Appendix 5.1E
Air Quality Modeling Protocol

Rice Solar Energy Project Dispersion Modeling Protocol

Prepared for

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Acronyms and Abbreviations

°F	degrees Fahrenheit
ACC	air-cooled condenser
AFC	Application for Certification
ARB	California Air Resources Board
CCAR	California Climate Action Registry
CEC	California Energy Commission
CEQA	California Environmental Quality Act
CO	carbon monoxide
DEM	Digital Elevation Model
EPA	U.S. Environmental Protection Agency
GHG	greenhouse gas
Gpm	gallon(s) per minute
GRP	General Reporting Protocol
HARP	Hotspots Analysis Reporting Program
HRA	health risk assessment
Km	kilometer
MDAQMD	Mojave Desert Air Quality Management District
MW	megawatt
NAD27	North American Datum 1927
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NSR	New Source Review
OEHHA	Office of Environmental Health Hazard Assessment
OLM	ozone limiting method
PM_{10}	particulate matter less than 10 microns
$PM_{2.5}$	particulate matter less than 2.5 microns

PMI	point of maximum impact
PSD	Prevention of Significant Deterioration
REL	reference exposure level
RSEP	Rice Solar Energy Project
SO_2	sulfur dioxide
SO_x	sulfur oxides
STG	steam turbine generator
TAC	toxic air contaminant
USGS	U.S. Geological Survey
UTM	Universal Transverse Mercator
VCAPCD	Ventura County Air Pollution Control District
VOC	volatile organic compound
WSAC	wet surface air cooler

SECTION 1

Introduction

Rice Solar Energy, LLC is developing a 150-megawatt (MW) electric concentrating solar-thermal power plant to be constructed on the site of the former World War II-era Rice Army Airfield, now abandoned and in private ownership. The 3,324-acre site is located in an unincorporated area of eastern Riverside County, immediately south of State Route 62 at milepost 109, approximately 15 miles west of the town of Vidal Junction and U.S. Route 95, and some 75 miles east of Twentynine Palms. There are no residential dwellings or sensitive receptors within a 15-mile radius of the site.

The proposed Rice Solar Energy Project (RSEP) is based on concentrating solar-thermal power technology, which utilizes reflecting mirrors, called heliostats, to redirect sunlight onto a receiver erected at the top of a tower in the center of the solar field. Molten salt will be heated as it passes through the receiver and is circulated through a series of heat exchangers to generate high-pressure superheated steam. The steam is then used to power a common steam turbine generator (STG) at conventional temperatures and pressures, to produce electricity. The steam from the STG will be condensed using an air-cooled condenser (ACC) and returned via feedwater pumps to the heat exchangers where the high-pressure superheated steam will be regenerated.

The molten salt is a combination of sodium nitrate and potassium nitrate (both commonly used as a fertilizer), with a melting temperature of approximately 450 degrees Fahrenheit (°F). In the liquid state, the salt has a viscosity and appearance similar to water. Salt is a heat storage medium that retains thermal energy very effectively over time. Once the salt is melted to a liquid form during the commissioning phase, it will remain heated and in a liquid state throughout the plant's operating life, continuously circulated through the steam receiver and steam generation systems. The salt does not degrade over time, and remains consistent for use throughout the life of the facility. Therefore, aside from initial melting and conditioning of the salt prior to plant commissioning, no fossil fuels are utilized in the solar-thermal power generation process.

Although the solar-thermal power generation operational phase will not consume fossil fuels, the project will include two diesel-powered emergency generators and two diesel-powered fire pumps. As previously noted, the RSEP will employ dry cooling technology for its operation by way of an ACC. However, additional cooling for the STG lubricating oil will be provided by a wet surface air cooler (WSAC) with a recirculation rate of approximately 2,736 gpm. Because the WSAC unit recirculation rate is less than 10,000 gpm and the primary function is to cool the STG lubricating oil, it is expected the WSAC will be exempt from the Mojave Desert Air Quality Management District (MDAQMD) permitting requirements per Rule 219. However, the emissions from the WSAC unit will be evaluated as part of the air quality and public health risk assessments prepared for the California Energy Commission (CEC) Application for Certification (AFC) licensing process.

