentration (ppm)		0.119	0.132	0.116
Number of days exceeded:	State: > 0.09 ppm	15	24	21
Maximum 8-hour concentration (ppm)		0.101	0.113	0.097
Number of days exceeded:	State: > 0.07 ppm	66	101	93
	Federal: > 0.075 ppm	42	67	55
Coarse Particulates (PM_{10}) – measured at the Hesperia station				
Maximum 24-hour concentration (µg/m^3)		48	41	45
Number of days exceeded:	State: > 50 µg/m^3	0	0	0
	Federal: > 150 µg/m^3	0	0	0
Annual arithmetic average concentration (µg/m^3)		23	23	19
Exceeded for the year:	State: > 20 µg/m^3	Yes	Yes	No
Fine Particulates ($PM_{2.5}$) – measured at the Victorville station				
Maximum 24-hour concentration (µg/m^3)		18.0	15.0	12.0
Number of days exceeded:	Federal: > 35 µg/m^3	0	0	0
Annual arithmetic average concentration (µg/m^3)		7.6	N/A	N/A
Exceeded for the year:	State: > 12 µg/m^3	No	N/A	N/A
	Federal: > 15 µg/m^3	No	N/A	N/A
Nitrogen Dioxide (NO_2) – measured at the Victorville station				
Maximum 1-hour concentration (µg/m^3)		137	75	56
Number of days exceeded:	State: > 339 µg/m^3	0	0	0
Annual arithmetic average concentration (ppm)		15	15	13
Exceeded for the year:	State: > 57 µg/m^3	No	No	No
	Federal: > 100 µg/m^3	No	No	No
Sulfur Dioxide (SO_2) – measured at the Victorville station				
Maximum 24-hour concentration (ppm)		0.007	N/A	N/A
Number of days exceeded:	State: > 0.04 ppm	0	N/A	N/A
	Federal: > 0.14 ppm	0	N/A	N/A
Annual arithmetic average concentration (ppm)		0	N/A	N/A
Exceeded for the year:	Federal: > 0.030 ppm	No	N/A	N/A

Sources: United States Environmental Protection Agency (www.epa.gov/air/data/index.html); California Air Resources Board (www.arb.ca.gov/adam/welcome.html); and South Coast Air Quality Management District (http://www.aqmd.gov/smog/historicaldata.htm).
ppm = parts per million
µg/m^3 = microgram of pollutant per cubic meter of air
N/A = Data not available

Nevertheless, the court threw out the EPA's policy for implementing new O_3 rules, saying that the agency ignored a section of the law that restricts its authority to enforce such rules.

In April 2003, the EPA was cleared by the White House Office of Management and Budget (OMB) to implement the 8-hour ground-level O_3 standard. The EPA issued the proposed rule implementing the 8-hour O_3 standard in April 2003. The EPA completed final 8-hour nonattainment status on April 15, 2004. The EPA revoked the 1-hour O_3 standard on June 15, 2005, and lowered the 8-hour O_3 standard from 0.08 ppm to 0.075 ppm on April 1, 2008.

The EPA issued the final $PM_{2.5}$ implementation rule in fall 2004. The EPA lowered the 24-hour $PM_{2.5}$ standard from 65 to 35 $\mu g/m^3$ and revoked the annual PM_{10} standard on December 17, 2006. The EPA issued final designations for the 2006 24-hour $PM_{2.5}$ standard on December 12, 2008.

The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the EPA has the authority to regulate CO_2 emissions under the federal Clean Air Act (CAA). While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the EPA commenced several actions in 2009 that are required to implement a regulatory approach to global climate change.

On September 30, 2009, the EPA announced a proposal that focuses on large facilities emitting over 25,000 tons of GHG emissions per year. These facilities would be required to obtain permits that would demonstrate they are using the best practices and technologies to minimize GHG emissions.

On December 7, 2009, the EPA Administrator signed a final action under the CAA, finding that six greenhouse gases (CO_2, CH_4, N_2O, HFCs, PFCs, and SF_6) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change. This EPA action does not impose any requirements on industry or other entities. However, the findings are a prerequisite to finalizing the GHG emission standards for light-duty vehicles mentioned below.

On April 1, 2010, the EPA and the Department of Transportation's National Highway Traffic Safety Administration (NHTSA) announced a final joint rule to establish a national program consisting of new standards for model year 2012 through 2016 light-duty vehicles that will reduce GHG emissions and improve fuel economy. EPA is finalizing the first-ever national GHG emissions standards under the CAA, and NHTSA is finalizing Corporate Average Fuel Economy (CAFE) standards under the Energy Policy and Conservation Act. The EPA GHG standards require these vehicles to meet an estimated combined average emissions level of 250 grams of CO_2 per mile in model year 2016, equivalent to 35.5 miles per gallon (mpg).

