4.3 Air Quality and Greenhouse Gases

This section discusses construction and operational emissions and odors that could result from the Rail Spur Project. The section also discusses air toxic emissions as well as greenhouse gas emissions. The section describes the regulatory settings associated with the Project, identifies the applicable significance thresholds for air and GHG impacts, assesses potential impacts of the Rail Spur Project and recommends measures to mitigate significant impacts. The section also provides a discussion of cumulative air and GHG impacts.

Emission rates were generated using standard emission factors and use rates contained within the CalEEMod modeling program, as applicable. Toxic emission impacts were assessed utilizing the most recent version of the HARP2 modeling program. Emission calculations and modeling results are included in Appendix B. As described in Section 2.0, Project Description, the Rail Spur Project would include the installation of a rail unloading facility and associated pipelines and utilities. This analysis is intended to provide a reasonable worst-case scenario of potential air emissions resulting from the proposed activities and recommends mitigation to reduce significant impacts.

4.3.1 Environmental Setting

San Luis Obispo County (SLOC) is part of the South Central Coast Air Basin, which also includes Santa Barbara and Ventura counties. The climate of the region is strongly influenced by its proximity to the Pacific Ocean. Airflow around the County plays an important role in the movement and dispersion of pollutants. The speed and direction of local winds are controlled by the location and strength of the Pacific high-pressure system and other global weather patterns, topographical factors, and circulation patterns that result from temperature differences between the land and the sea.

The land area of San Luis Obispo County is approximately 3,316 square miles, encompassing varied vegetation, topography, and climate. From a geographical and meteorological standpoint, the County can be divided into three general regions: the Coastal Plateau, the Upper Salinas River Valley, and the East County Plain. Air quality in each of these regions is characteristically different, although the physical features that divide them provide only limited barriers to the transport of pollutants between the regions.

The Rail Spur Project is within the Coastal Plateau. Approximately 75 percent of the County population, and a corresponding portion of the commercial and industrial facilities, are also within the Coastal Plateau. Due to higher population density and closer spacing of urban areas, emissions of air pollutants per unit area are generally higher in this region than in the other two regions of the county, although the meteorological characteristics of the coastal areas contribute to lower monitoring results.

4.3.1.1 Air Quality Monitoring

Ten air-quality monitoring stations measure San Luis Obispo County's air quality (Grover Beach only monitors wind speed and direction, no air quality). The San Luis Obispo County Air Pollution Control District (SLOCAPCD) operates seven permanent stations at Nipomo Regional Park, Grover Beach, Morro Bay, Atascadero, Red Hills (near Shandon in eastern San Luis Obispo County), Arroyo Grande, and the Carrizo Plain. The California Air Resources Board (CARB) operates two additional stations in the cities of San Luis Obispo and Paso Robles. One station on the Nipomo Mesa (i.e., Nipomo-Guadalupe) is operated by the SLOCAPCD for the Phillips Refinery.

Although the Arroyo Grande station is the closest to the Rail Spur Project, it only monitors particulate matter (PM_{10} and $PM_{2.5}$). Therefore, the closest SLOCAPCD station to the Rail Spur Project area that monitors for Project-related pollutants is the Nipomo Regional Park monitoring station, approximately 5 miles east of the Rail Spur Project area. The Nipomo-Guadalupe monitoring station, approximately 1 mile southeast of the Rail Spur Project Site, is examined in this report for particulate matter, sulfur dioxide, and wind speed and direction information.

Air quality monitoring is rigorously controlled by federal and state quality assurance and control procedures to ensure data validity. Gaseous pollutant levels are measured continuously and averaged every hour, 24 hours per day. Particulate pollutants (PM_{10}) are monitored continuously at the Arroyo Grande, Nipomo Regional Park and Nipomo-Guadalupe stations and continuous $PM_{2.5}$ monitors (hourly average) at Nipomo-Guadalupe and Arroyo Grande stations.

Specific Air Pollutants

Carbon Monoxide (CO): CO is a colorless and odorless gas formed by the incomplete combustion of fossil fuels. CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for CO is intended to protect people whose medical condition already compromises their circulatory system's ability to deliver oxygen.

Nitrogen Dioxide (NO_2): NO_2 is a brownish gas formed in the atmosphere through a rapid reaction of the colorless gas nitric oxide (NO) with atmospheric oxygen. NO and NO_2 are collectively referred to as nitrogen oxides (NO_x). NO_2 can cause respiratory irritation and constriction of the airways, making breathing more difficult.

Sulfur Dioxide (SO_2): SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and breathing difficulty.

PM_{10}, the coarse fraction of suspended particulate matter measuring 10 microns or less in diameter, includes a complex mixture of man-made and natural substances including sulfates, nitrates, metals, elemental carbon, sea salt, soil, organics, and other materials. PM_{10} have adverse health impacts because these microscopic particles can penetrate the respiratory system. In some cases, the particulates themselves may cause actual damage to the alveoli of the lungs or they may contain adsorbed substances that are injurious.

Ambient PM_{10} concentrations have been primarily a localized issue of concern in SLOC, including Paso Robles, San Luis Obispo, Morro Bay, and Nipomo. Exceedances in these areas are the major impetus for the county's nonattainment designation for the state PM_{10} standard. The major sources for PM_{10} are mineral quarries, grading, demolition, agricultural tilling, road dust, and vehicle exhaust.

$PM_{2.5}$ is a subset of the PM_{10}. In addition to the health effects of PM_{10}, exposure to $PM_{2.5}$ may result in increased respiratory symptoms, disease, and decreased lung function.

In addition to primary criteria pollutants, the SLOCAPCD monitors ozone at various locations throughout the region. Unlike primary criteria pollutants emitted directly from an emissions source, ozone is a secondary pollutant. Ozone is formed in the atmosphere through the photochemical reaction of volatile organic compounds (VOC), NO_x, oxygen, and other hydrocarbon materials with sunlight.

Ozone is a deep lung irritant, causing the passages to become inflamed and swollen. Exposure to ozone alters respiration, most characteristically with shallow, rapid breathing and a decrease in pulmonary performance. Ozone also reduces the respiratory system's ability to fight infection and remove foreign particles.

Ozone exists both at ground level, where it is considered a pollutant with harmful effects and at higher elevations in the lower portion of the stratosphere from approximately 13 to 40 kilometers above Earth, where it absorbs more than 95 percent of the sun's ultraviolet light providing a beneficial effect.

Combustion byproducts reacting with sunlight and ambient conditions primarily generate ground-level ambient ozone. Areas where ozone violations primarily occur are the northern and eastern portions of the county, where summer temperatures are high. Ozone levels exceeding the state standard have been measured in Paso Robles, the Carrizo Plain, and Atascadero in recent years. In addition, ozone is carried into San Luis Obispo County from upwind regions of the state.

Table 4.3.1 provides a list of the State and National criteria air pollutant standards. Because concentrations of ozone and PM_{10} exceed state health-based standards, SLOC has been designated as a non-attainment area for these two pollutants. Table 4.3.2 shows 4 years of monitoring data between 2010 and 2013 for ozone, NO_2, and PM_{10} for the Nipomo Regional Park monitoring station, approximately 5 miles east of the SMR (at West Tefft Street and Pomeroy Road). Also shown are PM and SO_2 monitoring results for the Nipomo-Mesa and Nipomo-Guadalupe Road sites (Mesa2), which are within 1 mile of the Refinery to the east, and the Cal Fire station, located adjacent to the SMR. The federal PM_{10} was exceeded at the Cal Fire station. Exceedances to the federal ozone standard were noted during this timeframe at monitors located in eastern SLOC. PM_{10} and ozone exceed the state standards. The eastern portion of San Luis Obispo County has been designated non-attainment for the federal 8-hr ozone standard. Table 4.3.2 shows the monitoring results for the monitoring stations close to the project site. Historically, the SLOCAPCD has operated three monitoring stations on the Mesa. These include Nipomo-Regional Park, Nipomo-Guadalupe Road, and Nipomo-Hillview Road. The Nipomo-Hillview Road station is closed, and was only used to monitor PM_{10}. Table 4.3.3 shows the

attainment status of criteria pollutants throughout the entire South Central Coast Air Basin. As per the SLOCAPCD annual report in 2013 "The federal 24-hour PM2.5 standard of 35 µg/m3 was exceeded three times at Cal Fire in 2013; this site also exceeded the federal and state standards for annual average $PM_{2.5}$ (12 µg/m3). As a result, the county will soon be designated by the CARB as nonattainment for that standard, since one year of exceeding the annual standard is a violation of the standard. Violation of the federal $PM_{2.5}$ annual standard (also 12 µg/m3) does not occur until the 3-year average of annual averages exceeds the standard. Based on data collected in 2014, the County may be in danger of violating the federal standard as well by year's end."

The CARB meteorological data from the Nipomo-Guadalupe monitoring station, approximately 1 mile southeast of the Rail Spur Project Site, is the closest station to the Project Site that has detailed wind direction and speed information. This data was plotted into a wind rose (Figure 4.3-1) to demonstrate the predominant wind direction and speeds at the Project Site. Figure 4.3-1 shows that the predominate wind blows from the west and northwest 36 percent of the time, and from the east (east and southeast) less than 20 percent of the time. Wind speeds averaged approximately 5 miles per hour, with periods of stronger winds above 20 miles per hour occurring less than one percent of the time.

4.3.1.2 Countywide Emissions Inventory

This section summarizes the countywide emission inventory.

Countywide Criteria Pollutant Emissions

On a regional basis, ozone is the criteria pollutant of significant concern in SLOC, particularly within the Coastal Plateau. Ozone is a secondary pollutant, formed in the atmosphere by complex photochemical reactions involving the precursor pollutants of nitrogen oxides (NO_x) and reactive organic gases (ROG) and sunlight.

The amount of ozone formed is dependent upon both the ambient concentration of the chemical precursors and the intensity and duration of sunlight. Consequently, ambient ozone concentration tends to vary seasonally with the weather.

NO_x is emitted primarily from the combustion of fossil fuels with mobile source producing the majority of NO_x emissions. Table 4.3.4 shows data on the most recent inventory available from the SLOCAPCD (year 2008). The majority of ROG emissions are also generated by mobile source fossil fuel combustion, wildfires and through the evaporation of petroleum products. Particulate emissions are generated primarily from road dust, wildfires and construction activities.

Although large sources are surveyed and updated each year, the SLOCAPCD performs an emissions inventory for the majority of permitted sources every 3 years. The last complete inventory was conducted for 2008 emissions; Table 4.3.4 shows these emissions for ozone precursors and particulate matter. As seen in the table, the largest sources of ozone precursors are on-road vehicles, other mobile sources, and wildfires. The largest sources of particulate matter are wildfires, road dust, construction and demolition, and residential fuel combustion. Petroleum refining contributes less than one percent of the $PM_{2.5}$ emissions in the County.

Table 4.3.1 State and National Criteria Air Pollutant Standards, Effects, and Sources

Air Pollutant	State Standard (concentration, averaging time)	Federal Primary Standard (concentration, averaging time)	Most Relevant Effects
Ozone	0.09 ppm, 1-hour average 0.070 ppm, 8-hour	0.075 ppm, 8-hour average (0.070 ppm after 12/28/2015)*	(a) Short-term exposures: (1) Pulmonary function decrements and localized lung edema in humans and animals (2) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (b) Long-term exposures: Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (c) Vegetation damage; (d) Property damage.
Carbon Monoxide	9.0 ppm, 8-hour average 20 ppm, 1-hour average	9 ppm, 8-hour average 35 ppm, 1-hour average	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; (d) Possible increased risk to fetuses.
Nitrogen Dioxide	0.18 ppm, 1-hour average, 0.03 ppm, annual average	0.053 ppm 0.10 ppm 98th percentile, 3-year average	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; (c) Contribution to atmospheric discoloration.
Sulfur Dioxide	0.04 ppm, 24-hour average 0.25 ppm, 1-hour average	0.075 ppm, 1-hour, 99th percentile 3-year average 0.14 ppm 24-hour 0.03 ppm annual arithmetic mean	Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM_{10})	20 µg/m^3, annual arithmetic mean 50 µg/m^3, 24-hour average	150 µg/m^3, 24-hour average	(a) Excess deaths from short-term exposures and exacerbation of symptoms in sensitive patients with respiratory disease; (b) Excess seasonal declines in pulmonary function, especially in children.
Suspended Particulate Matter ($PM_{2.5}$)	12 µg/m^3, annual arithmetic mean	12 µg/m^3, annual arithmetic mean 35 µg/m^3, 24-hour average	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease, elderly, and children.
Sulfates	25 µg/m^3, 24-hour average	No federal standard	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) Property damage due to corrosion.
Lead	1.5 µg/m^3, 30-day average	0.15 µg/m^3, roll 3-month average 1.5 µg/m^3, calendar quarter	(a) Increased body burden; (b) Impairment of blood formation and nerve conduction.

Table 4.3.1 State and National Criteria Air Pollutant Standards, Effects, and Sources

Air Pollutant	State Standard (concentration, averaging time)	Federal Primary Standard (concentration, averaging time)	Most Relevant Effects
Visibility-Reducing Particles	In sufficient amount to give an extinction coefficient of 0.23 per kilometers (visual range of 10 miles or more) with relative humidity less than 70%, 8-hour average (10 a.m. to 6 p.m. PST)	No federal standard	Reduction of visibility, aesthetic impact and impacts due to particulates (see above)
Hydrogen Sulfide	0.03 ppm, 1-hour average	No federal standard	Odor nuisance. IDLH and ERPG-3 of 100 ppm
Vinyl Chloride	0.01 ppm, 24-hour average	No federal standard	Known carcinogen.