The proposed facility does not include fossil-fuel-fired steam electrical generation. Therefore, the project would not be categorized as one of the 28 Prevention of Significant Deterioration (PSD) major source categories (40 CFR 52.21(b)(1)(i)) and the PSD threshold for this project would be 250 tons per year per regulated air pollutants. The expected potential to emit for RSEP will be well below the 250 tons per year threshold for each of the PSD regulated pollutants (See Section 2.3). Therefore, the project would not be considered a major stationary source in accordance with PSD regulations.

However, in accordance with the New Source Review (NSR) requirements outlined in the MDAQMD Regulation XIII, modeling will be conducted to demonstrate that the project would neither cause a new violation of a state or federal ambient air quality standard nor make an existing violation significantly worse for nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2), or cause an exceedance of the cancer, chronic, or acute risk thresholds.

Therefore, Rice Solar Energy, LLC intends to submit an air quality impact analysis and a human health risk assessment to both MDAQMD and the CEC that evaluates the impacts from commissioning, start-up/shutdown, and normal facility operations. The project will also be required to evaluate construction-based impacts per the CEC regulations. This document presents the methodology proposed for evaluating the potential air quality impacts and health risks related to the construction, commissioning, and operation of the proposed facility.

SECTION 2

Methodology for Estimating Project-related Emissions

2.1 Construction

Approximately 1,410 acres of the total land holding of 3,324 acres will be disturbed during construction activities, which are expected to occur for approximately 27 months. Onsite construction activities will consist of installing a 638-foot solar receiving tower, the steam turbine power block, up to 17,500 heliostats, and various auxiliary equipment and administrative structures. Offsite construction activities will include the installation of a 9.2-mile transmission line.

Onsite and offsite project emissions will be divided into three categories: vehicle and construction equipment exhaust, fugitive dust from vehicle and construction equipment, and windblown fugitive dust. The following criteria pollutant emissions will be calculated: Nitrogen oxides (NO_x), sulfur oxides (SO_x), volatile organic compounds (VOC), CO, PM_{10}, and $PM_{2.5}$. Fugitive dust and construction equipment exhaust emissions will be estimated using URBEMIS2007 (version 9.2.4) emission factors. On-road exhaust emissions will be estimated using EMFAC2007 (version 2.3) emission factors.

Construction equipment greenhouse gas (GHG) emissions will be estimated using emission factors from the California Climate Action Registry (CCAR) General Reporting Protocol (GRP) (CCAR, 2009) and fuel consumption rates from the OFFROAD model. Vehicle emissions (trucks and worker commutes) will be estimated using emission factors from the CCAR GRP (CCAR, 2009) and United States Environmental Protection Agency (EPA) fuel economy values. In April 2009, the Office of Planning and Research submitted the proposed amendments to the California Environmental Quality Act (CEQA) Guidelines for greenhouse gas emissions to the Natural Resources Agency. The rulemaking process for certifying and adopting the proposed amendments began in July 2009. The Natural Resources Agency must certify and adopt the CEQA Guideline amendments before January 1, 2010. Therefore, emissions will be presented for informational purposes at this time and no conclusions regarding significance will be made during the analysis.

2.2 Commissioning

During plant commissioning, the initial melting, heating, and conditioning of the salt will result in limited emissions of criteria pollutants. For the melting and heating segments of the process, two small boilers each employing ultra low NO_x burners and flue gas recirculation, will be used to mitigate emissions from the combustion of propane or liquefied natural gas. For the salt conditioning process, the salt stored in the hot salt tank is heated to a temperature of approximately 1,000°F using a small boiler (about 20 MMBtu/hr, higher heat value). The salt conditioning results in the decomposition of the magnesium nitrate present as a minor component of the salt to NO_x. This NO_x is vented from the top of the hot salt tank

to a multi-stage wet scrubber to control NO_x emissions. The following criteria pollutant emissions will be calculated for the commissioning activities: NO_x, SO_x, VOC, CO, PM_{10}, and $PM_{2.5}$.

