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December 1, 2023

Mr. Eric Chiang
Project Manager – Energy Division
California Public Utilities Commission
505 Van Ness Avenue
San Francisco, CA 94102-3298

Re: Revised Health Risk Assessment for the SCE TLRR Eldorado-Pisgah-Lugo 220 kV Project (A.23-04-009)

Dear Mr. Chiang:

Southern California Edison Company (SCE) submitted a Certificate of Public Convenience and Necessity (CPCN) application and Proponent's Environmental Assessment (PEA) to the California Public Utilities Commission (CPUC) Energy Division for the TLRR Eldorado-Pisgah-Lugo (EPL) 220 kV Project. Upon review of the submittal, the CPUC identified deficiencies and requested additional information from SCE in Deficiency Letter #1, dated May 19, 2023. This memorandum responds to Comment DD-AQ3 in Deficiency Letter #1, by providing air toxics emission estimates from staging yards, screening Health Risk Assessments (HRA) for staging yards near sensitive receptors, and a discussion of screening HRA methodology and results. This revised HRA includes edits as described in SCE's response to the CPUC's "Data Request #2 for the SCE EPL TLRR Project (A.23-04-009)", dated October 20, 2023.

HRA Background

The Office of Environmental Health Hazard Assessment's (OEHHA) Air Toxics Hot Spots Program Risk Assessment Guidelines state that only construction activities lasting longer than two months in duration should be assessed for health risk impacts. SCE has compiled a list of staging yards near sensitive receptors, where the duration of activities that could generate air toxics are anticipated to occur for more than 2 months (OEHHA, 2015). Sensitive receptors, as described by OEHHA, are residences including private homes, condominiums, apartments and living quarters; schools, including preschools and daycare centers; health facilities such as hospitals, retirement and nursing homes, long term care hospitals, hospices; in addition to dormitories or similar live-in housing where children, chronically ill individuals or other sensitive persons could be exposed to toxic air contaminants (TACs). The list of staging yards that meet these criteria is provided in Table 1.

Table 1: Staging Yards Near Sensitive Receptors

Staging Yard Location	Count of Staging Yards	Distance to Nearest Sensitive Receptor
Bear Valley (SR-18 and Joshua Rd.)	1	201 meters (0.125 miles)
Lugo 1	1	120 meters (0.075 miles)
Lugo 2	1	500 meters (0.311 miles)

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In order to evaluate health risks to sensitive receptors near staging yard activities, screening HRAs were completed in accordance with OEHHA guidelines. The screening risk assessment was used to determine Maximum Individual Cancer Risk (MICR) and non-cancer Acute and Chronic Hazard Index (HIA and HIC, respectively) for each staging yard listed in Table 1. In order to determine pollutant concentrations at receptor locations, the AERSCREEN dispersion model was used. AERSCREEN is a screening level air dispersion model that generates air dispersion factors using meteorological conditions, such as ambient temperatures, wind speeds, and local terrain and surface characteristics. AERSCREEN models the estimated maximum concentration of an emitted pollutant at varying receptor distances from the emission source.

The screening HRA methodology utilizes the following information to determine risk levels:

- Maximum annual emissions of TAC identified as carcinogens or non-cancerous chronic health hazards;
- Maximum concentration of an emitted TAC modeled by AERSCREEN;
- Maximum hourly emissions of TACs with acute health risks;
- Distance from emission sources to the nearest off-site sensitive or worker receptor; and
- Project characteristics such as geographic location, meteorological conditions, operating schedule, and emission release heights.

Emissions of Toxic Air Contaminants

The operation of diesel-fueled construction equipment and vehicles at staging yards is expected to generate diesel particulate matter (DPM) emissions. Although trace quantities of other TACs could be emitted from activities such as vehicle fueling, these emissions are considered negligible and assumed to have no effect on HRA results. DPM emissions were approximated using the California Emissions Estimator Model® (CalEEMod) results provided in Appendix B of the PEA. The CalEEMod model was set up with the project portioned into 11 phases, where Phase 02: Staging Areas accounts for activities at staging yards for the entirety of the project. The Staging Areas portion of Table 3.6-1 of the PEA provides a detailed accounting of the relevant equipment and operating schedules.

The construction emissions modeled using CalEEMod for staging yards includes exhaust particulate matter emissions with aerodynamic diameters less than 10-microns and 2.5-microns (exhaust PM10 and exhaust PM2.5, respectively) from combustion equipment. As a conservative estimate, DPM was assumed to be represented entirely by exhaust PM10, as PM2.5 is a subset of PM10. The CalEEMod output for Phase 02: Staging Areas indicates 0.082 pounds (lbs) of exhaust PM10 per day from activities at staging yards. By assuming a weekly schedule of six days per week, the total annual DPM emissions from all staging yards is calculated as 25.584 lbs DPM/year.