State Regulations/Standards. In 1967, the California Legislature passed the Mulford-Carrell Act, which combined two Department of Health bureaus, the Bureau of Air Sanitation, and the Motor Vehicle Pollution Control Board, to establish ARB. Since its formation, ARB has worked with the public, the business sector, and local governments to find solutions to California's air pollution problems.

The ARB identified particulate emissions from diesel-fueled engines (diesel particulate matter [DPM]) as toxic air contaminants (TACs) in August 1998. Following the identification process, ARB was required by law to determine whether there is a need for further control. In September 2000, the ARB adopted the Diesel Risk Reduction Plan (Diesel RRP), which recommends many control measures to reduce the risks associated with DPM and to achieve goals of 75 percent DPM reduction by 2010 and 85 percent by 2020.

In a response to the transportation sector's significant contribution to California's CO_2 emissions, Assembly Bill (AB) 1493 (Pavley) was enacted on July 22, 2002. AB 1493 requires ARB to set GHG emission standards for passenger vehicles and light-duty trucks (and other vehicles whose primary use is noncommercial personal transportation in the State) manufactured in 2009 and all subsequent model years. To set its own GHG emissions limits on motor vehicles, California must receive a waiver from the EPA. On June 30, 2009, the EPA granted the waiver of CAA preemption to California for its GHG emission standards for motor vehicles beginning with the 2009 model year. Notice of the decision was published in the Federal Register on July 8, 2009.

In June 2005, Governor Schwarzenegger established California's GHG emissions reduction targets in Executive Order (EO) S-3-05. This EO established the following goals for the State of California: GHG emissions should be reduced to 2000 levels by 2010; GHG emissions should be reduced to 1990 levels by 2020; and GHG emissions should be reduced to 80 percent below 1990 levels by 2050.

California's major initiative for reducing GHG emissions is outlined in AB 32, the "Global Warming Solutions Act," passed by the California State legislature on August 31, 2006. This effort aims at reducing GHG emissions to 1990 levels by 2020. The ARB has established the level of GHG emissions in 1990 at 427 million metric tons of carbon dioxide equivalent ($MMTCO_2e$). The emissions target of 427 million metric tons (MMT) requires the reduction of 169 MMT from the State's projected business-as-usual 2020 emissions of 596 MMT. AB 32 requires ARB to prepare a Scoping Plan that outlines the main State strategies for meeting the 2020 deadline and to reduce GHGs that contribute to global climate change. The Scoping Plan was approved by ARB on December 11, 2008, and includes measures to address GHG emission reduction strategies related to energy efficiency, water use, and recycling and solid waste, among other measures.[1] Emission reductions that are projected to result from the recommended measures in the Scoping Plan are expected to total 174 $MMTCO_2e$, which would allow California to attain the emissions goal of 427 $MMTCO_2e$ by 2020. The Scoping Plan includes a range of GHG reduction actions that may include direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, and market-based mechanisms such as a cap-and-trade system. The Scoping Plan, even after Board approval, remains a recommendation. The measures in the Scoping Plan will not be binding until after they are adopted through the normal rulemaking process. The ARB rule-making process includes preparation and release of each of the draft measures, public input through workshops and a public comment period, followed by an ARB Board hearing and rule adoption.

[1] ARB. 2008. Climate Change Proposed Scoping Plan: a Framework for Change. October.

In addition to reducing GHG emissions to 1990 levels by 2020, AB 32 directed ARB and the newly created Climate Action Team (CAT)[1] to identify a list of "discrete early action GHG reduction measures" that can be adopted and made enforceable by January 1, 2010. On January 18, 2007, Governor Schwarzenegger signed EO S-1-07, further solidifying California's dedication to reducing GHGs by setting a new Low Carbon Fuel Standard. This EO sets a target to reduce the carbon intensity of California transportation fuels by at least 10 percent by 2020 and directs ARB to consider the Low Carbon Fuel Standard as a discrete early action measure.

In June 2007, ARB approved a list of 37 early action measures, including three discrete early action measures (Low Carbon Fuel Standard, Restrictions on High Global Warming Potential Refrigerants, and Landfill Methane Capture). Discrete early action measures are measures that were required to be adopted as regulations and made effective no later than January 1, 2010, the date established by Health and Safety Code (HSC) Section 38560.5. The ARB adopted additional early action measures in October 2007[2] that tripled the number of discrete early action measures. These measures relate to truck efficiency, port electrification, reduction of perfluorocarbons from the semiconductor industry, reduction of propellants in consumer products, proper tire inflation, and sulfur hexafluoride (SF_6) reductions from the non-electricity sector. The combination of early action measures is estimated to reduce State-wide GHG emissions by nearly 16 MMT.[3]

To assist public agencies in analyzing the effects of GHGs under CEQA, Senate Bill (SB) 97 (Chapter 185, 2007) required the Governor's Office of Planning and Research (OPR) to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions. On December 30, 2009, the Natural Resources Agency adopted CEQA Guidelines Amendments related to climate change. These amendments became effective on March 18, 2010.