Commissioning activities will also result in direct GHG emissions from the small boilers and indirect GHG emissions from electricity requirements. GHG emissions from propane combustion in the small boilers will be estimated using emission factors from the California Air Resources Board (ARB) Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (ARB, 2007). Indirect GHG emissions from electricity will be estimated using emission factors from the CCAR GRP (CCAR, 2009). Currently, proposed amendments to the CEQA Guidelines for GHG emissions are being reviewed. Therefore, GHG emissions will be presented for informational purposes at this time and no conclusions regarding significance will be made during the analysis.

2.3 Operation

The plant is designed to capture the maximum available solar energy whenever the sun is shining. The thermal storage system is sized such that the receiver and collector systems are able to capture solar energy during the day and store the energy for use during hours with cloud cover and/or the night-time hours. For prolonged periods of cloud cover or unplanned maintenance outages, electricity from the power grid will be used to keep the temperature of the molten salt solution in the storage tanks greater than 450°F. Therefore, an auxiliary boiler will not be included as part of the normal operations and as a result, criteria pollutant and toxic air contaminant (TAC) emissions from system start-up and shutdown activities are not expected to occur. Therefore, the only emission sources expected for the operation of the RSEP are routine testing of the diesel-powered emergency generators, fire pumps, and the WSAC unit.

Emissions of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x from the new diesel-powered emergency generators and emergency fire pumps will be calculated based on vendor data and current air toxic control measure emission levels. TAC emission levels will be based on the diesel engine source testing data published by the Ventura County Air Pollution Control District. The PM_{10}, $PM_{2.5}$, and TAC emissions from the WSAC unit will be based on vendor design and analytical groundwater sampling results.

An estimate of the annual RSEP criteria pollutant emissions are presented in Table 1. The estimates are based on preliminary engineering data, 30 minutes of maintenance and testing activities each week for the emergency engines, and 4,400 hours of WSAC operation per year. The emission estimates in Table 1 are provided for informational purposes and are subject to change. However, because the estimated facility emission totals are significantly less than the PSD applicability thresholds of 250 tons per year per pollutant, the project would not be subject to PSD review.

TABLE 1
Annual Facility Emission Estimates (tons per year)

	Facility Emission Totals (Estimate)					
Facility	**NO_2**	**SO_2**	**$PM_{10/2.5}$**	**VOC**	**CO**	**TAC**
Rice Solar Energy Project (~150 MW – Solar)*	1.1	<0.1	0.34	<0.1	0.11	<0.1

*Assumes four diesel engines are operated weekly for 30 minutes for maintenance and testing, and the WSAC unit operates 4,400 hours per year.

Combustion of diesel fuel in the emergency engines will result in emissions of the following greenhouse gases: carbon dioxide, methane, and nitrous oxide. Therefore, GHG emissions for normal facility operations will be calculated based on the maximum fuel usage predicted for RSEP and emission factors contained in the ARB Regulation for the Mandatory Reporting of Greenhouse Gas Emissions (ARB, 2007). Currently, proposed amendments to the CEQA Guidelines for GHG emissions are being reviewed. Therefore, GHG emissions will be presented for informational purposes at this time and no conclusions regarding significance will be made during the analysis.

The criteria pollutant and GHG emissions from worker commutes, material deliveries, and mirror washing activities will also be calculated. Criteria pollutant emissions will be estimated using emission factors from EMFAC2007 (version 2.3). GHG emissions will be estimated using emission factors from the CCAR GRP (CCAR, 2009). Criteria pollutant and GHG emissions from worker commutes, material deliveries, and mirror washing activities will be calculated for CEC informational purposes but will not be included in the dispersion modeling impact analysis.

SECTION 3

Air Quality Impact Analysis

The dispersion modeling methodology will follow the modeling guidance provided in the EPA's *Guideline on Air Quality Models* (EPA, 2005) and discussions with MDAQMD. As described in Section 1, the project will be located in an unincorporated area of eastern Riverside County. Because of the remote location, the availability of representative meteorological data is limited. Only 9 months of onsite meteorological data are available from the early 1940s. Also, the nearest active meteorological station with available data is approximately 35 miles south of the project site in Blythe, California.