Table 3.5-3 of the PEA lists 15 potential locations with staging yards, of which SCE identified three (3) locations where a staging yard is located near sensitive receptors and expected to be active for at least two months. In order to determine DPM emissions from each individual staging yard, SCE assumed that staging yard activity is independent of staging yard size (square footage) and location along the project path. Thus, the total emissions were distributed evenly between staging yards by dividing the number of staging yards at a location by the total number of staging yards for the project and applying that percentage to the total DPM emissions. For example, there is one (1) staging yard on SR-18 and Joshua

Rd. (Bear Valley) near sensitive receptors, which equates to 1 out of 15, or 6.67%. DPM emissions allocated to each staging yard location are presented in Table 2.

Table 2: Staging Yard DPM Emissions

Staging Yard Location	Count of Staging Yards near Sensitive Receptors	Total Count of Staging Yards for Project	Percent of Project (%)	Annual DPM lbs/year
Bear Valley (SR-18 and Joshua Rd.)	1	15	6.67%	1.706
Lugo 1	1		6.67%	1.706
Lugo 2	1		6.67%	1.706

AERSCREEN Modeling Parameters and HRA Methodology

The AERSCREEN air dispersion model was utilized for the screening HRA. AERSCREEN is the screening model recommended by OEHHA and the United States Environmental Protection Agency (USEPA) and is based on the more robust AERMOD air dispersion model. The AERSCREEN model produces estimates of the "worst-case" 1-hour concentrations for a single source of emissions, without the need for hourly meteorological data. It also includes conversion factors to estimate "worst-case" 3-hour, 8-hour, 24-hour, and annual concentrations. AERSCREEN is intended to produce concentration estimates that are equal to or greater than the estimates produced by AERMOD with a fully developed set of meteorological and terrain data, but the degree of conservatism will vary depending on the application.

AERSCREEN, like most air dispersion models, uses mathematical formulations to characterize the atmospheric processes that disperse pollutants emitted by a source. Using emission rates, exhaust parameters, terrain characteristics, and other parameters, AERSCREEN calculates down-wind pollutant concentrations at specified receptor distances. The results are then used to determine compliance with National Ambient Air Quality Standards (NAAQS) and other regulatory requirements. The results can also be used as inputs into health risk assessment calculations.

AERSCREEN can be used to model a variety of emission source types, such as a single point source, capped stack, horizontal stack, rectangular area, circular area, flare, or volume source. For this project, the staging yards were modeled as rectangular area sources. AERSCREEN automatically defaults to omitting terrain and stack effects on air dispersion for rectangular area sources. The model assumes that the local terrain and associated receptors are placed on a flat plane. The AERSCREEN rectangular area source model also does not consider emission stack release parameters such as stack temperature and release velocity. Since terrain effects and stack release parameters generally decrease the modeled maximum concentration of pollutants at a receptor by increasing calculated air dispersion, this setup provides a conservative model of DPM emissions dispersion from each staging yard. Additionally, the terrain in the vicinity of each modeled staging yard is generally flat with few significant elevation changes. As such, terrain data was not used, and the flat terrain default for area sources was utilized.

In order to define a rectangular area source, AERSCREEN accepts the coordinates associated with the bottom left corner of the area to be modeled, followed by inputs for length in the x-direction and length in the y-direction. The area can also be rotated relative to north by entering an offset angle. AERSCREEN defaults to an offset angle of zero degrees, which corresponds to no rotation relative to north. The combination of these parameters defines the boundary of each rectangular area source. Along with the area source boundary, the setup also requires entries for average emission height and emission rate. An average emission height of 5 feet from the ground was assumed for all three staging yards. An emission rate of 1.0 gram/second of DPM was used, which would result in modeled down-wind pollutant concentrations that are unitized and can be multiplied by the actual pollutant emission rate (in grams/second) to obtain the final pollutant concentration values. AERSCREEN evenly distributes the input emission rate across the total area of the source, at the specified release height. As a result, the modeled down-wind pollutant concentration values are dependent on the area of the area source.

All three staging yards have irregularly shaped boundaries. However, since AERSCREEN cannot model irregularly shaped area sources, rectangles that most closely approximate each staging yard boundary and area were used. For Lugo 1 and Lugo 2, the staging yard boundaries are relatively well defined by rectangles. However, the Bear Valley staging yard boundary shape resembles a parallelogram and is not easily defined by a rectangle of similar shape and area. For the Bear Valley staging yard, the rectangular area source was defined such that the area of the rectangle closely matched the actual area of the staging yard boundary. However, the resulting rectangle's boundary would be further from the nearest receptor than the actual staging yard boundary if the bottom left corner coordinates of the staging yard were used. To compensate, the bottom left corner coordinate of the rectangular area was shifted closer to the nearest receptor, along the staging yard boundary. Doing so results in a shorter modeled distance to nearest receptor, which generally leads to more conservative estimates of maximum downwind pollutant concentrations. Figures showing the staging yard boundaries and approximations of the rectangular area sources defined in AERSCREEN are provided in Appendix A. The inputs for defining each rectangular area source are provided in Appendix B.