SB 375, signed into law on October 1, 2008, is intended to enhance ARB's ability to reach AB 32 goals by directing ARB to develop regional GHG emissions reduction targets to be achieved within the automobile and light truck sectors for 2020 and 2035. ARB will work with California's 18 metropolitan planning organizations to align their regional transportation, housing, and land use plans and prepare a "Sustainable Communities Strategy" to reduce the number of vehicle miles traveled in their respective regions and demonstrate the region's ability to attain its GHG reduction targets.

California Green Buildings Standards Code (Cal Green Code) (California Code of Regulations [CCR], Title 24, part 11) was adopted by the California Building Standards Commission in 2010 and became effective in January, 2011. The Code applies to all new constructed residential, nonresidential, commercial, mixed-use, and State-owned facilities, as well as schools and hospitals. Cal Green Code comprises Mandatory Residential and Nonresidential Measures and more stringent Voluntary Measures (TIERs I and II).

Mandatory Measures are required to be implemented on all new construction projects and consist of a wide array of green measures concerning project site design, water use reduction, improvement of

1 CAT is a consortium of representatives from State agencies who have been charged with coordinating and implementing GHG emission reduction programs that fall outside of ARB's jurisdiction.

2 ARB. 2007. *Expanded List of Early Action Measures to Reduce Greenhouse Gas Emissions in California Recommended for Board Consideration.* October.

3 ARB. 2007. "ARB approves tripling of early action measures required under AB 32." News Release 07-46. http://www.arb.ca.gov/newsrel/nr102507.htm. October 25.

indoor air quality, and conservation of materials and resources. The Cal Green Building Code refers to Title 24, Part 6 compliance with respect to energy efficiency; however, it encourages 15 percent energy use reduction over that required in Part 6. Voluntary Measures are optional, more stringent measures to be used by jurisdictions that strive to enhance their commitment towards green and sustainable design and achievement of AB 32 goals. Under TIERs 1 and 2, all new construction projects are required to reduce energy consumption by 15 percent and 30 percent, respectively, below the baseline required under the California Energy Commission (CEC), as well as implement more stringent green measures than those required by mandatory code.

Regional Air Quality Planning Framework. The 1976 Lewis Air Quality Management Act established the MDAQMD and other air districts throughout the State. The federal CAA Amendments of 1977 required that each state adopt an implementation plan outlining pollution control measures to attain the federal standards in nonattainment areas of the state.

The ARB is responsible for incorporating air quality management plans for local air basins into a State Implementation Plan (SIP) for EPA approval. Significant authority for air quality control within them has been given to local air districts that regulate stationary source emissions and develop local nonattainment plans.

Regional Air Quality Management Plan. The MDAQMD and SCAG are responsible for formulating and implementing the air quality attainment plan (AQAP) for the Basin. Regional AQAPs were adopted in 1991, 1994, and 1997. The following SIP and AQAP are the currently approved plans for the Basin region:

- 1997 SIP for O_3, PM_{10}, and NO_2
- 1995 Mojave Desert Planning Area Federal PM_{10} Attainment Plan; no formal action by the EPA

The MDAQMD completed the MDAQMD 2004 Ozone Attainment Plan (State and federal) in April 2004, which has been approved by the EPA.

4.0 THRESHOLDS AND METHODOLOGY

The proposed project is located within the MDAQMD's air quality jurisdiction. Therefore, the emission thresholds established by the MDAQMD were adhered to in the assessment of air quality impacts for the proposed project.

A number of modeling tools are available to assess air quality impacts of projects. In addition, certain air districts, such as the MDAQMD, have created guidelines and requirements to conduct air quality analysis. MDAQMD's current guidelines, *California Environmental Quality Act (CEQA) and Federal Conformity Guidelines* (February 2009), were adhered to in the assessment of air quality impacts for the proposed project.

This Air Quality Analysis includes estimated emissions associated with short-term construction and long-term operation of the proposed project. Criteria pollutants with regional impacts would be emitted by project-related vehicular trips, as well as by emissions associated with stationary sources used on site. Localized air quality impacts, i.e., higher CO concentrations (CO hot spots) near intersections or roadway segments in the project vicinity, would be small and less than significant due to the generally low ambient CO concentrations in the project area.

The net increase in pollutant emissions determines the significance and impact on regional air quality as a result of the proposed project. The results also allow the local government to determine whether the proposed project will deter the region from achieving the goal of reducing pollutants in accordance with the AQMP in order to comply with federal and State AAQS.