Based on regulatory guidance, if representative meteorological data are not available, a screening model would be required to demonstrate compliance with the national and California ambient air quality standards. SCREEN3 is currently the EPA-approved screening model for regulatory applications. SCREEN3 uses a screening meteorological data set that contains a matrix of 54 different combinations of wind speed and stability classes designed to evaluate a full range of possible 1-hour average meteorological conditions. The maximum 1-hour predicted pollutant concentration is then scaled for different averaging periods by using the recommended adjustment factors in the SCREEN3 user's guide.

One limitation of SCREEN3 is that the dispersion algorithm is only able to model a single emission source at a time. Therefore, if a facility has multiple sources then the user is required to post-process the results manually to determine the total facility impact. To alleviate this problem, EPA's alternative Industrial Source Complex, Short-Term Model (ISCST3) can be utilized with a screening meteorological data set. ISCST3 was the recommended model by EPA until December 2005 when the AERMOD modeling system replaced ISCST3 as the recommended model for regulatory applications. Although AERMOD replaced ISCST3 in 2005, EPA is still developing a screening version of AERMOD, called AERSCREEN. Therefore, AERSCREEN is not currently available for use at this time.

One significant difference between the AERMOD modeling system and ISCST3 is the ability of AERMOD to calculate point source cavity zone impacts due to building downwash using the Plume Rise Model Enhancement (PRIME) algorithm. To evaluate if the results of the dispersion modeling analysis for the RSEP would be sensitive to cavity zone impacts, a SCREEN3 cavity zone modeling analysis was conducted for a single proposed point source on the facility. The results of the SCREEN3 cavity analysis demonstrate that the building cavity zone impacts only extend approximately 100 meters from the source, which is well within the project fence line, therefore, the results of the dispersion modeling analysis would not be sensitive to the PRIME algorithm in AERMOD.

A second difference between AERMOD and ISCST3 is the algorithm used to characterize terrain effects on point source plume movement. EPA has determined that in complex terrain AERMOD consistently produces lower regulatory design concentration estimates compared to those generated by ISCST3 (EPA, 2003). Therefore, the ambient concentrations

predicted from ISCST3 are expected to be more conservative than those with AERMOD in the complex terrain to the north of the facility.

Therefore, it is assumed that the use of a screening meteorological data set with ISCST3 would provide results that are similar or potentially more conservative than the use of onsite hourly meteorological data and AERMOD.

3.1 Model Selection

The construction, commissioning, and operational air quality impacts will be evaluated using the EPA's alternative ISCST3 model (Version 02035). ISCST3 is a Gaussian dispersion model capable of assessing impacts from a variety of source types in areas of simple, intermediate, and complex terrain. The model can account for point, area, line, and volume source types; downwash effects; and gradual plume rise as a function of downwind distance. The model is capable of estimating concentrations for averaging periods from 1 hour to 1 year. The required emission source data inputs to ISCST3 include source locations, source elevations, stack heights, stack diameters, stack exit temperatures, stack exit velocities, and pollutant emission rates.

ISCST3 will be used to predict a 1-hour concentration at each receptor using a screening meteorological data set. Screening meteorological data is a combination of possible wind speeds, wind directions, and stability categories. This represents a conservative 1-hour concentration because the combination of the most conservative wind speed, wind direction, and stability categories would not physically occur for each hour of the day. Although this approach may be overly conservative, it will be used because the meteorological data available near the site is limited. The additional short-term and annual concentrations at each receptor will be calculated based on the 3-hour, 8-hour, 24-hour, and annual persistence factors outlined in the EPA *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources* (EPA, 1992). The results from ISCST3 using a screening meteorological data set are considered conservative, thus the actual impacts from the facility are expected to be less than modeled.

It is assumed an evaluation of fumigation impacts is not required for this project since the diesel-fired emergency engines will only be operated once a week for testing and maintenance activities. It is also assumed an evaluation of Visibility Impacts to Class I areas is not required for this analysis because the facility operational emissions are expected to be significantly below the PSD thresholds.

3.2 Model Settings

The following EPA-recommended default values will be used for the modeling analyses:

- Rural dispersion coefficients
- Final plume rise
- Stack tip downwash
- Buoyancy-induced dispersion
- Default wind profile exponents
- Default vertical potential temperature gradients

3.3 Meteorological Data

The CEC requires a minimum of 1 year of meteorological data approved by ARB or the local air pollution control district to be used in the air dispersion modeling analysis. Based on a review of available data, it was discovered that 9 months of data were collected by the National Weather Service at the Rice Air Field between the years of 1943 and 1944. It was also determined the nearest available meteorological station is located approximately 35 miles southeast of the project site in Blythe, California.