The land uses in the vicinity of the staging yards were evaluated to determine if the urban or rural dispersion option should be used for the air dispersion modeling. Since urban areas typically have considerably more surface roughness as well as structures and surfaces that absorb heat, atmospheric dispersion can be somewhat different compared to rural areas. In the case of this project, the rural dispersion option was determined to be appropriate, as the locations are in sparsely populated/developed areas.

Representative meteorological parameters were selected in AERSCREEN for each staging yard. AERSCREEN does not use actual meteorological data files from nearby weather stations; instead, it uses a fully developed set of default meteorological conditions. Default parameters that can be adjusted include minimum and maximum temperatures, climate type, wind speeds, and surface friction. Based on these parameter inputs, AERSCREEN automatically generates default values for other relevant meteorological parameters. The modeling runs included the use of standard regulatory default options, except as noted.

The HRA methodology described in OEHHA's Air Toxics Hot Spots Program Risk Assessment Guidelines was used for determining MICR and HIC for DPM emissions from the staging yards shown in Table 2. Acute (non-cancer, HIA) health risks were not assessed because there are no published acute inhalation Reference Exposure Levels (REL) for DPM. The equations used for calculating sensitive receptor cancer risk are equations 5.4.1.1 and 8.2.4 A in the OEHHA guidelines. The equations used for calculating worker receptor cancer risk are equations 5.4.1.2- A and 8.2.4 B in the OEHHA guidelines. Detailed calculations are provided in Appendix B.

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Distance to Receptors

The distance between a staging yard boundary or AERSCREEN rectangular area source boundary and the nearest receptor building, whichever is shorter, was used as an estimate of receptor distance. Figures showing staging yards and associated sensitive receptors are provided in Appendix A.

HRA Results

The sensitive and worker MICR and HIC for each staging yard are presented in Table 3.

Table 3: Staging Yard HRA Results

	MICR (per million persons)		Chronic (HIC)	
Staging Yards	**Sensitive**	**Worker**	**Sensitive**	**Worker**
Bear Valley	1.29	0.023	7.42E-04	7.42E-04
Lugo 1	1.83	0.032	1.05E-03	1.05E-03
Lugo 2	0.43	0.008	2.49E-04	2.49E-04

The estimated MICR and HIC for each of these three staging yards are based on an assumed maximum operating duration of 30 months (2.5 years). However, it is expected that only one of these three staging yards has the potential to operate for that length of time. The operation of the other two staging yards evaluated in this HRA are also assumed to last for 30 months to be conservative; however, actual operations are expected to last less than 30 months. All of the staging yards are located within the jurisdiction of the Mojave Desert Air Quality Management District (MDAQMD). The Air Quality Thresholds of Significance published by the MDAQMD specifies a health risk significance threshold of 10 in one million for MICR and 1.0 for the maximally exposed individual for HIC (MDAQMD, 2020). These thresholds of significance are used to evaluate the MICR and HIC values calculated for each staging yard.

As shown in Table 3 above, the calculated MICR and HIC for each staging yard is well below the significance thresholds of 10 in one million MICR and 1.0 HIC. Therefore, the conservatively estimated health risk impacts from activities occurring at staging yards are considered less-than-significant. Detailed health risk calculations are provided in Appendix B.

Sincerely,

Danielle Ferralez

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Advisor, Environmental Science

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References

Office of Environmental Health Hazard Assessment (OEHHA). 2015. *Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments*. February. https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

Mojave Desert Air Quality Management District (MDAQMD). 2020. *MDAQMD California Environmental Quality Act (CEQA) and Federal Conformity Guidelines*. February. https://www.mdaqmd.ca.gov/home/showpublisheddocument/8510/638126583450266235

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Appendix A
Staging Yards and Nearest Sensitive Receptors

Legend: Sensitive Receptor; AERSCREEN Rectangular Area Source Boundary; Staging Area Boundary; Distance to Nearest Sensitive Receptor