Note: µg/m3 = micrograms per cubic meter.
* The 0.075 ppm was effective May 27, 2008. Was 0.08 ppm prior. Updated by EPA from 0.075 ppm to 0.070 on October 1, 2015, effective December 28, 2015
Source: SLOCAPCD 2009 and CARB 9/8/2010

Table 4.3.2 Monitoring Results at the Nipomo Monitoring Stations

Pollutant	Standard	2010	2011	2012	2013
Ozone					
Maximum 1-hour concentration (ppm)		.083	.075	.065	.076
Number days exceeded: State	> 0.09 ppm/1-hour	0	0	0	0
Max 8-hour concentration (ppm)		.075	.071	.060	.072
Number days exceeded: State	> 0.07 ppm/8-hour	2	1	0	1
Number days exceeded: Federal	> 0.075 ppm/8-hour	0	0	0	0
Particulates (PM_{10})					
Maximum 24-hour concentration ($\mu g/m^3$)		55.3	63.9	76.8	109.7
Number days exceeded: State	> 50 $\mu g/m^3$/24-hour	2	3	10	20.2
Number days exceeded: Federal	> 150 $\mu g/m^3$/24-hour	0	0	0	0
Maximum 24-hour concentration ($\mu g/m^3$) – Nipomo-Guadalupe		144.3	123.8	150.4	136.5
Number days exceeded: State	> 50 $\mu g/m^3$/24-hour	45	32	42	60.4
Number days exceeded: Federal	> 150 $\mu g/m^3$/24-hour	0	0	0	0
Maximum 24-hour concentration ($\mu g/m^3$) – CDF		167	134	180	163
Number days exceeded: State	> 50 $\mu g/m^3$/24-hour	74	65	70	93
Number days exceeded: Federal	> 150 $\mu g/m^3$/24-hour	1	0	3	2
Nitrogen Dioxide (NO_2)					
Daily Maximum NO_2 (ppm)		.0148	.0129	.009	0.09
Number days exceeded: State	> 0.18 ppm/1-hour	0	0	0	0
Sulfur Dioxide (SO_2)					
Maximum 1-hour concentration, ppm – Nipomo-Guadalupe		.023	.005	.007	0.146

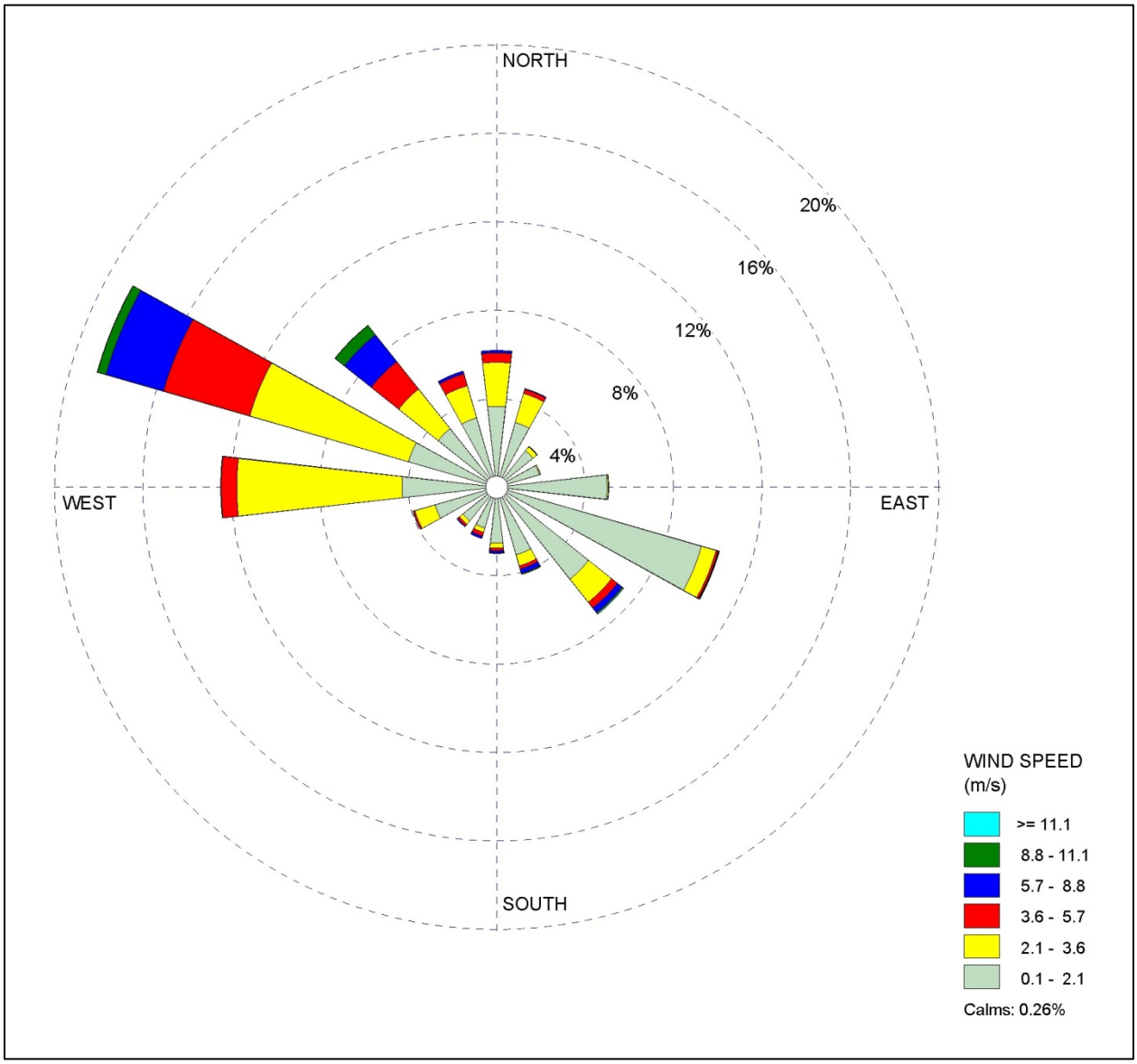
Notes: The Nipomo Regional Park Station monitors NO_2, ozone and PM_{10}. Nipomo Guadalupe values used for SO_2 and PM_{10}. CDF only monitors PM.
Source: CARB website Air Quality Data, SLOCAPCD Annual reports

Table 4.3.3 Attainment Status of Criteria Pollutants in San Luis Obispo County

Pollutant	State	Federal
O_3 – 1-hour	Non-attainment	Revoked
O_3 – 8-hour	Non-attainment	Non-attainment in eastern SLOC
PM_{10}	Non-attainment	Attainment
$PM_{2.5}$	Attainment	Attainment
CO	Attainment	Attainment
NO_2	Attainment	Attainment
SO_2	Attainment	Attainment
Lead	Attainment	Attainment
All others	Attainment/Unclassified	Attainment/Unclassified

Note: EPA action on a new ozone standard was released October 1, 2015..
Source: CARB

Figure 4.3-1 Nipomo Meteorological Station Wind Rose



Note: Wind rose shows the direction that the wind is coming from.
Source: SLOCAPCD meteorological data, Nipomo Guadalupe Road (Mesa 2) monitoring station 2008-2012

Countywide Air Toxics

Air toxics are substances that may cause or contribute to an increase in cancer or serious illness, such as respiratory disease. The federal 1990 Clean Air Act Amendments (CAAA) set up a new nationwide air toxics control program. The federal program focuses on larger industrial sources that are of the highest national priority, such as chemical manufacturers. State and local air pollution control agencies adopt measures to minimize Californians' exposure to toxic air contaminants (TAC). The State of California regulates TAC in several ways. The Toxic Air

Contaminant Identification and Control Act (AB1807-1983) created a program to reduce the health risks from air toxics.

Table 4.3.4 San Luis Obispo County Ozone Precursors and PM Emissions by Source

Emission Sources of Ozone Precursors	ROG (tpy)	ROG %	NO_x (tpy)	NO_x %
Fuel Combustion	64	1	586	4
Waste Disposal	8.1	0	1.3	0
Cleaning/Surface Coating	1,023	11	0.0	0
Petroleum Production and Marketing	372	4	13	0
Industrial Processes	101	1	37	0
Solvent Evaporation	604	6	0.0	0
Miscellaneous Processes	1,445	15	258	2
On-Road Motor Vehicles	2,623	27	4,448	33
Other Mobile Sources	1,837	19	7,563*	56
Wildfires	1,581	16	715	5
Total Ozone Precursor	9,657**		13,620	
Emission Sources of Particulate Matter	**PM_{10} (tpy)**	**PM_{10} %**	**$PM_{2.5}$ (tpy)**	**$PM_{2.5}$ %**
Wildfires	2,307	20	1,956	46
Ships & Commercial Boats	366	3	356	8
Cooking	123	1	74	2
Waste Burning & Disposal	34	0	32	1
Fugitive Wind Blown Dust	639	6	106	2
Unpaved Road Dust	3,226	28	321	7
Paved Road Dust	1,789	16	266	6
Construction & Demolition	1,486	13	150	3
Livestock	723	6	150	3
Residential Fuel Combustion	631	6	610	14
Mineral Processes	87	1	-	-
Farm Equipment	-	-	62	1
Off-Road Equipment	-	-	91	2
On-Road Motor Vehicle	-	-	114	3
Petroleum Refining	-	-	9	0
Total PM	11,410		4,298	

Notes: * 4,587 tons of this is ships and commercial boats – ARB area source offshore
** Excludes biogenic and geogenic sources
Source: SLOCAPCD 2008 Emission Inventory

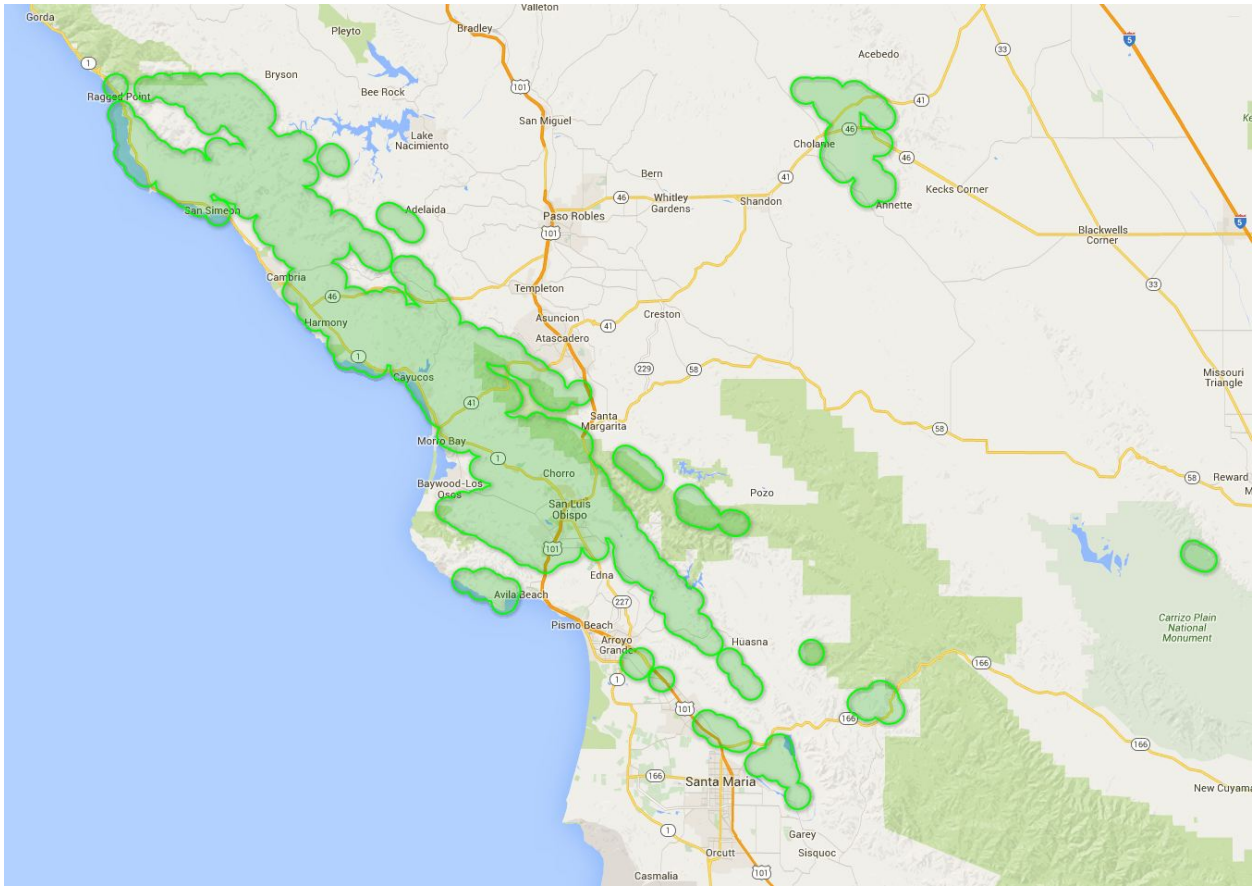
This law expanded CARB authority to evaluate and control air toxics. An additional state law, the Air Toxics "Hot Spots" Information and Assessment Act (AB2588-1987) supplements the original legislation by requiring a statewide air toxics inventory and notifying local residents of

significant risks from nearby sources. A 1992 amendment to the law (SB1731) requires that risks be reduced from these sources.

The CARB has identified asbestos as a TAC. In its natural state, asbestos occurs throughout many areas. Serpentine is a very common rock type in California and was identified by the CARB as having the potential to contain naturally occurring asbestos. Under the CARB Air Toxics Control Measure (ATCM) for Construction, Grading, Quarrying, and Surface Mining Operations, prior to any grading activities at a site, a geologic analysis is necessary to determine if serpentine rock is present. Grading projects larger than 1 acre in serpentine rock would require prior SLOCAPCD approval of an Asbestos Dust Mitigation Plan and an Asbestos Health and Safety Program.

Serpentine rock is found in many regions of SLOC, including coastal areas, as far inland as Paso Robles, and the extreme eastern area along the San Andreas Fault. Figure 4.3-2 shows areas subject to the naturally occurring asbestos ATCM requirements. The Project Site is within one of these general areas that may include asbestos-containing rock.

Figure 4.3-2 Areas Requiring Asbestos ATCM Geological Analysis and Requirements



Source: SLOCAPCD CEQA Handbook 2012

Fugitive Dust

The project is located in an area that has historically been subject to poor air quality conditions (e.g., exceeds the state PM10 standard over 70 times per year) due to high northwesterly winds and blowing sand and dust across the Oceano dunes (SLOCAPCD 2010).

A study performed by the SLOCAPCD, the South County Phase 2 Particulate Study, evaluated whether impacts from off-road vehicle activities at the Oceano Dunes State Vehicle Recreational Area (ODSVRA), the Phillips Refinery coke piles, and adjacent agricultural fields were contributing to the particulate problems on the Nipomo Mesa (SLOCAPCD 2010). As the SVRA is upwind of the Nipomo Mesa, the study data includes the SVRA in the area that is the major source of particulates on the Nipomo Mesa. Average weekend and weekday particulate measurements taken on the Nipomo Mesa over the past 12 years were analyzed to determine whether there were higher PM levels on the weekends, which would be relevant to the typically higher weekend off-road vehicle activity at the SVRA.

The analysis found higher weekend concentrations at one monitoring station but the data were not conclusive. The Phase 2 portion of the study concluded that off-road vehicle activity in the SVRA is a major contributing factor to the PM concentrations observed on the Nipomo Mesa and that neither the petroleum coke piles at the Phillips facility nor agricultural fields or activities in and around the area are a significant source of ambient PM on the Nipomo Mesa.

The study indicates that off road vehicle activity on the dunes is known to cause de-vegetation, destabilization of dune structure, and destruction of the natural crust on the dune surface. All of these increase the ability of winds to entrain sand particles from the dunes and carry them to the Nipomo Mesa, representing an indirect emissions impact from the vehicles. The study concluded that off-road vehicle activity is the primary cause of the high PM levels measured on the Nipomo Mesa during episode days.

The study documents the frequent occurrence of unhealthful particulate levels on the Nipomo Mesa. Even though the composition of the particulates is predominately natural crustal particles, the health implications are not lessened. All fine airborne particulate matter, regardless of composition, can cause respiratory distress when inhaled, especially to the very young, the elderly, and those with compromised respiratory systems. In addition, sand particles from the Oceano Dunes are high in crystalline silica, a known carcinogen.

The SLOCAPCD subsequently adopted Rule 1001, "Fugitive Dust Emissions Standards, Limitations and Prohibitions" to address fugitive dust from offroad vehicle activity on the dunes.