Because of the limited amount of meteorological data available near the project, an expanded SCREEN3 screening meteorological data file will be used in conjunction with ISCST3 to evaluate the potential air quality impacts. The SCREEN3 meteorological data file is a matrix of different combinations of wind speed and stability categories designed to evaluate a full range of possible 1-hour average meteorological conditions. However, the SCREEN3 meteorological file does not include a directional component, which is required to evaluate air quality impacts using ISCST3. Therefore, in order to create a meteorological data file for use with ISCST3, the SCREEN3 meteorological file will be expanded to include a 360-degree directional component at 5-degree increments. The screening meteorological data will be consistent with the screening meteorological file included in the ARB *Hotspots Analysis Reporting Program* (Version 1.4a, July 2008), including the 5-degree wind direction increments. A default ambient temperature of 293 degrees Kelvin will also be used. An excerpt of the screening meteorological data file is included as an attachment to this report. An electronic copy of the data file will be submitted to the MDAQMD along with the AFC modeling files.

3.4 Background Data

According to Appendix B (g)(8)(G) of the CEC data adequacy checklist, the ambient concentrations of all criteria pollutants for the previous 3 years as measured at the three ARB-certified monitoring stations closest to the project site, along with an analysis of whether this data is representative of conditions at the project site, is required. The applicant may also substitute an explanation as to why information from one, two, or all stations is either not available or unnecessary.

The three closest ARB-certified monitoring sites are located approximately 35 miles southeast of the project site in Blythe, California (Riverside County), approximately 85 miles southwest of the project site in Indio, California (Riverside County), and approximately 100 miles west of the project site in Palm Springs, California (Riverside County). The nearest station monitoring all six pollutants is located approximately 150 miles west-northwest of the project site in Victorville, California (San Bernardino, County). Because the nearest NO_2 monitoring station is located approximately 100 miles west (Palm Springs) of the project location, a search for monitoring locations in the neighboring state of Arizona was also conducted. Based on the search, a monitoring site was identified approximately 40 miles east-northeast of the project site at the Alamo State Park near Parker, Arizona (La Paz County). The NO_2 data were collected by the State of Arizona as part of a special study conducted in 2005 and 2006 and are available on the EPA AIRS database.

Table 2 summarizes the pollutants monitored at each of the monitoring stations. The data available at all monitoring stations are the most recent 3 years of data with the exception of the Alamo Lake State Park site.

TABLE 2
Summary of the Nearest Monitoring Stations and the Pollutants Monitored at Each Station*

Monitoring Location	Approximate Distance to RSEP (miles)	Ozone	NO_2	CO	SO_2	PM_{10}	$PM_{2.5}$
Blythe, CA	35	X	—	—	—	—	—
Alamo Lake State Park, near Parker, AZ	40	X	X	—	—	—	—
Indio, CA	85	X	—	—	—	X	X
Joshua Tree, CA	85	X	—	—	—	—	—
Palm Springs, CA	100	X	X	X	—	X	X
Barstow, CA	140	X	X	X	—	X	—
Victorville, CA	150	X	X	X	X	X	X

* Limited ozone, NO_2, CO, SO_2, and PM_{10} data are also available for the MDAQMD Twentynine Palms Station.
— = Pollutant was not monitored at this location.

If possible, the ambient air quality data used to demonstrate a project's compliance with the ambient air quality standards should represent the area where project impacts are expected to occur. In the case of the ambient NO_2 and ozone monitoring locations, the only available data are located in Palm Springs, Barstow, Victorville, and near Parker, Arizona. Assuming the RSEP site experiences a general easterly wind pattern, the project impacts would occur closer to the Alamo Lake State Park monitoring station (northeast of Parker, Arizona) than the California monitoring stations (located either south or west of RSEP). Although, there is only one year of data available at the Alamo Lake State Park monitoring station, the site is expected to be the most representative of the RSEP location because it is a desert location with little urban development or concentration of combustion sources nearby. As a result, the background NO_2 data from the Alamo Lake State Park monitoring station will be added to the predicted concentrations and compared to the ambient air quality standards.