4.1 THRESHOLDS OF SIGNIFICANCE

Based on *Guidelines for the Implementation of California Environmental Quality Act*, Appendix G, Public Resource Code (PRC) Sections 15000–15387, a project would normally be considered to have a significant effect on air quality if the project would violate any ambient air quality standards, contribute substantially to an existing air quality violation, expose sensitive receptors to substantial pollutant concentrations, or conflict with adopted environmental plans and goals of the community in which it is located.

In addition to the federal and State AAQS, there are daily emissions thresholds for construction and operation of a proposed project in the Basin. Specific criteria for determining whether the potential air quality impacts of a project are significant are set forth in the MDAQMD's *CEQA and Federal Conformity Guidelines* (August 2011). The criteria include emissions thresholds, compliance with State and national air quality standards, and consistency with the current air quality plans. It should be noted that the emission thresholds were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with adequate margin of safety,[1] these emission

[1] http://www.epa.gov/air/criteria.html.

thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

4.1.1 Regional Thresholds for Construction and Operational Emissions

The following significance thresholds for direct and indirect impacts have been established by the MDAQMD:

- 137 pounds per day (lbs/day) or 25 tons per year (tons/yr) of ROGs
- 137 lbs/day or 25 tons/yr of NO_X
- 548 lbs/day or 100 tons/yr of CO
- 82 lbs/day or 15 tons/yr of PM_{10}
- 137 lbs/day or 25 tons/yr of SO_X

Projects in the MDAQMD with construction-related emissions that exceed any of the emission thresholds above are considered significant. Projects with operation-related emissions that exceed any of the above-listed emissions thresholds are considered significant under CEQA.

4.1.2 Local Microscale Concentration Standards

The significance of localized project impacts under CEQA depends on whether ambient CO levels in the vicinity of the project are above or below State and federal CO standards. If ambient levels are below the standards, a project is considered to have a significant impact if project emissions result in an exceedance of one or more of these standards. If ambient levels already exceed a State or federal standard, project emissions are considered significant if they increase 1-hour CO concentrations by 1.0 ppm or more or 8-hour CO concentrations by 0.45 ppm or more. The following are applicable local emission concentration standards for CO:

- California State 1-hour CO standard of 20.0 ppm
- California State 8-hour CO standard of 9.0 ppm

When ambient levels are below standards without the project emissions, a project is considered to have significant impacts if project emissions result in an exceedance of one or more of these standards.

4.1.3 Global Climate Change

The analysis of greenhouse gases (GHGs) is a much different analysis than the analysis of criteria pollutants for the following reasons. For criteria pollutants, significance thresholds are based on daily emissions because attainment or nonattainment is based on daily exceedances of applicable AAQS. Further, several ambient AAQS are based on relatively short-term exposure effects on human health (e.g., 1-hour and 8-hour). Since the half-life of carbon dioxide (CO_2) is approximately 100 years, for example, the effects of GHGs are longer-term, affecting global climate over a relatively long time

frame. As a result, the current position is to evaluate GHG effects over a longer time frame than a single day.

The recommended approach for GHG analysis included in the Governor's Office of Planning and Research (OPR) June 2008 release is to: (1) identify and quantify GHG emissions, (2) assess the significance of the impact on climate change, and (3) if significant, identify alternatives and/or mitigation measures to reduce the impact below a level of significance.[1] The June 2008 OPR guidance provides some additional direction regarding planning documents as follows: "CEQA can be a more effective tool for GHG emissions analysis and mitigation if it is supported and supplemented by sound development policies and practices that will reduce GHG [greenhouse gas] emissions on a broad planning scale and that can provide the basis for a programmatic approach to project-specific CEQA analysis and mitigation. For local government lead agencies, adoption of general plan policies and certification of general plan EIRs [Environmental Impact Reports] that analyze broad jurisdiction-wide impacts of GHG emissions can be part of an effective strategy for addressing cumulative impacts and for streamlining later project-specific CEQA reviews."

To assist public agencies in analyzing the effects of GHGs under CEQA, SB 97 (Chapter 185, 2007) required the OPR to develop CEQA guidelines on how to minimize and mitigate a project's GHG emissions.

On December 30, 2009, the California Natural Resources Agency adopted CEQA Guidelines Amendments related to Climate Change. The amendments became effective on March 18, 2010, and state:

> (a) The determination of the significance of greenhouse gas emissions calls for a careful judgment by the Lead Agency consistent with the provisions in section 15064. A lead agency should make a good-faith effort, based on available information, to describe, calculate or estimate the amount of greenhouse gas emissions resulting from a project. A lead agency shall have discretion to determine, in the context of a particular project, whether to:
>
> (1) Use a model or methodology to quantify greenhouse gas emissions resulting from a project, and which model or methodology to use. The lead agency has discretion to select the model it considers most appropriate provided it supports its decision with substantial evidence. The lead agency should explain the limitations of the particular model or methodology selected for use; or
>
> (2) Rely on a qualitative analysis or performance based standards.
>
> (b) A lead agency may consider the following when assessing the significance of impacts from greenhouse gas emissions on the environment:

[1] State of California, 2008. Governor's Office of Planning and Research. CEQA and Climate Change: Addressing Climate Change Through California Environmental Quality Act Review. June 19.