4.3.1.3 Odors

The release of material that contains even small amounts of sulfur compounds (H_2S) or hydrocarbons produces an odor. Several compounds associated with the oil and gas industry can produce nuisance odors. Sulfur compounds, found in oil and gas, have very low odor threshold levels. For instance, H_2S can be detected by humans at concentrations from 0.5 parts per billion [ppb] (detected by 2 percent of the population) to 40 ppb, qualified as annoying by 50 percent of the population. Above these levels, H_2S would be detected by most people. The Occupational Safety and Health Administration limits occupational exposure to H_2S at 20 ppm with a 50 ppm

peak over 10 minutes (29 CFR 1910.1000 Z-2 Table). Inhaling 100 ppm can be lethal according to the Emergency Response Planning Guideline (AIHA 2008).

Health impacts of H_2S are generally at higher concentrations than those which first produce odors. The California Office of Environmental Health Hazard Assessment (OEHHA) reference exposure levels for H_2S indicate that acute impacts of H_2S are experienced at levels of 30 ppb (for a 1-hour exposure).

Many volatile compounds found in oil and gas (e.g., pentane, n-pentane, hexane, ethane, and longer chain hydrocarbons) typically have petroleum or gasoline odors with varying odor thresholds. The most odiferous of these compounds are hexane, which has an odor threshold of between 68 and 248 ppm, and pentane, which has an odor threshold of 2 ppm (New Jersey 2004).

4.3.1.4 Valley Fever

Valley fever is caused by Coccidioides, a fungus that lives in soil in the southwestern United States and parts of Mexico, Central America, and South America. Inhaling the airborne fungal spores can cause an infection called coccidioidomycosis, which is also known as “cocci” or “valley fever.” Most people who are exposed to the fungus do not get sick, but some people develop flu-like symptoms that may last for weeks to months. In a very small proportion of people who get valley fever, the infection can spread from the lungs to the rest of the body and cause more severe conditions, such as meningitis or even death. Valley fever cannot spread from person to person (CDC 2014).

Most cases of valley fever in the US occur in people who live in or have traveled to the southwestern United States, especially Arizona and California. The coastal areas of California are considered "suspected endemic" (CDC 2014).

Although Valley Fever concerns are not addressed by the SLOCAPCD, they may be a concern for projects that generate a lot of fugitive dust, thereby potentially increasing the incidence of Valley Fever in workers and nearby residents if proper dust control methods are not followed. As fugitive dust is addressed in this section of the EIR, Valley Fever issues have also been addressed here.

4.3.1.5 Greenhouse Gases

The California legislature concluded that global climate change poses significant adverse effects to the environment (Assembly Bill [AB] 32, the California Global Warming Solutions Act of 2006). In addition, the global scientific community has expressed a high confidence that climate change is man-made (i.e., caused by humans) and that climate change could lead to adverse changes around the globe (Intergovernmental Panel on Climate Change Climate, IPCC 2007, 2014). Consequently, the following sections analyze potential climate change emissions that may occur while implementing the Rail Spur Project.

Global climate change is a change in the average weather of the earth, measured by wind patterns, storms, precipitation, and temperature. Although historical records show that dramatic fluctuations in temperature have occurred in the past, such as during previous ice ages, some data indicate that the current temperature record differs from previous climate changes in both rate and magnitude (AEP 2007, IPCC 2014).

Global climate change caused by greenhouse gases (GHG) is currently one of the most widely debated scientific, economic, and political issues in the United States. Although many groups agree with the conclusions of the Intergovernmental Panel on Climate Change and the CARB, many groups feel the work is lacking. However, in terms of California Environmental Quality Act (CEQA) analysis, jurisdictions have developed significance criteria and directed CEQA documents to analyze emissions of GHG.

Climate Change Background

GHG include any gas that absorbs infrared radiation in the atmosphere. GHG include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorocarbons. The warming potential of different types of GHG varies. The global warming potential (GWP) is the potential of a gas or aerosol to trap heat in the atmosphere. Since GHG absorb different amounts of heat, a common reference gas, CO_2, is used to relate the amount of heat absorbed to the amount of the gas emissions, referred to as CO_2 equivalent, or CO_2e. CO_2e is the amount of GHG emitted multiplied by the global warming potential. The global warming potential of CO_2 is therefore defined as one.

The increase of GHG emissions has lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the greenhouse effect. Put another way, the amount of GHG in the atmosphere regulates the earth's temperature. Without natural GHG, the earth's surface would be cooler (CARB 2006). Emissions from human activities, such as electricity production and vehicle operation, have increased the emissions of these gases into the atmosphere. Emissions of GHG in excess of natural ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and acceleration of climate change. Unlike criteria air pollutants and TAC, which are pollutants of regional and local concern, GHG are global pollutants and climate change is a global issue.

Climate changes could lead to various changes in weather and rainfall patterns over time. According to the CARB, potential climate change impacts in California may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CARB 2006, 2007). The California State Assembly Select Committee Sea Level Rise and the California Economy issued a report in 2014 (CSA 2014) indicating that sea level rise could total 1.4 to 5.5 feet by 2100 in Southern California, giving rise to impacts on infrastructure, saltwater intrusion, and coastal erosion.

In the Findings and Declarations for AB 32, the Legislature found that: "The potential adverse impacts of global warming include the exacerbation of air quality problems, a reduction in quality and supply of water to the state from the Sierra snowpack, a rise in sea levels resulting in the displacement of thousands of coastal businesses and residences, damage to the marine ecosystems and the natural environment, and an increase in the incidences of infectious diseases, asthma, and other health-related problems."

Warming of the climate system is unequivocal, and many of the changes now being observed from the 1950s to present day are unprecedented over decades to millennia. The atmosphere and ocean have warmed, the amounts of snow and ice have diminished, and sea level has risen (IPCC 2014).

The linear warming trend over the years from 1951 to 2012 (0.12 degrees Celsius per decade) is nearly twice that for the 100 years from 1906 to 2005. Over the period 1901 to 2010, global mean sea level rose by 8 inches (IPCC 2014).

AB 32 addresses the results of these studies conducted by the Intergovernmental Panel on Climate Change (IPCC 2001, 2007, 2014) that examined a range of scenarios estimating an increase in globally averaged surface temperature and ocean rise by 2100 due to human causes.

The IPCC Studies indicate that “In order to stabilize the concentration of GHGs in the atmosphere, emissions would need to peak and decline thereafter. The lower the stabilization level, the more quickly this peak and decline would need to occur.” The studies also found that stabilization of atmospheric CO_2 concentrations at less than 450 ppm would limit temperature rise to less than 3.6 degrees Fahrenheit by the year 2100 and would require global anthropogenic CO_2 emissions to drop below year 1990 levels within a few decades (by 2020). If GHG emissions, and atmospheric CO_2 levels, were to be kept to this "low" or “Category I” level, impacts to gross domestic product (GDP) would be projected to “produce market benefits in some places and sectors while, at the same time, imposing costs in other places and sectors” (IPCC 2007, 2014). Higher levels of CO_2 could cause a reduction in global GDP of more than 5 percent, with substantially higher regional losses. Scenarios that are likely to maintain warming at below 3.6 degrees Fahrenheit are characterized by a 40 percent to 70 percent reduction in GHG emissions by 2050, relative to 2010 levels, and an emissions level near zero or below in the year 2100.

Therefore, stabilizing GHG emissions levels at 1990 levels over the next two decades, and reducing GHG emissions by between 50 and 85 percent by the year 2050, would reduce the impacts of climate change to "Category 1" levels that would produce nominal changes in global average GDP and would be less than significant.

Types of Greenhouse Gases

Water vapor is the most abundant and variable GHG in the atmosphere. It is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Evaporation from the oceans is the main source of water vapor (approximately 85 percent). Other sources include evaporation from other water bodies, sublimation (change from solid to gas) from ice and snow, and transpiration from plant leaves (AEP 2007).

Carbon dioxide (CO_2)is an odorless, colorless GHG with a GWP of 1. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanoes. Man-made sources of carbon dioxide include burning fuels, such as coal, oil, natural gas, and wood. The interaction of man-made sources and natural sources of GHG and how they contribute to the atmospheric levels of GHG is a complex issue. Current concentrations of CO_2 in the atmosphere are approximately 400 parts per million (ppm).

Methane, (CH_4) a gas, is the main component of natural gas used in homes and has a GWP of approximately 25 (as per 40 CRF Table A-1 to Subpart A of Part 98—Global Warming Potentials, dated January 2014). Decaying organic matter in forests and oceans is a natural source of methane. Man-made sources include landfills, fermentation of manure, and cattle. Geological deposits known as natural gas fields contain methane, which is extracted for fuel.

Nitrous oxide (N_2O), also known as laughing gas, is a colorless gas with a GWP of approximately 298. Nitrous oxide is produced by microbial processes in soil and water, including reactions that occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (e.g., nylon production, nitric acid production) also emit N_2O. Nitrous oxide is used in rocket engines, as an aerosol spray propellant, and in race cars. During combustion, NO_x (NO_x is a generic term for mono-nitrogen oxides, NO and NO_2) is produced as a criteria pollutant and is not the same as N_2O. Very small quantities of N_2O may be formed during fuel combustion by the reaction of nitrogen and oxygen (API 2004).

Fluorocarbons (CFC, HCFC, HFC) are synthetic gases formed by replacing all hydrogen atoms in methane or ethane with chlorine or fluorine atoms. Chlorofluorocarbons and their substitutes Hydrochlorofluorocarbons (HCFCs) and Hydrofluorocarbons (HFCs), are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at the earth's surface). Chlorofluorocarbons were first synthesized in 1928 as refrigerants, aerosol propellants, and cleaning solvents. However, they destroy stratospheric ozone and the Montreal Protocol stopped their production in the 1990s, with phase-out of HCFCs by 2030 and accepted use of HFCs.

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. Its global warming potential of 22,800 is the highest of any gas. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Table 4.3.5 shows a range of gases that contribute to GHG warming with their associated global warming potential. The table also shows their estimated lifetime in the atmosphere and the global warming potential.

Although ozone is a GHG, unlike the other GHG, ozone in the troposphere is relatively short-lived and therefore is not global in nature. According to the CARB, it is difficult to determine accurately the contribution of ozone precursors (NO_x and VOC) to global climate change (CARB 2006).

Table 4.3.5 Global Warming Potential of Various Gases

Gas	Life in the Atmosphere (years)	20-year GWP (average)
Carbon Dioxide	50-200	1
Methane	12	25
Nitrous Oxide	120	298
CFC, HCFC, HFCs	1.5-264	12-14,800
Sulfur Hexafluoride	3,200	22,800

Note: GWP = global warming potential
Source: *EPA 40 CFR Part 98, Subpart A, Table A-1, dated Nov 29, 2013*

Calculation of Greenhouse Gas Emissions

The quantification of GHG emissions associated with a Project can be complex and relies on a number of assumptions. GHG emissions are global because emissions from one location could affect the entire planet, and they are not limited to local impacts. Therefore, offsite impacts, such as vehicle emissions and other associated transportation emissions, are included.

Emissions are generally classified as either direct or indirect. Direct emissions are associated with the production of GHG emissions at the Project Site. These include the combustion of natural gas in heaters or stoves, the combustion of fuel in engines and construction vehicles, and fugitive emissions from valves and connections, which include methane as a component.

Indirect emissions include the emissions from vehicles (both gasoline and diesel) delivering materials and equipment to the site and the use of electricity. Electricity also produces GHG emissions because fossil fuels generate some electricity.

This report utilizes the California Air resources Board Mandatory Reporting of Greenhouse Gas Emissions method to calculate GHG emissions (CARB 2012).

To quantify the emissions associated with electrical generation, the CalEEMod factors for the San Luis Obispo area are used.

Indirect GHG emissions associated with trash hauling and other services that might visit the Rail Spur Project Site are incorporated through the inclusion of the travel of diesel trucks that would visit and service the Project Site.

National Greenhouse Gas Emissions

Fossil fuel combustion is responsible for the vast majority of the United State's GHG emissions, and CO_2 is the primary GHG. In 2011, total US GHG emissions were 6,702 million metric tons of carbon dioxide equivalent ($MMTCO_2E$). GHG emissions peaked at 7,263 in 2007. In 2011, approximately 26 percent of GHG emissions were associated with transportation, approximately 32 percent were associated with electricity generation and 12 percent were associated with industrial.

Statewide Greenhouse Gas Emissions

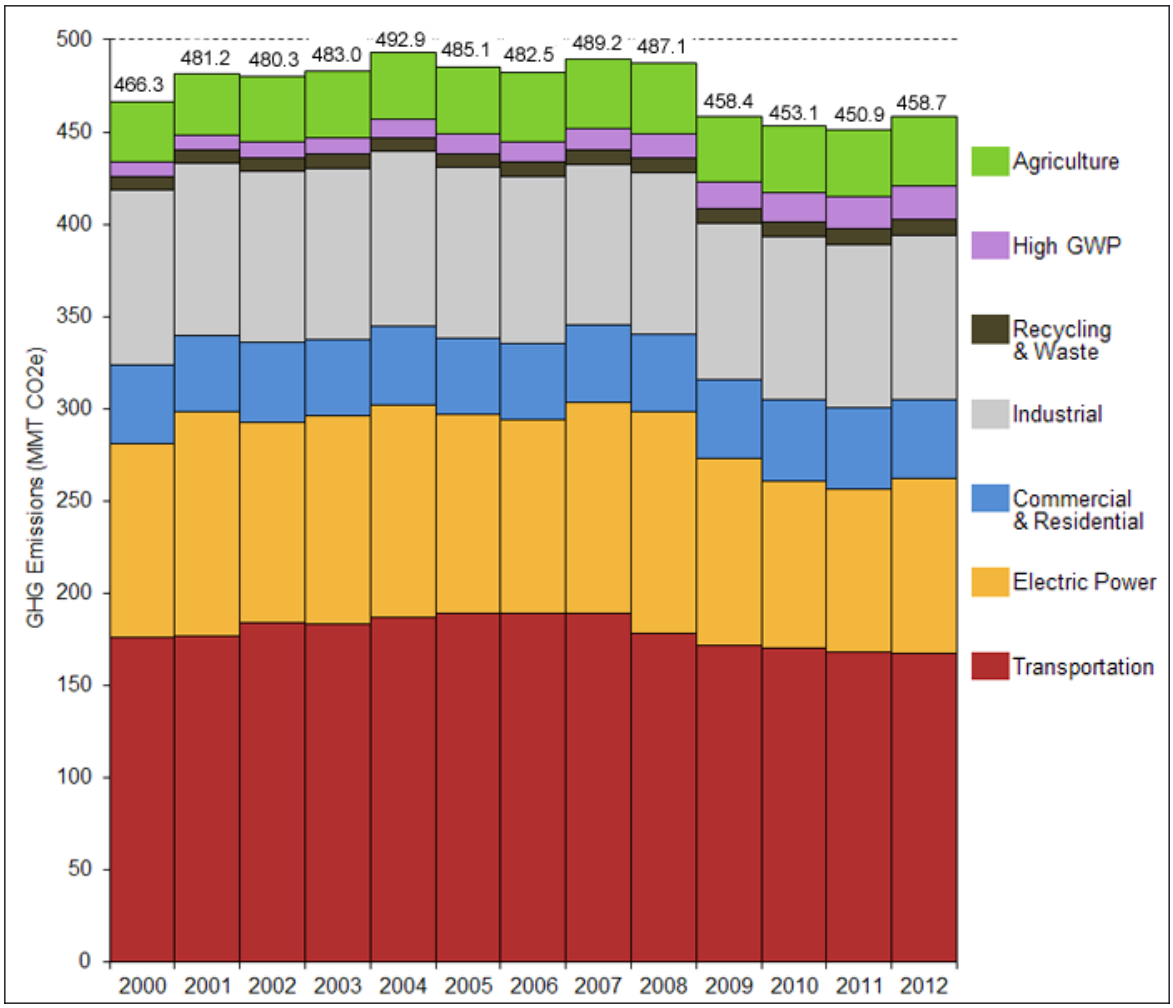
With a population of 38 million, California is the most populous state in the United States. In 2012, California produced 459 $MMTCO_2E$ of GHG emissions (CARB 2014). Figure 4.3-3 shows the breakdown of California GHG emissions since 2000. The transportation sector is the single largest contributor of California's GHG emissions in 2012, producing 37 percent of the State's total GHG emissions in 2010. In contrast, electrical generation produced 21 percent and industrial processes produced 19 percent.