The nearest PM_{10} and $PM_{2.5}$ monitors are located in Indio. The PM_{10} and $PM_{2.5}$ data collected at the Indio monitoring station are expected to be a conservative estimate of the background concentrations near the RSEP site because the area has a higher concentration of motorized vehicles and ground disturbance compared to the RSEP site. However, because this is the nearest monitoring site, it was conservatively used to represent the background concentrations at the RSEP site. Therefore, the three most recent years of background PM_{10} and $PM_{2.5}$ data from the Indio monitoring station will be added to the predicted concentrations and compared to the ambient air quality standards.

As shown in Table 2, the nearest CO monitoring station is located in Palm Springs. Therefore, the three most recent years of CO data recorded at the Palm Springs monitoring station will be used. The data collected at the Palm Springs monitoring station represents a conservative estimate of the background CO concentrations in the project area because the

area surrounding the Palm Springs station is developed and densely populated while the proposed project site is rural with the nearest developed area over 15 miles away.

The only SO_2 monitor within 150 miles of RSEP is located in Victorville. Therefore, measurements from Victorville will be used to conservatively estimate the existing SO_2 background concentrations in the vicinity of the project.

The ARB ambient air quality data summaries will be used as the primary source of data. The EPA AIRS database summaries will be used when data are unavailable in the ARB summaries. The maximum ambient background concentrations will be combined with the modeled concentrations and used for comparison to the ambient air quality standards.

3.5 Receptors

Receptor and source base elevations will be determined from the United States Geological Survey (USGS) Digital Elevation Model (DEM) data using the 7.5-minute format (30-meter spacing between grid nodes). All coordinates will be referenced to Universal Transverse Mercator (UTM) North American Datum 1927 (NAD27), Zone 11. Every effort will be made to maintain receptor spacing across DEM file boundaries.

Cartesian coordinate receptor grids will be used to provide adequate spatial coverage surrounding the project area for assessing ground-level pollution concentrations, to identify the extent of significant impacts, and to identify maximum impact locations. To minimize model run times and control file size, a coarse- and fine-grid approach will be used for the impact analysis. The following coarse grid will be used to identify the areas of maximum concentration:

- Fence line receptors will be spaced at 50-meter intervals
- 50-meter spacing from property boundary to 1 kilometer (km) from the fence line
- 500-meter spacing from beyond 1 km to 5 km from the origin
- 1 km spacing from 5 km to 10 km
- Concentrations within the facility fence line will not be calculated

The following refined grid will be used to further evaluate the areas of maximum impact identified during the coarse-grid analysis:

- 50-meter spacing surrounding areas of maximum impact beyond 1 km of the facility extending 500 meters from the maximum location.

3.6 Evaluation of Impacts

As noted in Section 3.1, the ISCST3 model will be used to predict a 1-hour concentration at each receptor using a combination of possible wind speeds, wind directions, and stability categories. This represents a conservative 1-hour concentration because the combination of the most conservative wind speed, wind direction, and stability categories would not physically occur in the atmosphere for each hour of the day. Although this approach may be overly conservative, it will be used because the meteorological data available near the site is limited. The additional short-term and annual concentrations at each receptor will be calculated based on the 3-hour, 8-hour, 24-hour, and annual persistence factors outlined in

the EPA "*Screening Procedures for Estimating the Air Quality Impact of Stationary Sources*" (EPA, 1992). These values are summarized below in Table 3.

TABLE 3
Screening 1-Hour Adjustment Factors

Averaging Period	Persistence Factor
3-Hour	0.9
8-Hour	0.7
24-Hour	0.4
Annual	0.08

Source: EPA, 1992

3.6.1 Construction Impact Assessment

The construction site will be represented as a set of volume sources and an area source in the modeling analysis. The exhaust and fugitive dust emissions will be modeled as two series of volume sources with plume centerline heights of 4.6 meters (15 feet) and 2.4 meters (8 feet). Approximately 75 volume sources will be spaced throughout the power block, heliostat field, and the construction laydown area. The spacing between the volume sources will vary between 100 and 300 meters. The wind-blown dust emissions will be modeled as an area source assuming an average release height of 1 meter.