(1) The extent to which the project may increase or reduce greenhouse gas emissions as compared to the existing environmental setting.

(2) Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.

(3) The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions. Such regulations or requirements must be adopted by the relevant public agency through a public review process and must include specific requirements that reduce or mitigate the project's incremental contribution of greenhouse gas emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

CEQA Guidelines Section 15064(b) provides that the "…determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data," and further, states that an "…ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting."

Individual projects incrementally contribute toward the potential for GCC on a cumulative basis in concert with all other past, present, and probable future projects. While individual projects are unlikely to measurably affect GCC, each project incrementally contributes toward the potential for GCC on a cumulative basis, in concert with all other past, present, and probable future projects.

Revisions to Appendix G of the CEQA Guidelines suggest that the project be evaluated for the following impacts:

Would the project generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment?

Would the project conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs?

However, despite this, currently the CEQA statutes, OPR guidelines, and/or the draft proposed changes to the CEQA Guidelines prescribe thresholds of significance or a particular methodology for performing a GHG impact analysis; as with most environmental topics, significance criteria for GHG impacts are left to the judgment and discretion of the Lead Agency.

This air quality analysis analyzes whether the project's GHG emissions should be considered cumulatively significant based on whether they:

Hinder attainment of the State's goals of reducing GHG emissions to 1990 levels by 2020, as stated in the Global Warming Solutions Act of 2006. A project may be considered to help attainment of the

State's goals by being consistent with an adopted Statewide 2020 GHG emissions limit or the plans, programs, and regulations adopted to implement the Global Warming Solutions Act of 2006.
Fail to achieve increased energy efficiency or reduce overall GHG emissions from an existing facility.
Significantly increase the consumption of fuels or other energy resources, especially fossil fuels that contribute to GHG emissions when consumed.

The analysis of the potential GHG impacts of the proposed project uses compliance with AB 32, considered a "previously approved mitigation program," as set forth in CEQA Guidelines Section 15064(h)(3) to determine if the project's incremental contribution of GHGs is a cumulatively considerable contribution to GCC. OPR's proposed draft amendment to Section 15064.7 of the CEQA Guidelines reinforces the use of this approach. CEQA Guideline Section 15064(h)(3) states three main conditions that a plan must meet to be sufficient for use as a basis for determining significance of GHG emissions. The plan must:

1. Be "a previously approved plan or mitigation program."
2. Provide "specific requirements that will avoid or substantially lessen the cumulative problem."
3. "Be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency."

AB 32 meets conditions 1 and 3 provided above. Accordingly, consistency or inconsistency with the reduction targets in AB 32 is evaluated. To do so, project features that implement specific reduction measures identified in the rules and regulations that implement AB 32 were evaluated.

5.0 IMPACTS AND MITIGATION

Air pollutant emissions associated with the project would occur over the short term from construction activities, such as fugitive dust from site preparation and grading, and emissions from equipment exhaust. There would be long-term regional emissions associated with project-related vehicular trips. Long-term stationary source emissions would occur due to energy consumption such as electricity usage by the proposed land uses.

5.1 CONSTRUCTION IMPACTS

5.1.1 Equipment Exhausts and Related Construction Activities

Construction activities produce combustion emissions from various sources such as site grading, utility engines, on-site heavy-duty construction vehicles, equipment hauling materials to and from the site, asphalt paving, and motor vehicles transporting the construction crew. Exhaust emissions from construction activities envisioned on site would vary daily as construction activity levels change. The use of construction equipment on site would result in localized exhaust emissions.

Project construction will consist of two major phases: (1) site preparation and (2) PV system installation testing and Startup. Phase 1 is expected to take approximately 2 months and Phase 2 approximately 7 months. Construction will generally occur during daylight hours, Monday through Friday. Weekend and non-daylight work hours may be necessary to make up schedule deficiencies or to complete critical construction activities.

Construction of the PV facility will begin with initial clearing and grading, as required, of the staging areas. Access to the project site from public roads will be improved to appropriate construction period standards. The staging areas will typically include construction offices, a first aid station and other temporary buildings, worker parking, truck loading and unloading facilities, and an area for assembling. PV system installation will include earthwork, grading, and erosion control, as well as construction of the plant substation and erection of the PV modules, supports, and associated electrical equipment.

Concrete will be required for the footings, foundations, and pads for the transformers, and substation equipment. Concrete will be produced at an off-site location by a local provider and transported to the project site by truck.