Local Greenhouse Gas Emissions

In July 2008, the County Board of Supervisors made a commitment to calculating San Luis Obispo County's contribution to global climate change through the development of an Energywise Plan (Climate Action Plan) currently in draft form. The GHG Inventory estimates that the unincorporated areas of San Luis Obispo County emitted approximately 917,953 metric tons of CO_2-equivalent emissions in the baseline year 2006. The transportation sector was the

largest contributor to emissions (40 percent). Emissions from the commercial/industrial and residential sectors accounted for 24 and 15 percent of the total, respectively. Emissions from other sources, including livestock, select aircraft operations, and agricultural equipment, comprised the remaining 21 percent of the total.

Figure 4.3-3 California Greenhouse Gas Emissions



Source: CARB website 2014

4.3.1.6 Current Emissions from Refinery Operations

Emissions produce impacts associated with criteria pollutant emissions, emissions of GHG and emissions of toxic materials.

Santa Maria Refinery (SMR) Criteria Pollutant Emissions

Current operations at the Refinery produced criteria emissions associated with a range of equipment types and operations, including:

- Combustion sources, including diesel pumps and compressors, heaters, boiler, generators, incinerators and flares (emergency use only);
- Fugitive emissions from pumps, valves, and connections;
- Fugitive emissions from hydrocarbon tanks;
- Coke handling and storage; and
- Other miscellaneous sources, including solvent use, oily water treatment, cooling towers, and sulfur pit vents.

The Refinery reports emissions from these sources to the SLOCAPCD annually. Table 4.3.6 summarizes the emissions for these sources for the operations of the Refinery operating at the permit level of throughput (prior to the completion of the Throughput Increase Project, which would increase some equipment emissions by up to 10%).

Offsite criteria emissions include the emissions from vehicles used to transport employees and from vehicles used to transport coke, sulfur, and other materials delivered to or exported by the Refinery. These emissions include:

- Emissions from trucks and trains used to transport coke;
- Emissions from trucks used to transport sulfur;
- Emissions associated with transport of crude oil to the Santa Maria Pump Station to be delivered by pipeline to the Refinery;
- Emissions from trucks associated with normal materials shipments and employee duties; and
- Emissions from employee vehicles.

Table 4.3.7 shows emissions from offsite vehicle trips. Trucks delivering crude oil from several locations to the Santa Maria Pump Station create emissions. The weighted-average distance of these deliveries is 66 miles one way, from as far north as the San Ardo fields in Monterey County (83 miles) and south to Casmalia.

The Nipomo Mesa is located in an area that is impacted by periods of high particulate matter concentrations. The SLOCAPCD has been investigating the source of the high particulate matter concentrations on the Nipomo Mesa for the past decade.

Several studies performed by the SLOCAPCD in the Nipomo Mesa area have shown the source of the elevated particulate matter (PM) pollution to be windblown dust from the open sand areas of the Oceano Dunes State Vehicular Recreation Area (SVRA). The studies provided a comprehensive picture of the characteristics of a typical dust event. On November 16, 2011, the APCD Board approved the Coastal Dunes Dust Control Rule 1001 to require implementation of dust control measures on coastal dunes where vehicle activity occurs, to mitigate the impacts of the blowing dust. Mitigation efforts are currently underway.

Table 4.3.6 Refinery Emissions Permit Level – Annual and Daily

Annual Emissions, Tons/Year								
Equipment Description	**TOG**	**ROG**	**CO**	**NOx**	**SO2**	**PM**	**PM-10**	**PM-2.5**
Diesel Pumps and Compressors	0.1	0.1	0.3	1.3	0.0	0.1	0.1	0.1
Crude Heaters B2A/B	3.6	1.8	0.0	16.0	33.2	2.5	2.4	2.3
Vacuum Heaters B62A/B	0.6	0.3	0.3	2.1	2.9	0.4	0.4	0.4
Coke Heaters B102A/B	3.9	1.9	0.1	18.3	39.5	2.7	2.6	2.5
Steam Superheaters B201A/B	0.2	0.1	0.0	1.8	1.9	0.1	0.1	0.1
Boilers B504/506	3.7	1.8	1.1	12.0	21.0	2.5	2.5	2.5
Boiler Steam Generators B505	1.0	0.5	2.2	12.1	18.8	2.1	2.1	2.1
Boiler B507	2.1	1.0	1.0	6.5	12.0	1.4	1.4	1.4
Sulfur Plant Incinerator B602A/B	0.2	0.1	1.6	1.9	28.2	0.1	0.1	0.1
Tail Gas Combustor B702	0.2	0.1	1.7	2.0	2.0	0.2	0.2	0.2
Flare Stack C451	0.4	0.1	0.9	0.2	0.0	0.0	0.0	0.0
Kilns (Rotary and Cold Stack) - Carbon Plant	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
Oily water treatment system	6.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0
Cooling towers	2.8	2.8	0.0	0.0	0.0	0.0	0.0	0.0
Sulfur pit vents	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fugitive Emissions: non-crude tank	6.5	6.0	0.0	0.0	0.0	0.0	0.0	0.0
Fugitive Emissions: crude tank	9.0	8.2	0.0	0.0	0.0	0.0	0.0	0.0
Coke Storage - Carbon Plant	0.0	0.0	0.0	0.0	0.0	0.3	0.1	0.0
Rail car loading, baghouse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coke handling and conveying	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.1
Cooler Stack to Wet Scrubber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Misc Sources (solvent use, etc)	0.3	0.3	0.0	0.1	0.0	0.0	0.0	0.0
Total, tons/yr	***40.5***	***31.0***	***9.2***	***74.3***	***160***	***12.8***	***12.2***	***11.9***
Average Daily Emissions, lbs/day								
Equipment Description	**TOG**	**ROG**	**CO**	**NOx**	**SO2**	**PM**	**PM-10**	**PM-2.5**
Diesel Pumps and Compressors	0.6	0.4	1.5	7.1	0.1	0.5	0.5	0.5
Crude Heaters B2A/B	19.8	9.9	0.0	87.5	182.1	13.7	13.0	12.7
Vacuum Heaters B62A/B	3.3	1.6	1.5	11.6	16.1	2.2	2.1	2.1
Coke Heaters B102A/B	21.3	10.7	0.3	100.5	216.3	14.7	14.0	13.7
Steam Superheaters B201A/B	1.0	0.5	0.0	10.0	10.6	0.7	0.7	0.7
Boilers B504/506	20.1	10.1	6.0	65.9	115.1	13.9	13.9	13.9
Boiler Steam Generators B505	5.4	2.7	12.3	66.2	102.8	11.4	11.4	11.4
Boiler B507	11.5	5.7	5.7	35.7	65.7	7.9	7.9	7.9
Sulfur Plant Incinerator B602A/B	1.1	0.6	8.6	10.2	154.4	0.8	0.8	0.8
Tail Gas Combustor B702	1.2	0.6	9.1	10.9	11.1	0.8	0.8	0.8
Flare Stack C451	2.0	0.7	5.2	1.0	0.1	0.0	0.0	0.0
Kilns (Rotary and Cold Stack) - Carbon Plant	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0
Oily water treatment system	32.7	31.7	0.0	0.0	0.0	0.0	0.0	0.0
Cooling towers	15.5	15.5	0.0	0.0	0.0	0.0	0.0	0.0
Sulfur pit vents	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Fugitive Emissions: non-crude tank	35.4	32.9	0.0	0.0	0.0	0.0	0.0	0.0
Fugitive Emissions: crude tank	49.3	45.0	0.0	0.0	0.0	0.0	0.0	0.0
Coke Storage - Carbon Plant	0.0	0.0	0.0	0.0	0.0	1.6	0.8	0.2
Rail car loading, baghouse	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coke handling and conveying	0.0	0.0	0.0	0.0	0.0	2.0	1.0	0.3
Cooler Stack to Wet Scrubber	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Misc Sources (solvent use, etc)	1.7	1.7	0.1	0.5	0.0	0.0	0.0	0.0
Total, lbs/day	***221.9***	***170.1***	***50.4***	***407.0***	***874***	***70.3***	***67.0***	***65.1***

Source: Phillip66 Throughput Increase EIR current (2013) permit level (44,500bpd) without throughput increase.

Table 4.3.7 Offsite Vehicle Emissions – Within and Outside of San Luis Obispo County

	Peak Day Emissions, lbs/day						Total Emissions, Tons or Tons/yr								
Source	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	ROG	CO	NO_X	SO_2	PM_{10}	$PM_{2.5}$	N2O	CH4	CO2
Within SLO County															
Workers/Visitors weekdays	1.45	41.72	4.65	0.05	0.48	0.23	0.19	5.42	0.60	0.01	0.06	0.03	0.03	0.05	617
Workers/Visitors weekends	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.13	0.01	0.00	0.00	0.00	0.00	0.00	15
LDT trucks - misc refinery deliveries	0.17	4.72	0.60	0.00	0.03	0.02	0.03	0.86	0.11	0.00	0.01	0.00	0.01	0.01	63
HHDT Trucks - coke export	8.22	41.16	173.83	0.23	6.51	5.44	1.50	7.51	31.72	0.04	1.19	0.99	0.07	0.07	4531
HHDT Trucks - sulfur export	0.83	4.15	17.53	0.02	0.66	0.55	0.15	0.76	3.20	0.00	0.12	0.10	0.01	0.01	457
HHDT Trucks - crude deliveries to SM	2.29	11.48	48.50	0.07	1.82	1.52	0.42	2.10	8.85	0.01	0.33	0.28	0.02	0.02	1264
Locomotives to Long Beach- SLOC	0.72	2.10	12.86	0.00	0.44	0.40	0.01	0.04	0.26	0.00	0.01	0.01	0.00	0.00	16
Total	***13.68***	***105.33***	***257.97***	***0.37***	***9.94***	***8.16***	***2.31***	***16.82***	***44.77***	***0.07***	***1.72***	***1.41***	***0.13***	***0.15***	***6962***
Kern County															
HHDT Trucks - sulfur export	0.63	3.17	13.40	0.02	0.50	0.42	0.12	0.58	2.45	0.00	0.09	0.08	0.01	0.01	349
HHDT Trucks - coke export	10.96	54.87	231.77	0.31	8.68	7.26	2.00	10.01	42.30	0.06	1.58	1.32	0.09	0.09	6041
Total	***11.59***	***58.05***	***245.17***	***0.33***	***9.18***	***7.68***	***2.11***	***10.59***	***44.74***	***0.06***	***1.68***	***1.40***	***0.09***	***0.10***	***6390***
Santa Barbara County															
HHDT Trucks - crude deliveries to SM	0.51	2.57	10.86	0.01	0.41	0.34	0.09	0.47	1.98	0.00	0.07	0.06	0.00	0.00	283
Locomotives to Long Beach- SBC	16.13	47.32	290.04	0.01	10.04	9.03	0.33	0.97	5.97	0.00	0.21	0.19	0.03	0.01	359
Total	***16.65***	***49.90***	***300.90***	***0.02***	***10.45***	***9.37***	***0.43***	***1.44***	***7.95***	***0.00***	***0.28***	***0.25***	***0.03***	***0.01***	***643***
Monterey County															
HHDT Trucks - crude deliveries to SM	0.69	3.44	14.54	0.02	0.54	0.46	0.13	0.63	2.65	0.00	0.10	0.08	0.01	0.01	379
Ventura County															
Locomotives to Long Beach- VC	8.65	25.37	155.48	0.00	5.38	4.84	0.18	0.52	3.20	0.00	0.11	0.10	0.02	0.01	193
Los Angeles County															
Locomotives to Long Beach- LAC	8.32	24.39	149.50	0.00	5.17	4.66	0.17	0.50	3.08	0.00	0.11	0.10	0.02	0.00	185
Total Emissions All Counties	59.56	266.47	1123.57	0.75	40.66	35.17	5.32	30.51	106.40	0.13	3.99	3.34	0.29	0.28	14,751

Source: Data derived from SLOCAPCD and Phillips 66 Refinery Throughput EIR. Refinery is operating at the permit level of throughput in 2013 (44,500 bpd) without throughput increase.

SMR Operations Greenhouse Gas Emissions

Operations at the Refinery in the baseline year produced GHG emissions associated with a range of equipment types and operations, as shown in Table 4.3.6. Table 4.3.8 summarizes Refinery GHG emissions, which the Refinery voluntarily submits to the SLOCAPCD.

Table 4.3.8 Greenhouse Gas Emissions - Refinery Operations at Permit Level, metric tonnes

Source Type	CO_2	N_2O	CH_4	SF_6	Total CO_2 Equivalent Emissions
Refinery					
Stationary Combustion	238,905	0.4	4.0	0.0	239,129
Coke Processing (Calciner)	0	0.0	0.0	0.0	0
Mobile Combustion	751	0.0	0.0	0.0	780
Refrigerant Usage	0	0.0	0.0	0.0	20
Sulfur Recovery	8,743	0.0	0.0	0.0	8,743
Water Processes	0	0.2	1.5	0.0	105
VOC Fugitives	0	0.0	0.5	0.0	11
SF6 Usage	0	0.0	0.0	0.0	0
Purchased Electricity	6,256	0.0	0.0	0.0	6,265
TOTAL REFINERY	254,655	0.7	6.1	0.0	255,052
Offsite Mobile					
Workers commuting	568	0.0	0.0	0.0	577
LDT trucks - misc Refinery deliveries	57	0.0	0.0	0.0	60
HHDT Trucks - coke export	9,514	0.1	0.1	0.0	9,560
HHDT Trucks - sulfur export	725	0.0	0.0	0.0	729
HHDT Trucks - crude deliveries to SMPS	1,734	0.0	0.0	0.0	1,742
Locomotives to Long Beach	678	0.1	0.0	0.0	696
TOTAL MOBILE	13,276	0.3	0.3	0.0	13,362
TOTAL					268,415

Notes: Mobile combustion is emission related to Refinery operations, including employees, equipment or materials delivery, transport and movement of crude oil to the SMPS. Data is derived from 2009 Offsite Mobile data for this part of the table. The Calciner shut down in 2007. Emissions estimated at the refinery permit level from 2007 data. Source: SLOCAPCD spreadsheets with data derived from Phillips 66 submittals. Permit level is the 44,500 bpd before the Refinery throughput modifications.