To meet the CEC requirements, modeled concentrations of NO_x, CO, PM_{10}, $PM_{2.5}$, and SO_x from construction activities will also be combined with the ambient background concentrations and compared to the ambient air quality standards.

If hourly NO_x concentrations need to be examined in a more refined manner, the EPA's AERMOD-OLM (ozone limiting method) algorithm will be used to calculate the NO_2 concentration based on the maximum ambient ozone concentration for Blythe, California between 2006 and 2008. The Localized Significance Threshold Methodology (SCAQMD, 2008) may also be used to predict the conversion of 1-hour NO_x to NO_2 based on the distance from the source to the maximum modeled impacts.

3.6.2 Commissioning Impact Assessment

The two auxiliary boilers used to melt and heat the sodium nitrate and potassium nitrate solution will be modeled as point sources. Exhaust parameters will be based on information provided by the vendor. For the salt conditioning process, a multi-stage wet scrubber will be used to limit NO_x emissions from the decomposition of the magnesium nitrate impurities inherent in the salt mixture. The NO_x emissions from the multi-stage wet scrubber will be modeled as a point source. Exhaust parameters will be based on information provided by the vendor and engineering estimates.

The short-term concentrations of NO_2, CO, PM_{10}, $PM_{2.5}$, and SO_x from the commissioning phase of the project will be combined with the ambient background concentrations and compared to the short-term ambient air quality standards. If hourly NO_x concentrations need to be examined in a more refined manner, the EPA's AERMOD-OLM algorithm will be

used to calculate the NO_2 concentration based on the maximum ambient ozone concentration for Blythe, California between 2006 and 2008. The Localized Significance Threshold Methodology (SCAQMD, 2008) may also be used to predict the conversion of 1-hour NO_x to NO_2 based on the distance from the source to the maximum modeled impacts.

Because completion of the commissioning phase is expected to occur within 7 months, annual impacts will not be evaluated for the commissioning phase of the project.

3.6.3 Operational Impact Assessment

The four diesel-fired emergency engines and the WSAC unit will be modeled as point sources. Exhaust parameters will be based on information provided by the vendor. The maximum modeled concentrations will then be added to representative background concentrations, and the results compared to the state and federal ambient air quality standards for SO_2, NO_2, CO, PM_{10}, and $PM_{2.5}$. The highest ambient concentration from the most recent 3 years of ambient monitoring data will be used as the background concentration, with the exception of NO_2. The NO_2 concentration from the Alamo Lake State Park will be used to represent the ambient background NO_2 concentration. If hourly NO_x concentrations need to be examined in a more refined manner, the EPA's AERMOD-OLM algorithm will be used to calculate the NO_2 concentration based on the maximum ambient ozone concentration for Blythe, California between 2006 and 2008. The Localized Significance Threshold Methodology (SCAQMD, 2008) may also be used to predict the conversion of 1-hour NO_x to NO_2 based on the distance from the source to the maximum modeled impacts.

SECTION 4

Air Toxics

A human health risk assessment (HRA) will be performed to evaluate the potential cancer, chronic, and acute health impacts related to the proposed project. The HRA will follow the latest version of the Air Toxics Hot Spots Program Risk Assessment Guidelines (Office of Environmental Health Hazard Assessment [OEHHA], 2003). Additionally, for predicted cancer risks for residential receptors where the inhalation pathway is the dominant exposure pathway for cancer risks, the Derived (Adjusted) Method outlined in the ARB *Recommended Interim Risk Management Policy for Inhalation-based Residential Cancer Risk*, (ARB, 2003), will be used for the cancer risk evaluation.

As discussed in Section 3, TAC emissions from the four diesel-fired emergency engines will be included in the HRA. TAC emissions for the diesel-fired engines will be estimated based on the Ventura County Air Pollution Control District (VCAPCD) TAC emission factors (VCAPCD, 2001). Emissions will be estimated assuming 30 minutes per week for routine maintenance and testing. The TAC emissions from the WSAC unit will be based on vendor design and analytical groundwater sampling results.