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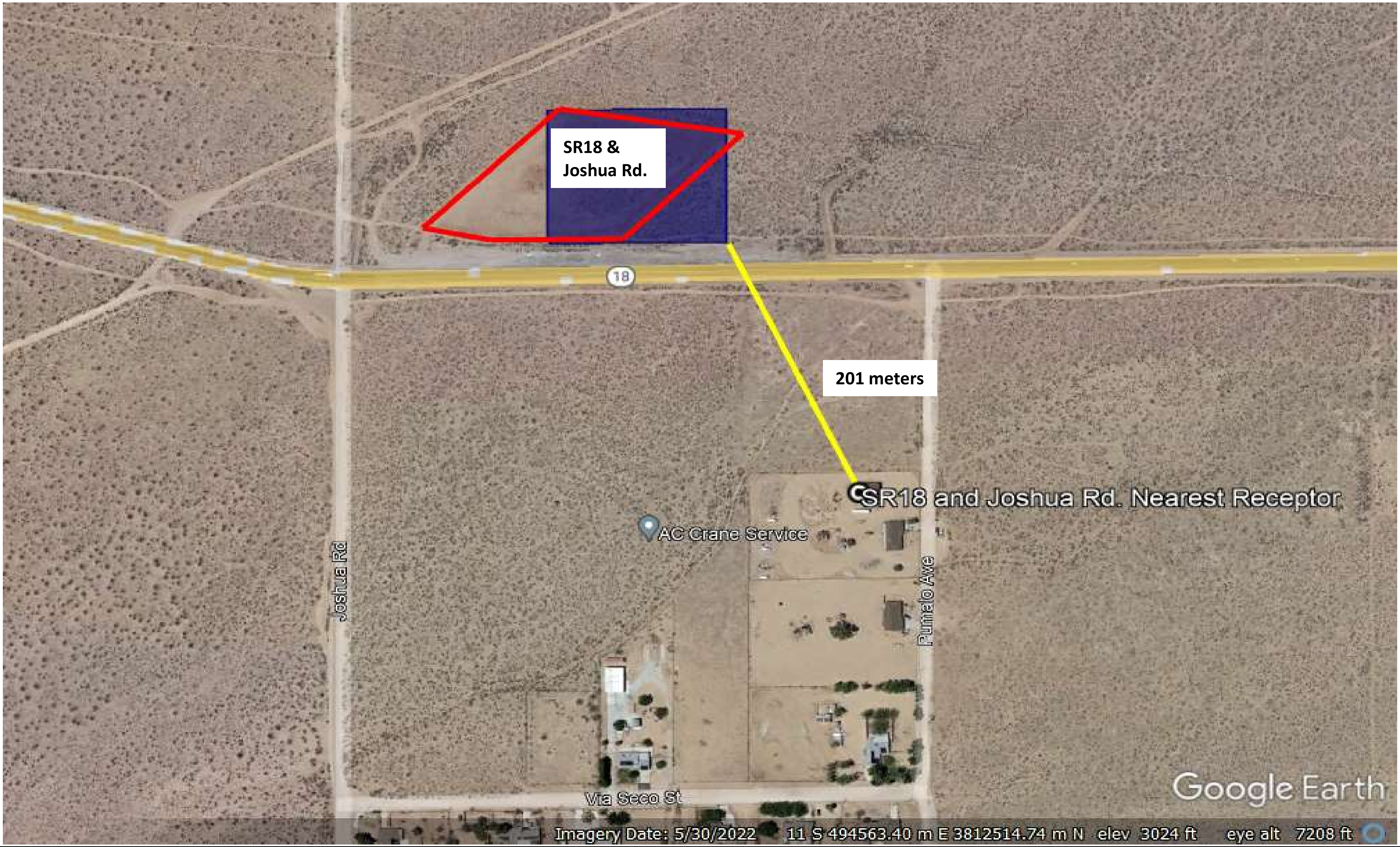
TLRR Eldorado-Pisgah-Lugo 220 kV Project
Sensitive Receptors Near Proposed Staging Areas

Figure 1



Legend:	Sensitive Receptor	AERSCREEN Rectangular Area Source Boundary	Staging Area Boundary	Distance to Nearest Sensitive Receptor

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TLRR Eldorado-Pisgah-Lugo 220 kV Project
Sensitive Receptors Near Proposed Staging Areas

Figure 2

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Appendix B

Detailed HRA Calculations

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Staging Area DPM Emissions

Staging Areas	Location (Latitude/Longitude)		Count of Staging Areas Near Sensitive Receptors	Total Count of Staging Areas	% of project	DPM lab/day	Total DPM lob/year	Annual DPM per Staging Area lb/year
SR-18 & Joshua Rd.	34.451	-117.049	1	15	6.67%	0.082	25.584	1.706
Lugo 1	34.366	-117.372	1		6.67%			1.706
Lugo 2	34.365	-117.366	1		6.67%			1.706

Staging Area HRA Results

	MICR (in one million)		Chronic (HIC)		8hr Chronic		Acute	
Staging Areas	Sensitive Receptor	Worker	Sensitive Receptor	Worker	Sensitive Receptor	Worker	Sensitive Receptor	Worker
SR-18 & Joshua Rd.	0.660	9.180E-03	7.42E-04	7.42E-04	N/A	N/A	N/A	N/A
Lugo 1	0.932	1.295E-02	1.05E-03	1.05E-03	N/A	N/A	N/A	N/A
Lugo 2	0.221	3.076E-03	2.49E-04	2.49E-04	N/A	N/A	N/A	N/A
Thresholds of Significance:	**10.0 in a million**		**1.0 (unitless)**		**N/A**		**N/A**	

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Eldorado-Pisgah-Lugo TLRR Project HRA
Programmatic Screening Scenario for Staging Area Located at SR-18 and Joshua Rd.