GHG emissions associated with employees commuting and offsite movement of sulfur, coke, and miscellaneous materials are not included in the inventories submitted to the SLOCAPCD. These emissions levels, also shown in Table 4.3.8, are calculated separately.

SMR Toxic Emissions

Toxic emissions are associated with operations at the Refinery as well as emissions from diesel trucks operating along area roadways. Refinery emissions of toxic materials are estimated by the Refinery and submitted to the SLOCAPCD along with modeling of cancer, acute, and chronic impacts at locations near the Refinery. These estimates are required by regulation, particularly the AB2588 requirements.

A toxic emission inventory was developed for the Refinery in 2004, which included only stationary sources at the SMR and also included operations such as the calciner, which have since been shut down. The 2004 inventory was used in a 2007 health risk assessment prepared by Phillips 66 (previously ConocoPhillips) which utilized the California Air Resources Board's Hotspots Analysis and Reporting Program model to assess the cancer, chronic, and acute health risk impacts.

The primary cause of health risk impacts at the Refinery in 2004 was determined to be the diesel-cooling water pump. In 2005, a diesel oxidation catalyst (DOC) was reportedly installed on the diesel cooling water pump to reduce diesel particulate emissions by 30 percent. The installation of the DOC and shutdown of calcining operations resulted in a reduction in health risk levels to 15 cancer cases per one million at the Refinery boundary (ConocoPhillips 2007).

Since 2004, several additional changes at the Refinery have reduced toxic emissions, including shutting down the calciner, installation of various DOC and diesel particulate filters (DPF) on several diesel engines, and reductions in fugitive emissions with a more rigorous fugitive emissions control program. Additionally, the SLOCAPCD reported that the diesel cooling water pump has been replaced by a natural gas engine with catalyst, which has reduced risk levels by at least 80 percent. This would reduce cancer health risk levels to approximately five cases per one million. The estimation of cancer risk levels is based upon a person being exposed to the air toxin at one location from the third-trimester of pregnancy through the 70th year of life, and assumes that the person is at this same location for an average of about 73 percent of the time.

As part of the Phillips 66 Throughput Increase FEIR, the Applicant prepared and submitted a revised HRA utilizing 2010 emission data and assumptions about the operating characteristics of the Refinery if it were to operate at the increased throughput levels. The revised HRA indicated that the highest cancer risks at the facility fence line would be 2.1 in a million, and that chronic and acute risks would be 0.02 and 0.38, respectively. These levels are less than the health risk thresholds of 10 in one million (for cancer) and 1.0 HI for acute and chronic impacts and would be less than significant. The main driver in this health risk assessment was diesel particulate emissions associated with diesel engines at the refinery.

The Phillips 66 Throughput Project EIR assessed the health risks associated with truck traffic to and from the SMR. Health risks were estimated at 5 to 6 cases per million along Highway 1 near Willow Road. Since the Throughput EIR, the Willow Road/Highway 101 interchange has been completed and the SMR traffic utilized that route instead of the Highway 1 route to the south. This would shift the health risks associated with the SMR truck traffic to along Willow Road instead of Highway 1 south of Willow Road. An average of 49 round truck trips per day at the SMR was used in the baseline analysis, as per the Throughput EIR.

The California Office of Environmental Health Hazard Assessment, which produces the guidelines for conducting health risk assessments and the HARP model, released a report in 2012 (OEHHA 2012) which updated health risk exposure assessment methods related to health risk assessments to account for the increased sensitivity and breathing rates of children and younger adults. The report defined updated breathing rates on a per kilogram basis for children which caused an increase in health risk for children by over 2.7 times as much as the previous model. The OEHHA report also added an age sensitivity factor to account for children ranging in age

from between 3 and 10. The report also adjusted the "fraction of time at home" value to be age dependant, although for children whose school is located within the 1 in a million risk level from a facility are assumed to be at home 100 percent of the time (OEHHA 2015). In combination, these adjustments caused the cancer risk estimates to increase substantially. A finalized HRA Guidance Document was released in early 2015 (OEHHA 2015) along with a revised version of the HARP modeling program (HARP2, currently model version 15197) which was used in this analysis in the FEIR. The OEHHA adjustments do not affect the acute and chronic risk assessments.

The HARP2 model was used (version 15197) to estimate the current refinery and associated mobile sources impacts. The cancer risk would be 18.1 in a million at the nearest sensitive receptor (assuming a 30 year exposure duration, as per OEHHA Guidelines, and a Tier 1 assessment assuming all children under 16 years of age are at home 100 percent of the time as Lopez Continuation High School and the Mesa Middle School are located within the proposed Project 1 in a million cancer contour), which is above the SLOCAPCD threshold. This receptor is affected primarily by trucks entering and leaving the SMR. The cancer risk contours for the existing SMR are shown in Figure 4.3-4.

SMR Odor Emissions

Several activities at the SMR, including sulfur handling, combustion of sulfurous gases, and fugitive emissions from leaking components, could produce odors in the surrounding residential and industrial areas. The SMR was under an Abatement Order from 1989 to 1993 from the SLOCAPCD. As a result of that order, plant and process modifications were made to significantly reduce emissions and odors. A fugitive emissions program implemented in 2007 reduced emissions from leaking components. The 2007 shutdown of the Calciner Plant also reduced the combustion and emissions of sulfurous gases.

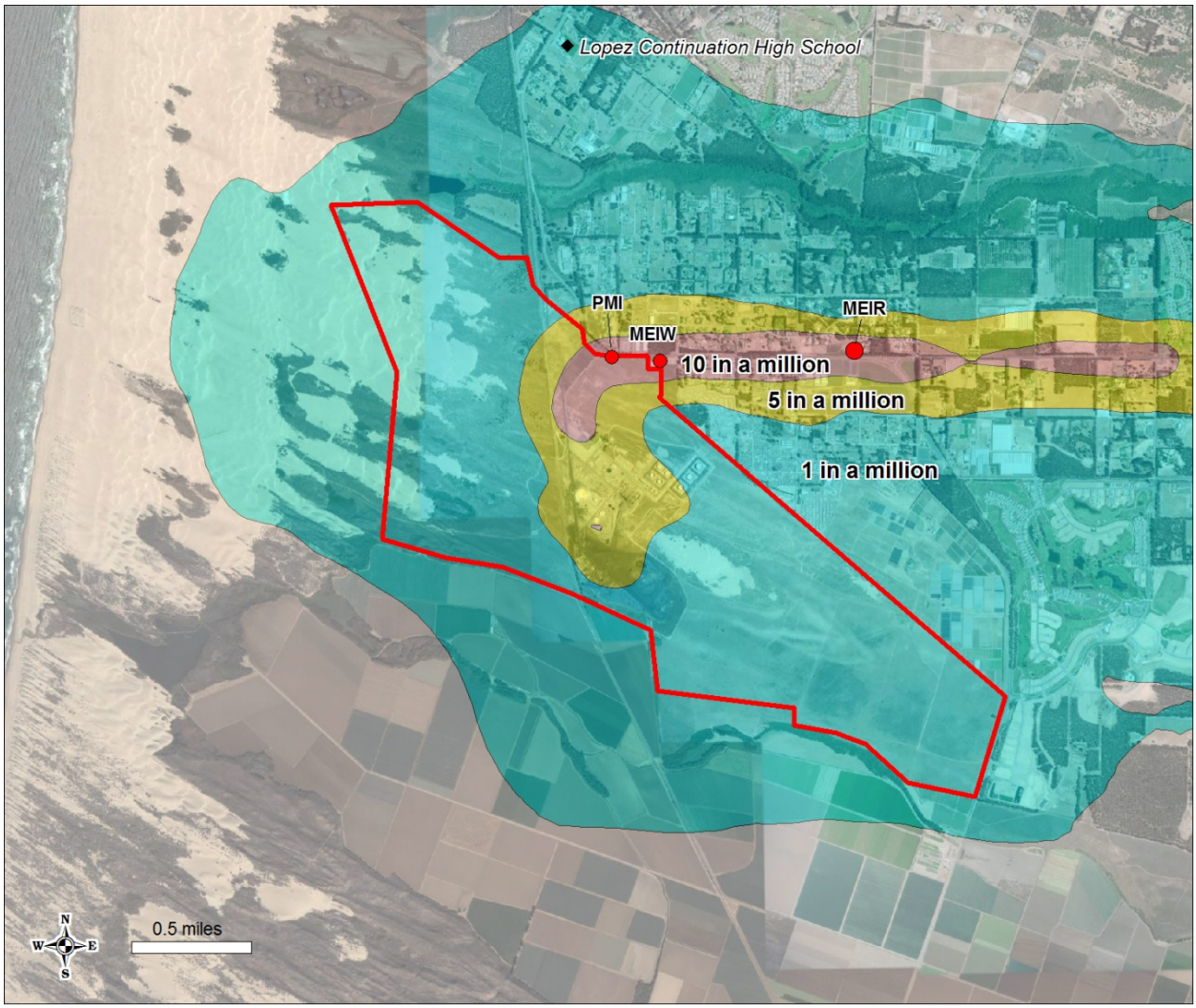
The SLOCAPCD investigates and compiles odor complaints for the SMR. Over the past 12 years, the SLOCAPCD recorded approximately 7.5 complaints per year on average, and SLOCAPCD staff verified 3.3 per year were attributable to the SMR. Complaints peaked at 20 in 2008, when the SLOCAPCD verified 11 complaints. In addition, the SMR has received, on average, 2.8 SLOCAPCD notices of violation per year over the past 17 years, for issues ranging from failure to submit appropriate plans to emissions levels that exceed permit values. One notice of violation was issued for odor nuisance in 17 years.

Santa Maria Pump Station Criteria Pollutant Emissions

Current operations at the Santa Maria Pump Station (SMPS) produced criteria emissions associated with a range of equipment types and operations, including:

- Unloading of crude oil trucks;
- Emergency standby engines;
- Tank heater boilers;
- Tank storage of crude oil (80,000 bbls) from truck offloading only; and
- Fugitive emissions from pumps, valves, and connections.

Figure 4.3-4 Cancer Health Risk Baseline Current Operations



PMI-Point of Maximum Impact
MEIR- Maximally Exposed Individual Resident
MEIW- Maximally Exposed Individual Worker
Mesa Middle School is located off the north side of the map about 1 mile northeast of Lopez Continuation High School.
Based upon HARP2 model version 15197.

According to the Santa Barbara County APCD permits (PTO 08218r9) and annual emission reports (for 2010), the SMPS has a permit truck unloading throughput limit of 21,859 barrels per day (bpd) as well as limits on the boiler heat inputs (502 mmbtu/day). Permit limits on NO_x and ROC are 12.35 and 26.82 lbs/day, respectively. In 2010, the maximum average monthly throughput at the SMPS was 6,847 bpd of crude oil through the truck unloading rack.

4.3.2 Regulatory Setting

Federal, state, and local agencies have established standards and regulations that govern the Rail Spur Project. The following sections summarize the regulatory setting for air quality that apply to new development within the local air basin and the historic and most recent efforts on addressing GHG emissions.

4.3.2.1 Air Quality

Federal Regulations

The Clean Air Act of 1970 directs attainment and maintenance of the National Ambient Air Quality Standards (NAAQS). The 1990 Amendments to this Act included new provisions that address air pollutant emissions that affect local, regional, and global air quality. The EPA is responsible for implementing the Clean Air Act and establishing the NAAQS for criteria pollutants. In 1997, the EPA adopted revisions to the Ozone and Particulate Matter Standards in the Clean Air Act. These revisions included 8-hour ozone standards and particulate matter standards for $PM_{2.5}$. However, in May of 1999 the US Court of Appeals for the District of Columbia remanded the ozone standards. In January 2001, the EPA issued a "Proposed Response to Remand" that declared the revised ozone standard should remain at 0.08 ppm, as established with the 1997 revisions. In March 2001, the US Supreme Court upheld the constitutionality of the Clean Air Act as the EPA interpreted it, setting health-protective air quality standards for ground-level ozone and particulate matter. In April 2004, the EPA issued its Final Nonattainment Area Designations for Eight-Hour Ozone Standard.

Air Quality Management Plan

Under the provisions of the Clean Air Act, the EPA requires each state that has not attained the NAAQS to prepare an Air Quality Management Plan, which is a separate local plan detailing how to meet the federal standards. The governor of each state designates a local agency to prepare these plans, which are then incorporated into a State Implementation Plan.

Emission Standards for Non-Road Diesel Engines

To reduce emissions from non-road diesel equipment, the EPA established a series of increasingly strict emission standards for new non-road diesel engines. Tier 1 standards were phased in from 1996 to 2000 (year of manufacture), depending on the engine horsepower category. Tier 2 standards were phased in from 2001 to 2006. Tier 3 standards were phased in from 2006 to 2008. Tier 4 standards were phased in from 2008 until 2015, and generally apply to all model years after 2014. These standards will apply to construction equipment.

Project-Specific Rules

Federal rules applicable to the Rail Spur Project are outlined in the Refinery Title 5 permit, pages iii-iv PTO 44-50.

Federal Regulation of Locomotives

Section 213 of the Federal Clean Air Act directs EPA to adopt emissions standards applicable to new locomotives and new engines used in locomotives. EPA promulgated the regulation in 1998 (Title 40 part 1033) with an update in 2008. The regulation establishes emission standards consisting of several tiers (Tier 0 through 4), applicable to remanufactured and new locomotives

as specified in the Final EPA National Locomotive Rule, with the tiers being phased in over a number of years. Locomotive engines are required to meet the specific Tier level when they are either originally manufactured or are remanufactured. The Tier level is a function of the locomotive original manufacture date. The 2008 Revised regulation Tier levels are labeled a "+" (such as Tier 0+) to indicate the updated 2008 levels. For example, for a locomotive originally manufactured in 1995 and remanufactured in 2006, it would have to meet the Tier 0 standard. A locomotive originally manufactured in 2003 and remanufactured in 2011 would have to meet the Tier 1+ standard.

State Regulations

California Air Resources Board

The CARB has jurisdiction over all air pollutant sources in the state; it delegated responsibility for stationary sources to local air districts and retained authority over emissions from mobile sources. The County's local air district is the San Luis Obispo County Air Pollution Control District (SLOCAPCD). The California Air Resources Board (CARB) established the California Ambient Air Quality Standards (CAAQS). Comparing the criteria pollutant concentrations in ambient air to the CAAQS determines state attainment status for criteria pollutants in a given region. The CARB, in partnership with local California air quality management districts, developed a pollutant-monitoring network to aid attainment of CAAQS. The network consists of numerous monitoring stations throughout California that monitor and report various pollutants' concentrations in ambient air.

California Clean Air Act

The California Clear Air Act (CCAA) went into effect in January 1, 1989, and was amended in 1992 (California Health and Safety Code, Division 26). The CCAA mandates achieving the health-based CAAQS at the earliest practical date.

Air Toxics "Hot Spots" Information and Assessment Act of 1987

The Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB2588) requires an inventory of air toxics emissions from individual facilities, an assessment of health risk, and notification of potential significant health risk (California Health & Safety Code, Division 26, Part 6).