Per communication with MDAQMD, an assessment of the potential health impacts from TACs from construction activities will not be required by MDAQMD because the construction activity is finite and there are no residential or sensitive receptors within 6 miles of the proposed project. (De Salvio, 2009).

4.1 Model Selection

The HRA modeling for the project operations will be conducted using the ARB *Hotspots Analysis Reporting Program* (HARP), along with the ARB HARP On-ramp program (version 1), and ISCST3 with screening meteorological data. The HARP On-ramp program converts the ISCST3 output files to files compatible with the HARP modeling system. The ISCST3 modeling approach, such as default options, source parameters, screening meteorological data, and receptor spacing, will be similar to the criteria pollutant modeling analysis. A unit emission rate (1 gram per second) will be used to model each source, as outlined in the HARP converter program manual.

The nearest residents are located more than 6 miles from RSEP. The La Pera Elementary School is the nearest school, located approximately 23 miles east of RSEP in Parker, Arizona. The La Paz Regional, the Parker Indian, and the Palo Verde hospitals are the nearest hospitals, located approximately 30 miles to the east-northeast in Parker, Arizona (La Paz Regional and Parker Indian) and 30 miles to the southeast in Blythe, California (Palo Verde). Therefore, potential toxic emissions from RSEP are not expected to impact any sensitive receptors within a 6-mile radius.

4.2 Evaluation of Impacts

Cancer risks will be evaluated for the project based on the annual TAC ground-level concentrations, inhalation cancer potency, oral slope factor, frequency and duration of exposure at the receptor, and breathing rate of the exposed persons. Cancer risks will be estimated using a conservative assumption of 70-year continuous exposure duration for residential receptors and a 40-year, 5-day week, 8-hours-per-day exposure duration for commercial/industrial receptors. Additionally, for predicted cancer risks for residential receptors where the inhalation pathway is the dominant pathway of cancer risks, the Derived (Adjusted) Method in HARP will be used for the cancer risk evaluation, based on the *Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk* (ARB, 2003). To assess chronic and acute non-cancer exposures, annual and 1-hour TAC ground-level concentrations will be compared with the Reference Exposure Levels (RELs) developed by OEHHA to obtain a chronic or acute hazard index.

In addition to inhalation exposure, the HRA will assess potential health impacts related to exposure from homegrown produce, dermal absorption, soil ingestion, and mother's milk, as required by OEHHA guidelines (OEHHA, 2003). The inhalation cancer potency, oral slope factor values, and RELs used to characterize health risks associated with the modeled impacts will be obtained from the most recent version of the *Consolidated Table of OEHHA/ARB Approved Risk Assessment Health Values* (OEHHA and ARB, 2009).

Because the nearest residential, worker, and sensitive receptors are more than 6 miles from the proposed project site, the potential cancer, chronic, and acute risk will only be reported for the point of maximum impact (PMI) in the AFC. The modeled PMI health risk values for the overall project will be compared to the following de minimus thresholds:

- Incremental increase in cancer risk of one in 1 million individuals
- Chronic hazard index of 1.0
- Acute hazard index of 1.0

Predicted cancer risk and hazard indices less than the above thresholds would be considered an acceptable increase in risk associated with the proposed project.

SECTION 5

Cumulative Impacts

Per CEC requirements, a cumulative air quality modeling impacts analysis for the project's typical operating mode will be conducted as part of the AFC process. Impacts from the project will be combined with other stationary emission sources within a 6-mile radius that have received construction permits but are not yet operational, or are in the permitting process (such as, the NSR or CEQA permitting process). However, based on discussions with MDAQMD (MDAQMD, 2009), it was confirmed that no permits have been issued or permit applications received for any source within 6 miles of the project site. Therefore, a cumulative impact assessment will not be conducted.

SECTION 6

References

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Attachment
Screening Meteorological Data File Excerpt

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99 1 1 9       0.0       2.5 293.0 2  800.0  800.0
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99 1 112       0.0       4.0 293.0 2 1280.0 1280.0
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99 1 114       0.0       5.0 293.0 2 1600.0 1600.0
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99 1 322       5.0       1.5 293.0 3  480.0  480.0
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