The proposed schedule for construction includes beginning site preparation and construction of the facility in the first quarter of 2013, anticipating to complete construction and being commercially operational by the fourth quarter of 2013. The project Trip Generation memo lists 90 daily worker trips and 56 daily water truck trips during Phase 1 and 300 daily worker trips, 14 daily water truck trips, and 20 daily equipment deliveries during Phase 2. Since construction equipment will be stored on site, this would occur atypically, but presents the most conservative estimate of trips. As shown in the tables in Appendix A, using the South Coast Air Quality Management District's (SCAQMD)

OFFROAD emissions factors for the construction equipment and the ARB EMFAC2011 emissions factors for the on-road vehicles, and based on the conservative assumptions also shown in the tables in Appendix A for trip distance and average road speeds, the total daily construction emissions from all equipment and vehicles would be under the MDAQMD daily thresholds.

5.1.2 Greenhouse Gas Emissions

As shown in the tables in Appendix A, construction of the proposed project would generate up to 6,000 lbs/day of CO_2e for 9 months. However, as discussed below in Section 5.2.2, the proposed project would reduce the long-term regional CO_2e emissions by 165,000 metric tons annually. The operational characteristics of the proposed project would offset the total construction emissions within less than 1 week of reaching full capacity.

5.1.3 Fugitive Dust

Fugitive dust emissions are generally associated with land clearing and exposure of soils to the air and wind, and cut-and-fill grading operations. Dust generated during construction varies substantially on a project-by-project basis, depending on the level of activity, the specific operations, and weather conditions at the time of construction. It is assumed that soil will be balanced on site to minimize the need for import or export of soil during project construction.

Construction emissions can vary greatly depending on the level of activity, the specific operations taking place, the equipment being operated, local soils, weather conditions, and other factors. The proposed project will be required to comply with MDAQMD Rules 402 and 403 to control fugitive dust. The tables in Appendix A list total construction emissions (i.e., fugitive-dust emissions and construction-equipment exhausts) that have incorporated all required control measures to reduce PM_{10} emissions from construction. The tables in Appendix A show that daily total construction PM_{10} emissions with standard control measures would be below the daily thresholds established by the MDAQMD.

5.1.4 Odors

Heavy-duty equipment in the project area during construction would emit odors. However, the construction activity would be short-term and would cease to occur after construction is completed. No other sources of objectionable odors have been identified for the proposed project. No mitigation measures are recommended.

MDAQMD Rule 402 regarding nuisances states: “A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which cause, or have a natural tendency to cause injury or damage to business or property.” The proposed uses are not anticipated to emit any objectionable odors. Therefore, objectionable odors posing a health risk to potential on-site and existing off-site uses would not occur as a result of the proposed project.

5.1.5 Naturally Occurring Asbestos

The proposed project is located in San Bernardino County, which is not among the counties that are found to have serpentine and ultramafic rock in their soils. Therefore, the potential risk for naturally occurring asbestos during project construction is small and less than significant.

5.2 LONG-TERM AIR QUALITY IMPACTS

5.2.1 Regional Project Operational Emissions

Upon completion of the construction, the project will enter the operational phase. The project will be operated on an unstaffed basis and monitored remotely, with regular on-site personnel visitations for security, maintenance, and system monitoring. There will be no on-site personnel during operation. Fewer than five employees would visit the site regularly for security, maintenance, and system monitoring purposes and would, therefore, generate a nominal number of trips on a regular basis.

The panels would be washed up to four times per year. Approximately 235,350 gallons of water per year will need to be trucked to the site for panel washing. Assuming the use of a 4,000-gallon water truck, this would require a total of 59 inbound and 59 outbound truck trips per year, plus fewer than 10 worker trips each time. The estimated trips due to construction activities would be significantly higher and for a longer duration than the trips generated by periodic visits for inspection, security, maintenance, system monitoring, and panel washing purposes.

5.2.2 Greenhouse Gas Emissions

This section evaluates potentially significant impacts to GCC that could result from implementation of the proposed project. Because it is not possible to tie specific GHG emissions to actual changes in climate, this evaluation focuses on the project's emission of GHGs. Mitigation measures are identified as appropriate.

GHG Emissions Background. Emissions estimates for the proposed project are discussed below. GHG emissions estimates are provided herein for informational purposes only, as there is no established quantified GHG emissions threshold. Bearing in mind that CEQA does not require "perfection" but instead "adequacy, completeness, and a good faith effort at full disclosure," the analysis below is based on methodologies and information available to the County of Riverside and the applicant at the time this analysis was prepared. Estimation of GHG emissions in the future does not account for all changes in technology that may reduce such emissions; therefore, the estimates are based on past performance of similar projects and represent a scenario that is worse than that which is likely to be encountered (after energy-efficient technologies have been implemented). While information is presented below to assist the public and the decision-makers in understanding the project's potential contribution to GCC impacts, the information available to the county is not sufficiently detailed to allow a direct comparison between particular project characteristics and particular climate change impacts, nor between any particular proposed mitigation measure and any reduction in climate change impacts.