California Diesel Fuel Regulations

With the California Diesel Fuel Regulations, the CARB set sulfur limitations for diesel fuel sold in California for use in on-road and off-road motor vehicles. The rule initially excluded harbor craft and intrastate locomotives, but it later included them with a 2004 rule amendment. Under this rule, diesel fuel used in motor vehicles, except harbor craft and intrastate locomotives, has been limited to 500-ppm sulfur since 1993. This sulfur limit was later reduced to 15-ppm, effective September 1, 2006.

Locomotive Regulations and MOUs

California developed and adopted the 1994 California State Implementation Plan ("1994 SIP") to attain the federal ozone air quality standard in the South Coast Nonattainment Area and certain other areas of California. Measure M14 of the 1994 SIP anticipates that locomotive fleets operating in the South Coast Nonattainment Area in 2010 and later will emit on average no more than the 5.5 grams per brake horsepower hour ("g/bhp hr") Tier 2 (2005 and later) new

locomotive oxides of nitrogen ("NOx") emission standard included in the Final EPA National Locomotive Rule. The Measure M14 resulted in a Memorandum Of Mutual Understandings And Agreements - South Coast Locomotive Fleet Average Emissions Program on July 2, 1998 between CARB, Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company.

On November 18, 2004, the CARB approved new requirements for fuel used in intrastate locomotives. Beginning January 1, 2007, diesel fuel sold for use in intrastate diesel-electric locomotives operating in California must meet the specifications of CARB diesel fuel. Intrastate (diesel-electric) locomotives are defined as those locomotives that operate and fuel primarily (at or greater than 90% of annual fuel consumption, mileage, and/or hours of operation) within the boundaries of the state of California.

The Statewide Rail Yard Agreement between ARB, UPRR, and BNSF was adopted in June 2005 and required UPRR and BNSF to reduce diesel particulate matter emissions in and around UPRR and BNSF rail yards throughout the state by up to 20 percent between 2005 and 2008. The Statewide Rail Yard Agreement required the preparation of health risk assessments and mitigation plans, placed limits on the idling of locomotives to 15 consecutive minutes, and use of low sulfur fuels.

CARB also publishes data that indicates the national locomotive mix of UPRR between the emission tiers. In 2009 (the most recent data available), approximately 70% of the locomotive mix of UPRR was Tier 0 or below, with 14% Tier 1 and 16% Tier 2 (CARB 2013).

4.3.2.2 Local

In 1967, California passed legislation that placed the primary responsibility for controlling air pollution at the local level. In April 1970, the San Luis Obispo County Board of Supervisors formed the SLOCAPCD, which included a decision-making body known as the SLOCAPCD Board of Directors. Over the past 30 years, the District has adopted and implemented nearly 100 rules and currently has nearly 1,070 individual permits and agricultural registrations, and it operates 850 facilities. In 1994, revisions to state law changed the composition of the Board of Directors to include all five County supervisors plus one city council member from each of the seven incorporated cities.

As part of the California Clean Air Act, the SLOCAPCD is required to develop a plan to achieve and maintain the state ozone standard by the earliest practicable date. To this end, the SLOCAPCD developed the Clean Air Plan (CAP). The latest CAP is dated 2001 CAP, adopted by the SLOCAPCD at a hearing on March 26, 2002, which addresses state requirements by updating the 1991 CAP (SLOCAPCD 2001). The 1991 CAP, adopted by the SLOCAPCD in 1992, contained a comprehensive set of control measures designed to reduce ozone precursor emissions from a wide variety of stationary and mobile sources. The 2001 CAP, similar to the 1998 CAP, is mainly a continuation of the 1995 CAP and proposed no new control measures.

Control measures proposed in the CAP include vapor recovery, solvent content reduction, improved fuel combustion, fuel switching or electrification, chemical or catalytic reduction, reduced vehicle use, and new source reviews.

The SLOCAPCD also issues annual reports that address issues such as air quality summaries for each year as well as air quality trends.

The SLOCAPCD developed a number of rules that are potentially applicable to the Rail Spur Project, including:

- Rule 204 – Requirements (new source review);
- Rule 219 – Toxics new source review;
- Rule 401 – Visible emissions;
- Rule 402 – Nuisance;
- Rule 403 – Particulate matter emission standards;
- Rule 405 – Nitrogen oxides emission standards, limitations, and prohibitions;
- Rule 406 – Carbon monoxide emission standards and limitations;
- Rule 407 – Organic material emission standards;
- Rule 412 – Airborne toxic control measures;
- Rule 417 – Control of fugitive emissions of volatile organic compounds;
- Rule 419 – Petroleum pits, ponds, sumps, well cellars and wastewater separators;
- Rule 420 – Cutback asphalt paving materials;
- Rule 425 – Storage of volatile organic compounds;
- Rule 430 – Control of oxides of nitrogen from industrial, institutional, commercial boilers, steam generators, and process heaters;
- Rule 431 – Stationary internal combustion engines; and
- Rule 433 – Architectural coatings.

4.3.2.3 Greenhouse Gas Emissions Regulations

International Regulations

Kyoto Protocol

The Kyoto Protocol is a treaty made under the United Nations Framework Convention on Climate Change, which was signed on March 21, 1994. The Convention was the first international agreement to regulate GHG emissions. It has been estimated that if the commitments outlined in the Kyoto Protocol are met, global GHG emissions would be reduced by an estimated 5 percent from 1990 levels during the first commitment period from 2008 until 2012. However, while the US is a signatory to the Kyoto Protocol, Congress has not ratified it; therefore, the US is not bound by the Protocol's commitments.

Climate Change Technology Program

In lieu of the Kyoto Protocol's mandatory framework, the US has opted for a voluntary and incentive-based approach toward emissions reductions. This approach, the Climate Change

Technology Program, is a multi-agency research and development coordination effort, led by the Secretaries of Energy and Commerce, who are charged with carrying out the President's National Climate Change Technology Initiative.

Federal Regulations

Clean Air Act

In the past, the US EPA has not regulated GHG under the Clean Air Act. However, the US Supreme Court recently held that the EPA can, and should, consider regulating motor-vehicle GHG emissions. In Massachusetts v. Environmental Protection Agency, 12 states and cities, including California, in conjunction with several environmental organizations sued to force the EPA to regulate GHG as a pollutant pursuant to the Clean Air Act (US Supreme Court No. 05-1120; 127 S.Ct. 1438 (2007)). The Court ruled that GHG fit within the Clean Air Act's definition of a pollutant and that the EPA's reason for not regulating GHG was insufficiently grounded.

40 CFR Section 98 specifies mandatory reporting requirements for a number of industries. The final 40 CFR part 98 applies to certain downstream facilities that emit GHG, and to certain upstream suppliers of fossil fuels and industrial GHG. For suppliers, the GHG emissions reported are the emissions that would result from combustion or use of the products supplied. The rule also includes provisions to ensure the accuracy of emissions data through monitoring, recordkeeping and verification requirements. The mandatory reporting requirements generally apply to facilities that produce more than 25,000 metric tonnes of CO_2 equivalent per year.

Clean Power Plan

Signed into law in August, 2015, the Clean Power Plan establishes national standards that address carbon pollution from power plants, establishing interim and final CO_2 emission performance rates for different types of power plants and is estimated to reduce carbon emissions from power plants in 2030 by 32 percent below 2005 levels.

State Regulations and Programs

Executive Order S-3-05

The 2005 California Executive Order S-3-05 established the following GHG emission-reduction targets for California:

- By 2010, reduce GHG emissions to 2000 levels;
- By 2020, reduce GHG emissions to 1990 levels; and
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

The Secretary of the California Environmental Protection Agency (CalEPA) is charged with coordinating oversight of efforts to meet these targets and formed the Climate Action Team to carry out the Order. Emission reduction strategies or programs developed by the Climate Action Team to meet the emission targets are outlined in a March 2006 report (CalEPA 2006). The Climate Action Team also provided strategies and input to the CARB Scoping Plan.

Assembly Bill 1493

In 2002, the legislature declared in AB 1493 (the Pavley regulations) that global warming was a matter of increasing concern for public health and the environment in the state. It cited several

risks that California faces from climate change, including reduction in the state's water supply, increased air pollution due to higher temperatures, harm to agriculture, and increase in wildfires, damage to the coastline, and economic losses caused by higher food, water, energy, and insurance prices. Furthermore, the legislature stated that technological solutions for reducing GHG emissions would stimulate California's economy and provide jobs. Accordingly, AB 1493 required the CARB to develop and adopt the nation's first GHG emission standards for automobiles. The CARB responded by adopting CO_2-equivalent fleet average emission standards. The standards will be phased in from 2009 to 2016, reducing emissions by 22 percent in the "near term" (2009 to 2012) and 30 percent in the "mid-term" (2013 to 2016), as compared to 2002 fleets.

The legislature passed amendments to AB 1493 in September 2009. Implementation of AB 1493 requires a waiver from the EPA, which was granted in June 2009.

Assembly Bill 32

AB 32 codifies California's GHG emissions target and requires the state to reduce global warming emissions to 1990 levels by 2020. It further directs the CARB to enforce the statewide cap that would begin phasing in by 2012. AB 32 was signed and passed into law by Governor Arnold Schwarzenegger on September 27, 2006. Key milestones of AB 32 include:

- June 20, 2007 - Identification of "discrete early action GHG emission-reduction measures."
- January 1, 2008 - Identification of the 1990 baseline GHG emissions levels and approval of a statewide limit equivalent to that level. Adoption of reporting and verification requirements concerning GHG emissions.
- January 1, 2009 - Adoption of a scoping plan for achieving GHG emission reductions.
- January 1, 2010 - Adoption and enforcement of regulations to implement the actions.
- January 1, 2011 - Regulatory adoption of GHG emission limits and reduction measures.
- January 1, 2012 - GHG emission limits and reduction measures become enforceable.

Since the passage of AB 32, the CARB published Proposed Early Actions to Mitigate Climate Change in California. This publication indicated that the issue of GHG emissions in CEQA and General Plans was being deferred for later action, so the publication did not discuss any early action measures generally related to CEQA or to land use decisions.

California Senate Bill 1368

In 2006, the California legislature passed SB 1368, which requires the Public Utilities Commission (PUC) to develop and adopt a "greenhouse gases emission performance standard" by March 1, 2007, for private electric utilities under its regulation. The PUC adopted an interim standard on January 25, 2007, requiring that all new long-term commitments for base load generation involve power plants that have emissions no greater than a combined cycle gas turbine plant. That level is established at 1,100 lbs/MWh of CO_2. The California Energy Commission has also adopted similar rules.

Senate Bill 97 – CEQA: Greenhouse Gas Emissions
In August 2007, Governor Schwarzenegger signed into law SB 97 – CEQA: Greenhouse Gas Emissions stating, "This bill advances a coordinated policy for reducing greenhouse gas emissions by directing the Office of Planning and Research and the Resources Agency to develop CEQA guidelines on how state and local agencies should analyze, and when necessary, mitigate greenhouse gas emissions." Specifically, SB 97 requires the Office of Planning and Research (OPR), by July 1, 2009, to prepare, develop, and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, including, but not limited to, effects associated with transportation or energy consumption. The Resources Agency would be required to certify and adopt those guidelines by January 1, 2010. OPR would be required to periodically update the guidelines to incorporate new information or criteria established by the CARB pursuant to the California Global Warming Solutions Act of 2006. SB 97 also identifies a limited number of types of projects that would be exempt under CEQA from analyzing GHG emissions.

On January 7, 2009, OPR issued its draft CEQA guidelines revisions pursuant to SB 97. On March 16, 2010, the Office of Administrative Law approved the Amendments, and filed them with the Secretary of State for inclusion in the California Code of Regulations. The Amendments became effective on March 18, 2010.

Office of Planning and Research Technical Advisory and Preliminary Draft CEQA Guidelines Amendments for Greenhouse Gas Emissions
Consistent with SB 97, on March 18, 2010, the CEQA Guidelines were amended to include references to GHG emissions. The amendments offer guidance regarding the steps lead agencies should take to address climate change in their CEQA documents.

According to OPR, lead agencies should determine whether GHG may be generated by a proposed project, and if so, quantify or estimate the GHG emissions by type and source. Second, the lead agency must assess whether those emissions are individually or cumulatively significant. When assessing whether a project's effects on climate change are cumulatively considerable, even though its GHG contribution may be individually limited, the lead agency must consider the impact of the Project when viewed in connection with the effects of past, current, and probable future projects. Finally, if the lead agency determines that the GHG emissions from the Rail Spur Project are potentially significant, it must investigate and implement ways to avoid, reduce, or otherwise mitigate the impacts of those emissions.

The Amendments do not identify a threshold of significance for GHG emissions, nor do they prescribe assessment methodologies or specific mitigation measures. The Preliminary Amendments maintain CEQA discretion for lead agencies to establish thresholds of significance based on individual circumstances.

The guidelines developed by OPR provide the lead agency with discretion in determining what methodology is used in assessing the impacts of greenhouse gas emissions in the context of a particular project. This guidance is provided because the methodology for assessing GHG emissions is expected to evolve over time. The OPR guidance also states that the lead agency can rely on qualitative or other performance based standards for estimating the significance of GHG emissions.

California Air Resources Board: Scoping Plan

On December 11, 2008, the CARB adopted the Scoping Plan as directed by AB 32 (CARB 2008). The Scoping Plan proposes a set of actions designed to reduce overall GHG emissions in California. Measures include a cap-and-trade system, car standards, low carbon fuel standards, landfill gas control methods, energy efficiency, green buildings, renewable electricity standards, and refrigerant management programs.

Since 2008, ARB has updated the projected business as usual (BAU) emissions based on current economic forecasts (i.e., as influenced by the economic downturn) and GHG-reduction measures already in place. The BAU projection for 2020 GHG emissions in California was originally, in the 2008 Scoping Plan, estimated to be 596 $MMTCO_2E$. ARB subsequently derived an updated estimate of emissions by considering the influence of the recent recession and reduction measures that are already in place. The 2011 Scoping plan estimates the year 2020 emissions at 507 $MMTCO_2E$ (as the BAU estimate).

The 2011 Scoping Plan concluded that achieving the 1990 levels by 2020 meant cutting approximately 16 percent, compared to the original 2008 Scoping Plan that estimated a 29% reduction (CARB 2011a). The 2011 Scoping Plan sets forth the expected GHG emission reductions from a variety of measures, including the Pavley I automobile standards and the Renewables Portfolio Standard, neither of which were assumed in the 2008 Scoping Plan (CARB, 2011b).

AB 32 requires that the Scoping Plan be revised every five years; the first five-year revision was approved by CARB in May 2014. This first revision provides an update on climate science and a report on progress toward the 2020 target, including achievements of the 2008 and 2011 Scoping Plans, an update on the inventory of GHG emissions, and an update of the economy and its potential affect on future emissions' forecasting. It also addresses post-2020 goals, including Executive Order S-3-05.

California Climate Action Registry General Reporting Protocol

The California Climate Action Registry is a program of the Climate Action Reserve and serves as a voluntary GHG registry. The California Climate Action Registry was formed in 2001 when a group of chief executive officers, who were investing in energy efficiency projects that reduced their organizations' GHG emissions, asked the state to create a place to accurately report their emissions history. The California Climate Action Registry publishes a General Reporting Protocol, which provides the principles, approach, methodology, and procedures to estimate such emissions.