AERSCREEEN General Inputs		
Parameter	**Input Value**	**Comments**
Projection	UTM	Universal Traverse Mercator
Datum	NAD83	North American Datum 1983
UTM Zone	11	
Hemisphere	Northern	
Reference Point	495499.01 m E, 3812164.89 m N	Project location reference, roughly center of staging area

AERSCREEEN Source Creation Input		
Parameter	**Input Value**	**Comments**
Source Type:	Area	Worst case compared to point source or volume source
X coordinate	495457.17 m E	Bottom left corner of the staging area
Y coordinate	3812113.23 m N	Bottom left corner of the staging area
Average Release Height (ft)	5	Assumed average emissions release height
Staging Area Side Length, X axis (meters)	120	Approximate length of staging area
Staging Area Side Length, Y axis (meters)	120	Approximate length of staging area
Orientation Offset Angle	0 degrees	No rotation needed

AERSCREEEN Scenario Parameters		
Parameter	**Input Value**	**Comments**
Dispersion Option (Rural vs. Urban)	Rural	
Pollutant	DPM	
Emission Rate	1.0 grams/second	
Minimum Temperature	274 K	Based on historical average of annual minimum for Apple Valley
Maximum Temperature	310 K	Based on historical average of annual maximum for Apple Valley
Minimum Wind Speed	0.5 m/s	Default
Adjust Surface Friction Velocity (ADJ_U*)	Yes (checked)	For low wind speed conditions; considered default.
Land Use Type	Desert Shrubland	
Land Use Condition	Dry	
Land Use Season	Annual Average	
Albedo	0.3275	Auto-populated by AERSCREEN from land use selections
Bowen Ratio	7.75	Auto-populated by AERSCREEN from land use selections
Surface Roughness	0.2625	Auto-populated by AERSCREEN from land use selections
Terrain Effects	Not included	Not considered for area sources
Distance to Nearest Receptor	201 meters	
Maximum distance of downwind receptor	1,300 meters	
Inversion Break Fumigation	None	No nearby bodies of water, does not apply
Shoreline Fumigation	None	No nearby bodies of water, does not apply

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Eldorado-Pisgah-Lugo TLRR Project HRA
Programmatic Screening Scenario for Staging Area Located at SR-18 and Joshua Rd.

Scenario	Annual Emissions (lb/year)	Hourly Emissions (lb/hour)	Maximum Modeled 1-Hour X/Q ($\mu g/m^3$)/(g/s)	Maximum Annual X/Q Concentration ($\mu g/m^3$)/(g/s)	Average Annual Emission Rate (g/s)	Annual DPM Concentration at the Maximally Exposed Individual Receptor ($\mu g/m^3$)
SR18 and Joshua Rd. Staging Area	1.7056	0.000194703	1,510	151	2.46E-05	0.00371

DPM Cancer Risk and Chronic Hazard Index Calculation for Sensitive Receptors

Sensitive Receptor Inhalation Dose and Inhalation Cancer Risk Parameters (OEHHA Equations 5.4.1.1 and 8.2.4 A & B)

Parameter	Value	Units	Comments
C_air	0.00371	$\mu g/m^3$	Maximum Annual Concentration of DPM at maximally impacted receptor
Inhalation Absorption Factor (A)	1	unitless	Default = 1
Exposure Frequency (EF)	0.96	unitless	Days/365 days - default = 350 days/365 days in a year for a resident
Inhalation Cancer Potency Factor (CPF)	1.1	mg/(kg/day)	Value for DPM
Averaging time for lifetime cancer risk (AT)	70	years	Recommended default
Chronic Inhalation Reference Exposure Level (REL)	5	$\mu g/m^3$	Chronic REL value for DPM

Age Range	Daily Breathing Rate[1] {BR/BW} (L/kg-day)	Daily inhalation dose[2] (DOSEair) (mg/kg-day)	Age Sensitivity Factor (ASF)	Exposure Duration[3] (ED) (yr)	Fraction of Time at Home[4] (FAH)	Residential Inhalation Cancer Risk by Age Range
Third trimester	361	1.29E-06	10	0.25	1	5.05E-08
0 to <2 yrs	1090	3.88E-06	10	1	1	6.10E-07
2 to <16 yrs	572	2.04E-06	3	0	1	0.00E+00
16 to <30 yrs	261	9.29E-07	1	0	0.73	0.00E+00
16 to <70 yrs	233	8.30E-07	1	0	0.73	0.00E+00

Cancer Risk Exposure Duration (years)[5]	Maximum Individual Cancer Risk (MICR)[6] (in a million)	Chronic Hazard Index[7]
1	0.660	7.42E-04

Notes and Definitions:

1.) {BR/BW} values are normalized to body weight (L/kg bodyweight -day) - taken from OEHHA Table 5.7 at 95th percentile breathing rate.
2.) Daily inhalation dose (DOSEair) is calculated using OEHHA Eq. 5.4.1.1
3.) One year total is assumed as the maximum exposure duration (ED) rather than recommended defaults; staging area operations are not expected to exceed one year.
4.) Fraction of time at home (FAH) is set to 1 for <=16 years old as a worst case scenario.
5.) Staging area operations are not expected to exceed one year.
6.) MICR is maximum of the sum of calculated residential cancer risks by age range for each ED equal to one year or adding up to one year.
7.) Chronic Hazard Index = Annual Concentration (μg/m3)/Chronic REL (μg/m3)