Preliminary guidance from OPR and recent letters from the Attorney General critical of CEQA documents that have taken different approaches indicate that lead agencies should calculate, or estimate, emissions from vehicular traffic, energy consumption, water conveyance and treatment, and waste generation activities.

The proposed project will help California meet its Renewable Portfolio Standard (RPS) goal, which is currently 33 percent of electrical power retail sales by 2020 under EOs S-14-08 and S-21-09 issued by Governor Schwarzenegger. The project supports Secretary of the Interior Salazar's Orders 3283 and 3285, which make developing renewable energy a top national priority. The project will also help the State achieve the 2006 Global Warming Solutions Act (AB 32) GHG reduction targets, which require California's GHG emissions to be reduced to 1990 levels by 2020.

When fully operational, the 20-MW SGF would have the capacity to directly convert solar energy to 20 MW of emission-free power using minimal water and producing no waste. The regular visits for security, maintenance, and system monitoring combined with the panel washing activities would result in the emissions of approximately 15,000 metric tons of CO_2e annually.[1] When compared to the GHG emissions that would be emitted if the same amount of electricity were generated from fossil fuels, the project would avoid emissions of up to 180,000 metric tons of CO_2e annually[2]; this is the equivalent of taking almost 34,375 automobiles off the road[3]. Therefore, the proposed project would result in a net decrease in annual GHG emissions and would not result in significant impact to environment with respect to generation of GHGs.

5.3 AIR QUALITY MANAGEMENT PLAN CONSISTENCY

An AQMP describes air pollution control strategies to be taken by a city, county, or region classified as a nonattainment area. The main purpose of an AQMP is to bring the area into compliance with federal and State air quality standards. CEQA requires that certain proposed projects be analyzed for consistency with the AQMP. For a project to be consistent with the AQMP adopted by the MDAQMD, the pollutants emitted from the project should not exceed the MDAQMD daily threshold or cause a significant impact on air quality, or the project must already have been included in the AQMP projection. However, if feasible mitigation measures are implemented and shown to reduce the impact level from significant to less than significant, a project may be deemed consistent with the AQMP. The AQMP uses the assumptions and projections of local planning agencies to determine control strategies for regional compliance status. Since the AQMP is based on the local General Plan, projects that are deemed consistent with the General Plan are found to be consistent with the AQMP.

The proposed project consists of the construction of a SGF to accommodate the population and business growth in the region and is not a growth-inducing project. Since designations are consistent with the current General Plan, implementation of the project will not require any amendments to the County's zoning designations for the project site. Therefore, the proposed project would be within the

1 Comparison of Lifecycle Greenhouse Gas Emissions of Various Electricity Generation Sources, http://www.world-nuclear.org/uploadedFiles/org/WNA/Publications/Working_Group_Reports/comparison_of_lifecycle.pdf.

2 Ibid.

3 EPA's Greenhouse Gas Equivalencies Calculator - http://www.epa.gov/cleanenergy/energy-resources/calculator.html.

County's General Plan projection. The proposed project is consistent with the adopted MDAQMD AQMP.

5.4 CUMULATIVE IMPACTS

The project would contribute criteria pollutants to the area during temporary project construction. A number of individual projects in the area may be under construction simultaneously with the proposed project. Depending on construction schedules and actual implementation of projects in the area, generation of fugitive dust and pollutant emissions during construction could result in substantial short-term increases in air pollutants. This would be a contribution to short-term cumulative air quality impacts.

Currently, the Basin is in nonattainment for PM_{10}, $PM_{2.5}$, and O_3. Construction of the proposed project, in conjunction with other planned developments within the cumulative study area, would contribute to the existing nonattainment status. Therefore, the proposed project would exacerbate nonattainment of air quality standards within the Basin and contribute to adverse cumulative air quality impacts. No feasible quantifiable mitigation measures have been identified to reduce this impact.

5.5 MITIGATION MEASURES

The air quality impacts from construction and operation of the proposed project are expected to be less than all applicable emissions thresholds and thus, less than significant. No mitigation measures would be needed.

6.0 REFERENCES

California Air Resources Board website: http://www.arb.ca.gov.

Mojave Desert Air Quality Management District. Air Quality Management Plan.

Mojave Desert Air Quality Management District. *CEQA and Federal Conformity Guidelines*. August 2011.

Mojave Desert Air Quality Management District. *Rule 402*.

Mojave Desert Air Quality Management District. *Rule 403*.

U.S. Environmental Protection Agency. Greenhouse Gas Equivalencies Calculator - http://www.epa.gov/cleanenergy/energy-resources/calculator.html.

Western Regional Climate Center website: http://www.wrcc.dri.edu.

World Nuclear Association. *Comparison of Lifecycle Greenhouse Gas Emissions of Various Electricity Generation Sources*, July 2011.