California Air Resource Board Proposed Mandatory Reporting Regulation

The Air Resources Board approved a mandatory reporting regulation in December 2007, which became effective January 2009 (which appears at sections 95100-95133 of title 17, California Code of Regulations), which requires the mandatory reporting of GHG emissions for specific industries emitting more than 25,000 metric tonnes of CO_2 equivalent per year.

California Air Resource Board Proposed Cap-and-Trade Regulation

The California Air Resource Board has recently adopted a rule to develop a cap-and-trade type system applicable to specific industries that emit more than 25,000 metric tonnes of CO_2

equivalent per year. The AB 32 Scoping Plan identifies a cap-and-trade program as one of the strategies California will employ to reduce the greenhouse gas (GHG) emissions that cause climate change. Under cap-and-trade, an overall limit on GHG emissions from capped sectors will be established by the cap-and-trade program and facilities subject to the cap will be able to trade permits (allowances) to emit GHGs. The program started on January 1, 2012, with an enforceable compliance obligation beginning with the 2013 GHG emissions for GHG emissions from stationary sources. The petroleum and natural gas systems sector is covered starting in 2013 for stationary and related combustion, process vents and flare emissions if the total emissions from these sources exceed 25,000 metric tonnes of CO_2 equivalent per year. Suppliers of Natural Gas and transportation fuels are covered beginning in 2015 for combustion emissions from the total volume of natural gas delivered to non-covered entity or for transportation fuels. Facilities subject to cap and trade are not automatically exempt from the significant evaluation under CEQA. Proposed projects must quantify GHG emissions and determine the significance of a project's environmental impact.

Executive Order B-30-15

The 2015 California Executive Order B-30-15 established a 2030 GHG emissions target of reducing greenhouse gas emissions by 40 percent below 1990 levels.

Senate Bill 350

The 2015 Clean Energy and Pollution Reduction Act was signed into law on October 10, 2015, and requires that the amount of electricity generated and sold to retail customers from renewable energy resources be increased to 50% by December 31, 2030, and that a doubling of statewide energy efficiency savings in electricity and natural gas by retail customers be achieved by January 1, 2030.

Local Regulations and Programs

County Climate Action Plan

The County adopted a Climate Action Plan (EnergyWise Plan) on November 22, 2011, as a blueprint for reducing greenhouse gas emissions. Additionally, a Green Building Ordinance to improve energy efficiency in new and existing development effective January 1, 2013. The CAP focuses on local actions to reduce GHG emissions through energy efficiencies, including: retrofitting existing buildings; reversing rural sprawl; and increasing use of non-fossil fuels such as solar and wind energy (SLOC 2011).

County General Plan, Conservation, and Open Space Element

The County Board of Supervisors in 2010 adopted a comprehensive Conservation and Open Space Element with a focus on reducing GHG emissions, increasing energy efficiency, and using local renewable energy. The County's EnergyWise Plan (adopted in 2011) included an inventory of GHG. The EnergyWise Plan is required by the Conservation and Open Space Element of the General Plan. The Inventory found that the unincorporated San Luis Obispo community emitted 917,700 metric tons of carbon dioxide equivalent ($MTCO_2e$) in 2006.

SLOCAPCD

The SLOCAPCD adopted GHG thresholds on March 28, 2012, and updated their CEQA Handbook in April 2012, to incorporate the new thresholds.

4.3.3 Significance Criteria

According to the April 2012 SLOCAPCD CEQA Air Quality Handbook, project impacts may be considered significant if one or more of the following special conditions cannot be met:

- Consistency with the most recent Clean Air Plan for San Luis Obispo County;
- Consistency with a plan for the reduction of greenhouse gas emissions that has been adopted by the jurisdiction in which the project is located and that, at a minimum, complies with State CEQA Guidelines Section 15183.5.
- Comparison of predicted ambient criteria pollutant concentrations resulting from the project to state and federal health standards, when applicable;
- Comparison of calculated project emissions to SLOCAPCD emission thresholds;
- The evaluation of special conditions which apply to certain projects; or
- Construction emissions would exceed the SLOCAPCD Thresholds.

The CEQA Air Quality Handbook defines thresholds for long-term operational emissions and short-term construction related emissions. Depending on the level of exceedance of a defined threshold, the SLOCAPCD has established varying levels of mitigation.

4.3.3.1 Operational Thresholds

Table 4.3.9 shows the threshold criteria established by the SLOCAPCD to determine a Project's significance and appropriate mitigation level for long-term operational emissions (i.e., vehicular and area source emissions).

Table 4.3.9 SLOCAPCD Thresholds of Significance for Operational Emissions Impacts

Pollutant	Daily	Annual
ROG + NO_x	25 pounds	25 tons
Diesel Particulate Matter	1.25 pounds	-
Fugitive Dust Particulate Matter (PM_{10})	25 pounds	25 tons
CO	550 pounds	-

Source: SLOCAPCD 2012

Emissions that equal or exceed the designated threshold levels within SLO County are considered potentially significant and shall be mitigated. For projects requiring air quality mitigation, the SLOCAPCD has developed a list of both standard and discretionary mitigation strategies tailored to the type of Project proposed: residential, commercial, or industrial.

Generally, the SLOCAPCD utilizes thresholds (see below) to ensure that ambient air quality standards are not exceeded. However, industrial and large commercial projects that have high emissions above the thresholds and are in close proximity to receptors are sometimes required to

perform air quality dispersion modeling if the SLOCAPCD determines that project emissions may have the potential to cause an exceedance of these standards.

4.3.3.2 Construction Thresholds

Use of heavy equipment and earth-moving operations during project construction generates fugitive dust and combustion emissions that may have substantial temporary impacts on local air quality. Fugitive dust emissions would result from land clearing, demolition, ground excavation, cut and fill operations, and equipment traffic over temporary roads. Combustion emissions, such as NO_x and ROG, are most significant when using diesel-fueled equipment, such as loaders, dozers, haul trucks, compressors, and generators. Table 4.3.10 lists construction thresholds.

Table 4.3.10 SLOCAPCD Thresholds of Significance for Construction Emissions Impacts

Pollutant	Daily	Quarterly Tier 1	Quarterly Tier 2
ROG + NO_x	137 pounds	2.5 tons	6.3 tons
Diesel Particulate Matter	7 pounds	0.13 tons	0.32 tons
Fugitive Dust Particulate Matter (PM_{10})	-	2.5 tons	-

Source: SLOCAPCD 2012

Exceeding Tier 1 emissions thresholds requires the implementation of a listing of standard mitigation measures and best available control technologies (BACT). Tier 2 requires the implementation of a construction activity management plan in addition to Tier 1 requirements. If emission levels cannot be decreased to less than the Tier thresholds, then offsite mitigation may be necessary.

4.3.3.3 Greenhouse Gases Thresholds

For land use development projects, the GHG threshold is:

- Compliance with a qualified GHG Reduction Strategy; OR
- Annual emissions less than 1,150 metric tons per year (MT/yr) of CO_2e; OR
- Annual emissions less than 4.9 MT CO_2e/service population (SP)/yr (residents + employees).

Land use development projects include residential, commercial and public land uses and facilities. This includes amortization of the construction emissions (50 years for residential projects and 25 years for commercial projects).

For stationary-source projects, the threshold is 10,000 metric tons per year (MT/yr) of CO_2e. Stationary-source projects include land uses that would accommodate processes and equipment that emit GHG emissions and would require an SLOCAPCD permit to operate. This threshold is applied to emissions within SLO County.

For construction, the GHG emissions from construction are amortized over the life of the project (50 years for residential projects and 25 years for commercial and industrial projects) and added to the operational GHG emissions.

4.3.3.4 Air Toxic Health Risk Thresholds

SLOCAPCD Rule 219, Toxics New Source Review, defines acceptable levels of health risk for regulated sources. Rule 219 identifies significance thresholds as follows:

> *The facility-wide risk from any source shall not exceed ten (10.0) in a million for cancer or a health hazard index (HI) of one (1.0) for either chronic non-cancer or acute health impacts, unless that facility is included in the Air Toxics Hot Spots program by the District, and the source simultaneously develops and implements an APCO-approved airborne toxic risk reduction audit and plan, as codified in Chapter 6, Facility Toxic Air Contaminant Risk Reduction Audit and Plan, of the California Health and Safety Code.*

These thresholds were utilized to evaluate facility-wide risk following the implementation of TBACT, which could include the use of cleaner diesel engines and implementing California verified diesel emission control strategies, such as the installation of catalysts. As per SLOCAPCD Rule 219, impacts are assessed at the "maximum exposed individual and the nearest receptor" with a receptor being a residence, school, health-care facility or off-site worksite. Acute impacts are based on the offsite location where any member of the public has reasonable access (defined in this EIR as the SMR boundary). As per SLOCAPCD and the CAPCOA Guidance (CAPCOA 2009), for CEQA, the thresholds apply to all facilities including vehicle emissions, and road related emissions.

4.3.3.5 Special Conditions

Special conditions are defined in the Handbooks for construction as the following:

- Sensitive receptors: The proximity of sensitive individuals (receptors) to a construction site constitutes a special condition, and the handbook indicates that construction sites within 1,000 feet of sensitive receptors may require a more aggressive implementation of mitigation measures;
- Diesel idling restrictions: limits on diesel idling within 1,000 feet of sensitive receptors;
- Naturally Occurring Asbestos (NOA): Requires the development of an Asbestos Dust Mitigation Plan for construction within areas that may contain NOA;
- Asbestos Material in Demolition: removal of materials that may contain asbestos shall have additional handling requirements;
- Development burning: prohibition on burning;
- Special permits for some equipment.

Some of these construction related special conditions are currently managed by federal, state or local rules and regulations, such as diesel idling, handling of asbestos materials, etc.

For operational phases of the project, special conditions include:

- The potential to emit toxic pollutants (see toxic threshold below);
- Emissions from agricultural operations;
- Fugitive dust emissions (incorporated into the thresholds below);
- Nuisance Impacts (odor): If a project has the potential to cause an odor or other nuisance problem which could impact a considerable number of people, then it may be considered significant.

4.3.4 Project Impacts and Mitigation Measures

The Rail Spur Project would generate air emissions due to the following activities:

- Construction equipment internal combustion engines;
- Construction equipment fugitive dust from earth moving and vehicle travel;
- Operational onsite internal combustion engines (e.g., locomotives);
- Operational fugitive emissions (e.g., valves, pumps, vapor recovery canisters);
- Operational offsite internal combustion engines (e.g., locomotives);
- Offsite electrical generation (from electrical loads and use of steam from existing boilers)
- Vehicle emissions from automobile and truck engines (both onsite and offsite); and
- Vehicle fugitive dust emissions due to travel on paved, dirt and gravel roads.

The Applicant has proposed a number of mitigation measures to address air quality impacts. As appropriate, these mitigation measures have been included in the project impact analysis.

The remainder of this section discusses the impact associated with the construction and operational emissions air emissions related to criteria, toxic and GHG emissions, as well as operational emissions related to potential odor impacts.

4.3.4.1 Construction Air Emissions

Air emissions of criteria pollutants (CO, ROG, NO_x, SO_2 and PM) during construction would result from construction equipment with internal combustion engines (e.g., backhoes, cranes), and offsite vehicles (e.g., construction employee commuter vehicles and trucks delivering equipment and materials). Earth moving activities would also generate fugitive dust emissions.

Toxic emissions associated with construction would be temporary in nature and would not be located close to sensitive receptors. Therefore, toxic emissions associated with construction would be less than significant.

GHG emissions associated with construction activities would be generated from onsite construction equipment internal engines and from offsite vehicle travel to and from the site. GHG emissions would total 970 metric tonnes of CO_2 equivalent ($MTCO_2e$). These emissions are amortized over 25 years and added to the operational GHG emissions tabulated below to determine significance. See the operations section below.

Impact #	Impact Description	Phase	Impact Classification
AQ.1	Construction activities associated with the Rail Spur project would generate criteria pollutant emissions that exceed SLOCAPCD thresholds.	Construction	Class II

Air emissions from construction equipment were estimated using the emission factors and equations from the CalEEMod 2013.2 software models for both onsite and offsite emissions, and the assumptions on the duration and personnel detailed in Section 2.0, Project Description. Appendix B includes details on the construction equipment and periods of operation for each equipment piece.

During construction, a large portion of PM_{10} emissions typically arises from large pieces of equipment and vehicles traveling on disturbed soil, unpaved surfaces, and various earth-moving activities, such as grading and clearing. These emissions are known as “fugitive dust”, and depend heavily on the size of the graded area, volume of soil moved, the number of vehicles and construction machinery required, and the duration of construction. The fugitive PM_{10} emissions are estimated based on a disturbed area as provided by the Applicant. Emission factors were used from CalEEMod program for soil moving and road dust.

Table 4.3.11 summarizes construction air emissions. CalEEMod inputs are summarized below:

- Wind Speed and Precipitation data used the SLO County defaults;
- Climate Zone data used the SLO County defaults;
- The utility was selected as Pacific Gas and Electric Company;
- Construction equipment listings and horsepower are based on equipment listings provided by the Applicant and verified by the EIR preparer;
- Equipment load factors were updated with Carl Moyer 2011 values;
- Mobile sources used the defaults; and
- Mitigations for construction included watering exposed areas 3 times per day for 61% fugitive dust control, reduced vehicle speeds to 15 mph and the use of Tier 3 engines with DPM on construction equipment above 100 hp.

Table 4.3.11 Construction Emissions

Pollutant	SLOCAPCD Thresholds			Project Daily, pounds	Project Quarterly, tons
	Daily	Quarterly Tier 1	Quarterly Tier 2		
ROG + NO_x	137 pounds	2.5 tons	6.3 tons	240.6	5.51
Diesel Particulate Matter	7 pounds	0.13 tons	0.32 tons	8.5	0.23
Fugitive Dust Particulate Matter (PM_{10})	-	2.5 tons	-	-	0.47

Notes: Source is CalEEMod. See Appendix B for CalEEMod output files.

The construction project was divided into the following phases in CalEEMod:

- Demolition of tracks with removal of 1,000 yds^3 of materials;
- Onsite soil and roadway distribution;
- Grading of the site;
- Site preparation and construction of the rail lines, including delivery of rail, rail base gravel;
- Site preparation and construction of the pipeline;
- Construction of the unloading area and buildings including delivery of steel, and processing equipment; and,
- Commissioning.

For all of these construction phases there are associated offsite vehicle trips for workers and the delivery and removal of equipment and supplies. The emissions from construction activities would exceed the SLOCAPCD thresholds for the daily emissions of NO_x and ROG, the quarterly emissions of NO_x and ROG Tier 1, the daily emissions of diesel particulate matter, and the quarterly emissions of diesel particulate matter Tier 1. Therefore, impacts would be potentially significant. There would be no exceedances of the construction thresholds for fugitive dust emissions.

The project site is located in an area that is designated as requiring a Naturally-occurring asbestos analysis. As NOA could be present in the soils, and could cause impacts as it would be associated with the generation of fugitive dust from activities, an Asbestos NOA Air Toxics Control Measure (ATCM), a Work Plan, Asbestos Dust Control Plan and a Health and Safety Plan would be required.

Valley fever is also a potential threat to workers and offsite areas if construction dust is not controlled.