DPM Cancer Risk and Chronic Hazard Index Calculation for Worker Receptors

Worker Receptor Inhalation Dose and Inhalation Cancer Risk Parameters (OEHHA Equations 5.4.1.2 and 8.2.4 A & B)

Parameter	Value	Units	Comments
Worker air concentration adjustment factor (WAF)	1	unitless	Taken from OEHHA Table 5.10
Inhalation Absorption Factor (A)	1	unitless	Default = 1
Exposure Frequency (EF)	0.685	unitless	250 days / 365 days. Equivalent to working 5 days/week, 50 weeks/year

Age Range	8-Hour Breathing Rate 95th Percentile[8] {BR/BW} (L/kg-day)	Daily inhalation dose (DOSEair) (mg/kg-day)	Age Sensitivity Factor (ASF)	Exposure Duration (ED) (yr)	Worker inhalation cancer risk	Worker Cancer Risk (in a million)
16 to <70 yrs	230	5.84E-07	1	1	9.18E-09	0.01

Notes and Definitions:

8.) {BR/BW} values are normalized to body weight (L/kg bodyweight -day) - taken from OEHHA Table 5.8 for 8-hour 95th percentile breathing rate.

Source:

Office of Environmental Health Hazard Assessment (OEHHA). Feb 2015. Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments.
https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

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Eldorado-Pisgah-Lugo TLRR Project HRA
Programmatic Screening Scenario for the Lugo 1 Staging Area

AERSCREEEN General Inputs		
Parameter	**Input Value**	**Comments**
Projection	UTM	Universal Traverse Mercator
Datum	NAD83	North American Datum 1983
UTM Zone	11	
Hemisphere	Northern	
Reference Point	465817.46 m E, 3802799.30 m N	Project location reference, roughly center of staging area

AERSCREEEN Source Creation Input		
Parameter	**Input Value**	**Comments**
Source Type:	Area	Worst case compared to point source or volume source
X coordinate	465764	Bottom left corner of the staging area
Y coordinate	3802614	Bottom left corner of the staging area
Average Release Height (ft)	5	Assumed average emissions release height
Staging Area Side Length, X axis (meters)	115	Approximate length of staging area
Staging Area Side Length, Y axis (meters)	403	Approximate length of staging area
Orientation Offset Angle	0 degrees	No rotation needed

AERSCREEEN Scenario Parameters		
Parameter	**Input Value**	**Comments**
Dispersion Option (Rural vs. Urban)	Rural	
Pollutant	DPM	
Emission Rate	1.0 grams/second	
Minimum Temperature	266 K	Based on historical average of annual minimum for Hesperia.
Maximum Temperature	316 K	Based on historical average of annual minimum for Hesperia.
Minimum Wind Speed	0.5 m/s	Default
Adjust Surface Friction Velocity (ADJ_U*)	Yes (checked)	For low wind speed conditions; considered default.
Land Use Type	Desert Shrubland	
Land Use Condition	Dry	
Land Use Season	Annual Average	
Albedo	0.3275	Auto-populated by AERSCREEN from land use selections
Bowen Ratio	7.75	Auto-populated by AERSCREEN from land use selections
Surface Roughness	0.2625	Auto-populated by AERSCREEN from land use selections
Terrain Effects	Not included	Not considered for area sources
Distance to Nearest Receptor	120 meters	
Maximum distance of downwind receptor	2000 meters	
Inversion Break Fumigation	None	No nearby bodies of water, does not apply
Shoreline Fumigation	None	No nearby bodies of water, does not apply

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Eldorado-Pisgah-Lugo TLRR Project HRA
Programmatic Screening Scenario for the Lugo 1 Staging Area

Scenario	Annual Emissions (lb/year)	Hourly Emissions (lb/hour)	Maximum Modeled 1-Hour X/Q ($\mu g/m^3$)/(g/s)	Maximum Annual X/Q Concentration ($\mu g/m^3$)/(g/s)	Emission Rate (g/s)	Maximum Annual DPM Concentration ($\mu g/m^3$)
Lugo 1 Staging Area	1.7056	0.000194703	2,131	213	2.46E-05	0.00523

DPM Cancer Risk and Chronic Hazard Index Calculation for Sensitive Receptors

Sensitive Receptor Inhalation Dose and Inhalation Cancer Risk Parameters (OEHHA Equations 5.4.1.1 and 8.2.4 A & B)

Parameter	Value	Units	Comments
C_air	0.00523	$\mu g/m^3$	Maximum Annual Concentration of DPM at maximally impacted receptor
Inhalation Absorption Factor (A)	1	unitless	Default = 1
Exposure Frequency (EF)	0.96	unitless	Days/365 days - default = 350 days/365 days in a year for a resident
Inhalation Cancer Potency Factor (CPF)	1.1	mg/(kg/day)	Value for DPM
Averaging time for lifetime cancer risk (AT)	70	years	Recommended default
Chronic Inhalation Reference Exposure Level (REL)	5	$\mu g/m^3$	Chronic REL value for DPM