APPENDIX A

CONSTRUCTION WORKSHEETS

Emissions Source	# of units	Hours per day	SCAQMD Off-Road EF[1] Diesel Emission Factors (lbs/hour) CO	VOC	NO_X	SO_X	PM_{10}	$PM_{2.5}$	CO_2	CH_4	
Phase 1											
Scraper	2	8	1.0395	0.2783	2.4118	0.0027	0.1005	0.0925	262.49	0.0251	
Backhoe	2	8	0.0934	0.0192	0.1399	0.0002	0.0077	0.0071	16.698	0.0017	
Phase 2											
Pile Drivers	3	8	0.3765	0.0872	0.7938	0.0013	0.033	0.0304	122.66	0.0079	
Backhoe	2	8	0.0934	0.0192	0.1399	0.0002	0.0077	0.0071	16.698	0.0017	
Lifts	2	8	0.1925	0.0529	0.3059	0.0004	0.0202	0.0186	34.722	0.0048	
Crane	1	8	0.4737	0.1348	1.1934	0.0014	0.0508	0.0468	128.64	0.0122	
	# of units	**Miles per day**	**EMFAC2011: 2013 Factors Diesel Emission Factors (gms/mi)**								**Speed (mph)**
Superintendent Truck	1	10	0.5594	0.0989	0.5686	0.009	0.0819	0.0754	377.48	0.06	15
Grade Checker Truck	1	10	0.5594	0.0989	0.5686	0.009	0.0819	0.0754	377.48	0.06	15
Delivery Trucks	2	20	0.5594	0.0989	0.5686	0.009	0.0819	0.0754	377.48	0.06	15
Water Truck	2	56	0.5594	0.0989	0.5686	0.009	0.0819	0.0754	377.48	0.06	15
			Gasoline Emission Factors (gms/mi)								
Worker Commute	45	40	1.2915	0.0346	0.1255	0.003	0.0015	0.0014	287.01	0.018	50

[1] From SCAQMD web site: http://www.aqmd.gov/ceqa/handbook/offroad/offroad.html, downloaded 5/2/2013.
OffRoad Diesel $PM_{2.5}$ calculated assuming the $PM_{2.5}$ fraction of Diesel PM_{10} is 0.920

[2] SO_X and CH_4 emissions factors from EMFAC2007 as EMFAC2011 does not include these two.

CH_4 = methane
CO = carbon monoxide
CO_2 = carbon dioxide
gms/mi = grams per mile
lbs/hour = pounds per hour
mph = miles per hour
NO_X = nitrogen oxides
$PM_{2.5}$= particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
SCAQMD = South Coast Air Quality Management District
SO_X = sulfur oxides
VOC = volatile organic compound

Emissions Source	Emission Rates (lbs/day)								
	CO	**ROC**	**NO_X**	**SO_X**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**	**CH_4**	**CO_2e**
Phase 1									
Scraper	17	4.5	39	0.043	1.6	1.5	4,200	0.4	4,200
Backhoe	1.5	0.31	2.2	0.003	0.12	0.11	270	0.028	270
Phase 2									
Pile Drivers	9	2.1	19	0.03	0.79	0.73	2,900	0.19	2,900
Backhoe	1.5	0.31	2.2	0.003	0.12	0.11	270	0.028	270
Lifts	3.1	0.85	4.9	0.006	0.32	0.3	560	0.076	560
Crane	3.8	1.1	9.5	0.011	0.41	0.37	1,000	0.097	1,000
Support Equipment									
Superintendent Truck	0.012	0.002	0.013	2E-04	0.002	0.002	8.3	0.001	8.3
Grade Checker Truck	0.012	0.002	0.013	2E-04	0.002	0.002	8.3	0.001	8.3
Delivery Trucks	0.049	0.009	0.050	8E-04	0.007	0.007	33	0.005	33
Water Truck	0.14	0.024	0.14	0.002	0.02	0.019	93	0.015	93
Worker Commute	5.1	0.14	0.5	0.012	0.006	0.005	1,100	0.071	1,100
Total Construction	**24**	**5**	**42**	**0.066**	**1.8**	**1.6**	**6,000**	**0.52**	**6,000**
MDAQMD Threshold	**548**	**137**	**137**	**137**	**82**	**No Thresholds**			
Significant?	**No**	**No**	**No**	**No**	**No**				

CH_4 = methane
CO = carbon monoxide
CO_2 = carbon dioxide
CO_2e = carbon dioxide equivalent
lbs/hour = pounds per hour
MDAQMD = Mojave Desert Air Quality Management District
NO_X = nitrogen oxides
$PM_{2.5}$= particulate matter less than 2.5 microns in diameter
PM_{10} = particulate matter less than 10 microns in diameter
ROC = reactive organic compound
SCAQMD = South Coast Air Quality Management District
SO_X = sulfur oxides