Age Range	Daily Breathing Rate[1] {BR/BW} (L/kg-day)	Daily inhalation dose[2] (DOSEair) (mg/kg-day)	Age Sensitivity Factor (ASF)	Exposure Duration[3] (ED) (yr)	Fraction of Time at Home[4] (FAH)	Residential Inhalation Cancer Risk by Age Range
Third trimester	361	1.81E-06	10	0.25	1	7.12E-08
0 to <2 yrs	1090	5.48E-06	10	1	1	8.60E-07
2 to <16 yrs	572	2.87E-06	3	0	1	0.00E+00
16 to <30 yrs	261	1.31E-06	1	0	0.73	0.00E+00
16 to <70 yrs	233	1.17E-06	1	0	0.73	0.00E+00

Cancer Risk Exposure Duration (years)[5]	Maximum Individual Cancer Risk (MICR)[6] (in a million)	Chronic Hazard Index[7]
1	0.93	0.0010

Notes and Definitions:

1.) {BR/BW} values are normalized to body weight (L/kg bodyweight -day) - taken from OEHHA Table 5.7 at 95th percentile breathing rate.
2.) Daily inhalation dose (DOSEair) is calculated using OEHHA Eq. 5.4.1.1
3.) One year total is assumed as the maximum exposure duration (ED) rather than recommended defaults; staging area operations are not expected to exceed one year.
4.) Fraction of time at home (FAH) is set to 1 for <=16 years old as a worst case scenario.
5.) Staging area operations are not expected to exceed one year.
6.) MICR is maximum of the sum of calculated residential cancer risks by age range for each ED equal to one year or adding up to one year.
7.) Chronic Hazard Index = Annual Concentration (µg/m3)/Chronic REL (µg/m3)

DPM Cancer Risk and Chronic Hazard Index Calculation for Worker Receptors

Worker Receptor Inhalation Dose and Inhalation Cancer Risk Parameters (OEHHA Equations 5.4.1.2 and 8.2.4 A & B)

Parameter	Value	Units	Comments
Worker air concentration adjustment factor (WAF)	1	unitless	Taken from OEHHA Table 5.10
Inhalation Absorption Factor (A)	1	unitless	Default = 1
Exposure Frequency (EF)	0.685	unitless	250 days / 365 days. Equivalent to working 5 days/week, 50 weeks/year

Age Range	8-Hour Breathing Rate 95th Percentile[8] {BR/BW} (L/kg-day)	Daily inhalation dose (DOSEair) (mg/kg-day)	Age Sensitivity Factor (ASF)	Exposure Duration (ED) (yr)	Worker inhalation cancer risk	Worker Cancer Risk (in a million)
16 to <70 yrs	230	8.24E-07	1	1	1.2954E-08	0.01

Notes and Definitions:

8.) {BR/BW} values are normalized to body weight (L/kg bodyweight -day) - taken from OEHHA Table 5.8 for 8-hour 95th percentile breathing rate.

Source:

Office of Environmental Health Hazard Assessment (OEHHA). Feb 2015. Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments.
https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf

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Eldorado-Pisgah-Lugo TLRR Project HRA
Programmatic Screening Scenario for the Lugo 2 Staging Area

AERSCREEEN General Inputs		
Parameter	**Input Value**	**Comments**
Projection	UTM	Universal Traverse Mercator
Datum	NAD83	North American Datum 1983
UTM Zone	11	
Hemisphere	Northern	
Reference Point	466325.00 m E, 3802700.00 m N	Project location reference, roughly center of staging area

AERSCREEEN Source Creation Input		
Parameter	**Input Value**	**Comments**
Source Type:	Area	Worst case compared to point source or volume source
X coordinate	466237.00	Bottom left corner of the staging area
Y coordinate	3802668.00	Bottom left corner of the staging area
Average Release Height (ft)	5	Assumed average emissions release height
Staging Area Side Length, X axis (meters)	150	Approximate length of staging area
Staging Area Side Length, Y axis (meters)	130	Approximate length of staging area
Orientation Offset Angle	22 degrees	

AERSCREEEN Scenario Parameters		
Parameter	**Input Value**	**Comments**
Dispersion Option (Rural vs. Urban)	Rural	
Pollutant	DPM	
Emission Rate	1.0 grams/second	
Minimum Temperature	266 K	Based on historical average of annual minimum for Hesperia.
Maximum Temperature	316 K	Based on historical average of annual minimum for Hesperia.
Minimum Wind Speed	0.5 m/s	Default
Adjust Surface Friction Velocity (ADJ_U*)	Yes (checked)	For low wind speed conditions; considered default.
Land Use Type	Desert Shrubland	
Land Use Condition	Dry	
Land Use Season	Annual Average	
Albedo	0.3275	Auto-populated by AERSCREEN from land use selections
Bowen Ratio	7.75	Auto-populated by AERSCREEN from land use selections
Surface Roughness	0.2625	Auto-populated by AERSCREEN from land use selections
Terrain Effects	Not included	Not considered for area sources
Distance to Nearest Receptor	500 meters	
Maximum distance of downwind receptor	2000 meters	
Inversion Break Fumigation	None	No nearby bodies of water, does not apply
Shoreline Fumigation	None	No nearby bodies of water, does not apply

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Scenario	Annual Emissions (lb/year)	Hourly Emissions (lb/hour)	Maximum Modeled 1-Hour X/Q ($\mu g/m^3$)/(g/s)	Maximum Annual X/Q Concentration ($\mu g/m^3$)/(g/s)	Emission Rate (g/s)	Maximum Annual DPM Concentration ($\mu g/m^3$)
Lugo 2 Staging Area	1.7056	0.000194703	506	51	2.46E-05	0.00124

DPM Cancer Risk and Chronic Hazard Index Calculation for Sensitive Receptors

Sensitive Receptor Inhalation Dose and Inhalation Cancer Risk Parameters (OEHHA Equations 5.4.1.1 and 8.2.4 A & B)

Parameter	Value	Units	Comments
C_air	0.00124	$\mu g/m^3$	Maximum Annual Concentration of DPM at maximally impacted receptor
Inhalation Absorption Factor (A)	1	unitless	Default = 1
Exposure Frequency (EF)	0.96	unitless	Days/365 days - default = 350 days/365 days in a year for a resident
Inhalation Cancer Potency Factor (CPF)	1.1	mg/(kg/day)	Value for DPM
Averaging time for lifetime cancer risk (AT)	70	years	Recommended default
Chronic Inhalation Reference Exposure Level (REL)	5	$\mu g/m^3$	Chronic REL value for DPM

Age Range	Daily Breathing Rate[1] {BR/BW} (L/kg-day)	Daily inhalation dose[2] (DOSEair) (mg/kg-day)	Age Sensitivity Factor (ASF)	Exposure Duration[3] (ED) (yr)	Fraction of Time at Home[4] (FAH)	Residential Inhalation Cancer Risk by Age Range
Third trimester	361	4.31E-07	10	0.25	1	1.69E-08
0 to <2 yrs	1090	1.30E-06	10	1	1	2.04E-07
2 to <16 yrs	572	6.82E-07	3	0	1	0.00E+00
16 to <30 yrs	261	3.11E-07	1	0	0.73	0.00E+00
16 to <70 yrs	233	2.78E-07	1	0	0.73	0.00E+00

Cancer Risk Exposure Duration (years)[5]	Maximum Individual Cancer Risk (MICR)[6] (in a million)	Chronic Hazard Index[7]
1	0.22	0.000249

Notes and Definitions:
1.) {BR/BW} values are normalized to body weight (L/kg bodyweight -day) - taken from OEHHA Table 5.7 at 95th percentile breathing rate.
2.) Daily inhalation dose (DOSEair) is calculated using OEHHA Eq. 5.4.1.1
3.) One year total is assumed as the maximum exposure duration (ED) rather than recommended defaults; staging area operations are not expected to exceed one year.
4.) Fraction of time at home (FAH) is set to 1 for <=16 years old as a worst case scenario.
5.) Staging area operations are not expected to exceed one year.
6.) MICR is maximum of the sum of calculated residential cancer risks by age range for each ED equal to one year or adding up to one year.
7.) Chronic Hazard Index = Annual Concentration (μg/m3)/Chronic REL (μg/m3)

DPM Cancer Risk and Chronic Hazard Index Calculation for Worker Receptors

Worker Receptor Inhalation Dose and Inhalation Cancer Risk Parameters (OEHHA Equations 5.4.1.2 and 8.2.4 A & B)

Parameter	Value	Units	Comments
Worker air concentration adjustment factor (WAF)	1	unitless	Taken from OEHHA Table 5.10
Inhalation Absorption Factor (A)	1	unitless	Default = 1
Exposure Frequency (EF)	0.685	unitless	250 days / 365 days. Equivalent to working 5 days/week, 50 weeks/year

Age Range	8-Hour Breathing Rate 95th Percentile[8] {BR/BW} (L/kg-day)	Daily inhalation dose (DOSEair) (mg/kg-day)	Age Sensitivity Factor (ASF)	Exposure Duration (ED) (yr)	Worker inhalation cancer risk	Worker Cancer Risk (in a million)
16 to <70 yrs	230	1.96E-07	1	1	3.08E-09	0.0031

Notes and Definitions:
8.) {BR/BW} values are normalized to body weight (L/kg bodyweight -day) - taken from OEHHA Table 5.8 for 8-hour 95th percentile breathing rate.

Source:
Office of Environmental Health Hazard Assessment (OEHHA). Feb 2015. Air Toxics Hot Spots Program, Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments.
https://oehha.ca.gov/media/downloads/crnr/2015guidancemanual.pdf