Although it is not anticipated, demolition of railroad items, building or piping could encounter asbestos containing materials (ACM) and would require special handling. During grading or demolition, hydrocarbon contaminated soils could be encountered and special handling of these soils would be required.

Mitigation measures to reduce emissions are associated with addressing fugitive dust through measures such as site watering, vehicle speed limits, maintaining minimum soil moisture, etc. Measures to reduce diesel particulate matter are associated with the installation of diesel particulate catalysts or the use of Tier 3 engines.

Mitigation Measures

AQ-1a *Prior to issuance of grading and construction permits, and throughout project construction, as applicable, the Applicant shall implement the following construction emission reduction measures:*

a. Properly maintain all construction equipment according to manufacturer's specifications;

b. Fuel all off-road and portable diesel powered equipment with CARB-certified motor vehicle diesel fuel (non-taxed version suitable for use off-road);

c. Applicant shall include the following, in addition to complying with state Off-Road Regulations, in order to reduce peak daily/quarter ROG+NOx emissions: 1) Use CARB Tier 4 certified diesel construction equipment off-road heavy-duty diesel engines and 2) Stagger the construction schedule to prevent peak day/quarter emissions from exceeding the threshold (for example, no site preparation during grading and soil transport);

d. Use CARB 2010 or cleaner certified on-road heavy-duty diesel trucks to the extent feasible and comply with state On-Road Regulations;

e. If construction or trucking companies that are awarded the bid or are subcontractors for the project do not have equipment to meet the above two measures, the impacts from the dirtier equipment shall be addressed through SLOCAPCD approved off-site or other mitigation measures;

f. All on- and off-road diesel equipment shall not idle for more than 5 minutes. Signs shall be posted in the designated queuing areas and job sites to remind drivers and operators of the 5 minute idling limit;

g. Diesel idling within 1,000 feet of sensitive receptors is not permitted (Sensitive receptors are defined in the SLOCAPCD Handbook as people that have an increased sensitivity to air pollution or environmental contaminants. Sensitive receptor locations include schools, parks and playgrounds, day care centers, nursing homes, hospitals, and residential dwelling units);

h. Staging and queuing areas shall not be located within 1,000 feet of sensitive receptors;

i. Equipment shall be electrified when feasible;

j. Substitute gasoline-powered or diesel hybrids in place of diesel-powered equipment, where feasible; and

k. Use alternatively fueled construction equipment on-site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel.

AQ-1b *Prior to issuance of grading and construction permit, the Applicant shall ensure SLOCAPCD regulations that prohibit developmental burning of vegetative material within San Luis Obispo County are followed for the life of the project.*

AQ-1c *Prior to issuance of grading and construction permit, the Applicant shall ensure that portable equipment and engines 50 horsepower or greater, used during grading and construction activities must have a California portable equipment registration (issued by the ARB) or a SLOCAPCD permit. Proof of registration must be provided to the SLOCAPCD prior to the start of grading or construction or a permit secured from the SLOCAPCD prior to the start of grading or construction. The following list is as a guide to equipment and operations that may have permitting requirements, but it is not exclusive:*

a. Power screens, conveyors, diesel engines, and/or crushers;

b. Portable generators and equipment with 50-horsepower or greater engines;

c. Internal combustion engines;

d. Unconfined abrasive blasting operations;

e. Concrete batch plants;

f. Rock and pavement crushing;

g. Tub grinders; and

h. Trommel screens.

AQ-1d *Prior to issuance of grading and construction permit, the Applicant shall ensure that all grading and construction equipment greater than 100 bhp be equipped with CARB Level 3 diesel particulate filters (DPF), or equivalent, to achieve an 85 percent reduction in diesel particulate emissions from an uncontrolled engine. If CARB verified Level 3 DPFs cannot be secured for all of the equipment greater than 100 hp then the applicant will offset the added DPM with measures including but not limited to schedule modifications, implementation of no idling requirement, or other applicable measures providing a total reduction equivalent to an 85 percent reduction from uncontrolled engines as approved by the SLOCAPCD.*

AQ-1e *Prior to issuance of grading and construction permits, or during construction, if emissions of ROG+NO_x with the above mitigations still exceed the thresholds, the Applicant shall secure SLOCAPCD-approved onsite or off-site reductions in ROG + NO_x emissions to ensure that ROG + NO_x emissions do not exceed the SLOCAPCD quarterly thresholds. Coordination with the SLOCAPCD should begin at least six (6) months prior to issuance of grading and/or construction permits for the Project to allow time for refining calculations and for the SLOCAPCD to review and approve the Construction Activity Management Plan (CAMP) and on-site or off-site mitigation approach.*

AQ-1f *Prior to issuance of applicable grading permit, the Applicant shall prepare a Dust Control Plan to be approved by the APCD and County Health and include*

requirements in the SLOCAPCD CEQA Handbook identified as fugitive dust mitigation measures and shall include a combination of the following, as approved by the SLOCAPCD and County Health:

a. *Reduce the amount of the disturbed area where possible.*

b. *Use of water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site. An adequate water supply source must be identified. Increased watering frequency would be required whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water should be used whenever possible.*

c. *All dirt stockpile areas should be sprayed daily as needed, covered, or a SLOCAPCD-approved alternative method will be used. (90 percent reduction from no dust control).*

d. *Permanent dust control measures identified in the approved Project revegetation and landscape plans should be implemented as soon as possible following completion of any soil disturbing activities and shall use native species that have been shown to reduce particulate emissions to the extent feasible.*

e. *Exposed ground areas that will be reworked at dates greater than one month after initial grading should be sown with a fast-germinating non-invasive grass seed and watered until vegetation is established.*

f. *All disturbed soil areas not subject to revegetation should be stabilized using approved chemical soil binders, jute netting, or other methods approved in advance by the SLOCAPCD.*

g. *All roadways, driveways, etc. to be paved should be completed as soon as possible. In addition, equipment pads should be laid as soon as possible after grading unless seeding or soil binders are used.*

h. *Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface at the construction site.*

i. *All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least 2 feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with CVC Section 23114.*

j. *Install wheel washers where vehicles enter and exit unpaved roads onto streets, or wash off trucks and equipment leaving the site.*

k. *Sweep streets at the end of each day if visible soil material is carried onto adjacent paved roads. Water sweepers with reclaimed water should be used where feasible*

l. *Apply water every 3 hours to disturbed areas within the construction site in order to achieve a 61 percent reduction in particulate emissions. In addition, when drought conditions are present, fugitive dust control measures need to be modified by*

utilizing soil binders or other equivalent measures, to conserve water resources while still providing the necessary emission reductions.

m. *In support of APCD standard fugitive dust mitigation measures, the applicant shall designate a Visible Emission Evaluation certified person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize nuisance violations from dust complaints (Rule 402) and to reduce visible emissions below the APCD's Rule 401 requirement that opacity not exceed 20% for greater than 3 minutes in any 60 minute period. Their duties shall include holidays and weekend periods when work may not be in progress. The name and telephone number of the designated monitor shall be provided to the SLOCAPCD Compliance Division and the Department of Planning and Building prior to the start of any grading, earthwork, or demolition.*

n. *All PM_{10} mitigation measures required shall be shown on grading and building plans.*

o. *Between June 1 and November 30, when Valley Fever rates of infection are the highest, additional dust suppression measures (such as additional water or the application of additional soil stabilizer) will be implemented prior to and immediately following ground disturbing activities if wind speeds exceed 15 miles per hour (mph) or temperatures exceed 95 degrees Fahrenheit for three consecutive days. The additional dust suppression will continue until winds are 10 mph or lower and outdoor air temperatures are below 90 degrees for at least two consecutive days. The additional dust suppression measures will be incorporated into the Final Dust Control Plan. The Plan will be submitted to the County for review and approval.*

p. *The primary project construction contractor will prepare and implement a worker training program that describes potential health hazards associated with Valley Fever, common symptoms, proper safety procedures to minimize health hazards, and notification procedures if suspected work-related symptoms are identified during construction. The worker training program will identify safety measures to be implemented by construction contractors during construction. Safety measures will include: 1) Providing HEPA-filtered air-conditioned enclosed cabs on heavy equipment. 2) Train workers on proper use of cabs, such as turning on air conditioning prior to using the equipment. 3) Providing communication methods, such as two-way radios, for use by workers in enclosed cabs. 4) Providing personal protective equipment (PPE), such as half-mask and/or full-mask respirators equipped with particulate filtration, to workers active in dusty work areas. 5) Providing separate, clean eating areas with hand-washing facilities for construction workers. 6) Cleaning equipment, vehicles, and other items before they are moved offsite to other work locations. 7) Providing training for construction workers so they can recognize the symptoms of Valley Fever and promptly report suspected symptoms of work-related Valley Fever to a supervisor. 8) Directing workers that exhibit Valley Fever symptoms to immediately seek a medical evaluation.*

q. Construction activities that will generate dust shall be limited to periods when good air quality is forecasted to the maximum extent feasible. The 6 day forecast for the CDF forecast zone shall be utilized as available from the APCD website, slocleanair.org. This information should be used by all on-site workers to plan construction activities for days when the air quality is forecast to be good.

AQ-1g Prior to issuance of applicable grading permit, the Applicant shall submit a geologic evaluation under the CARB ATCM for Construction, Grading, Quarrying, and Surface Mining Operations, to determine if Naturally Occurring Asbestos (NOA) is present within the area that will be disturbed. NOA has been identified as a toxic air contaminant by the CARB. If NOA is not present, an exemption request must be filed with the SLOCAPCD. If NOA is found at the site, the Applicant must 1) comply with all requirements outlined in the Asbestos ATCM. This may include development of an Asbestos Dust Mitigation Plan and an Asbestos Health and Safety Program for approval by the SLOCAPCD; and 2) conduct a geological evaluation prior to any grading. Technical Appendix 4.4 of the SLOCAPCD CEQA Handbook includes a map of zones throughout the County where NOA has been found. More information on NOA is available at http://www.slocleanair.org/business/asbestos.php.

AQ-1h Prior to issuance of demolition permits, if required, the Applicant shall comply with asbestos containing material (ACM) requirements. Demolition activities can have potential negative air quality impacts, including issues surrounding proper handling, demolition, and disposal of ACM. ACM could be encountered during demolition or remodeling of existing buildings. Asbestos can also be found in utility pipes and pipelines (transite pipes or insulation on pipes). If utility pipelines are scheduled for removal or relocation or a building(s) is proposed to be removed or renovated, various regulatory requirements may apply, including the requirements stipulated in the National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M - asbestos NESHAP). These requirements include but are not limited to: (1) notification to the SLOCAPCD; (2) an asbestos survey conducted by a Certified Asbestos Inspector; and (3) applicable removal and disposal requirements of identified ACM. More information on asbestos is available at http://www.slocleanair.org/business/asbestos.php.

AQ-1i Should hydrocarbon contaminated soil be encountered during construction activities, the SLOCAPCD must be notified as soon as possible and no later than 48 hours after affected material is discovered to determine if an SLOCAPCD Permit will be required. In addition, the following measures shall be implemented immediately after contaminated soil is discovered: 1) Covers on storage piles shall be maintained in place at all times in areas not actively involved in soil addition or removal; 2) Contaminated soil shall be covered with at least six inches of packed uncontaminated soil or other TPH –non-permeable barrier such as plastic tarp. No headspace shall be allowed where vapors could accumulate; 3) Covered piles shall be designed in such a way to eliminate erosion due to wind or water. No openings in the covers are permitted; 4) During soil excavation, odors shall not be evident to such a degree as to cause a public nuisance; and, 5) Clean soil must be segregated from contaminated

soil. The notification and permitting determination requirements shall be directed to the SLOCAPCD Enforcement Division

Residual Impacts

Implementation of fugitive dust measures would reduce fugitive dust emissions. Implementation of construction equipment controls for diesel particulate matter would reduce DPM to levels below the thresholds (see Table 4.3.12). Emissions of ROG+NO_x would remain above the daily and quarterly thresholds without offsite reductions or the staggering of the construction schedule. Staggering of the construction schedule to prevent rail spur construction from occurring at the same time as grading and soil transport would reduce the peak daily ROG+NOx to 77 lbs/day (below the thresholds). Extending the grading and soil transport activities to 5 months, instead of 4, would reduce the quarterly ROG+NOx emissions to 2 tons/quarter and below the thresholds. With the implementation of offsite reductions through mitigation measure AQ-1e or scheduling staggering (AQ-1a), impacts would be *less than significant with mitigation (Class II).*

Table 4.3.12 Construction Emissions- Mitigated

Pollutant	SLOCAPCD Thresholds			Project Daily, pounds	Project Quarterly, tons
	Daily	Quarterly Tier 1	Quarterly Tier 2		
ROG + NO_x	137 pounds	2.5 tons	6.3 tons	153.3	2.96
Diesel Particulate Matter	7 pounds	0.13 tons	0.32 tons	4.9	0.12
Fugitive Dust Particulate Matter (PM_{10})	-	2.5 tons	-	-	0.20

Notes: Source is CalEEMod. See Appendix B for CalEEMod output files. The emission levels do not include the emissions reductions due to construction schedule staggering. Staggering reduces ROG+NOx to 77 lbs/day and 2.0 tons/qrtr. See Appendix B for details.

The funds identified for ROG+NOx offsite mitigation conditions are used to fund eligible, quantifiable emission reduction projects through emission reduction programs approved by the SLOCAPCD Board. When offsite mitigation is needed, applicants secure SLOCAPCD-approved off-site mitigation projects or provide SLOCAPCD the approved funding necessary to fully mitigate the project's pollutants to a level of insignificance and those emission reductions are validated by the SLOCAPCD. If the applicant elects to have SLOCAPCD secure the off-site mitigation measures, the applicant shall provide an additional 15% to the SLOCAPCD to administer the emission reduction. The use of off-site mitigation is a useful tool for project proponents to secure necessary emission reductions and ensure the project's overall air quality impacts are fully mitigated. Offsite mitigation projects undertaken by the SLOCAPCD could occur anywhere within SLO County. It is also possible that Phillips 66 could use existing on site emissions credits that they have secured with the SLOCAPCD resulting from past changes in the operations at the SMR.

4.3.4.2 Operational Air Emissions

Air emissions of criteria pollutants (CO, ROG, NO_x, SO_2 and PM) during operations would result from the operation of locomotives (both onsite and offsite), fugitive emissions from components and from the vapor recovery carbon canisters, and from vehicles associated with

employees and the transportation of materials. These activities would generate emissions of criteria pollutants, toxic emissions, the potential for odors, and GHGs. Operational sources may require multiple SLOCAPCD permits.

Emissions are calculated using spreadsheets included in Appendix B. Emissions from locomotives are based on emission factors associated with the EPA Regulatory requirements, EPA estimated average emission factors (EPA 2009) and the UPRR mix of locomotive engines that could visit the site (CARB 2013). As there is a large range of emission levels that the current population of locomotives exhibit, for the peak day, the worst case locomotive emissions are used. For the annual average, an average emission level is used. CARB has data on the UPRR mix of locomotives in the year 2009. The UPRR locomotive mix in 2009 was 24% uncontrolled locomotives, 46% Tier 0, 14% Tier 1 and 16% Tier 2. Therefore, for the worst case day, it was assumed that all of the locomotives operated by UPRR would be "uncontrolled", or not regulated by the Federal locomotive requirements (as they have not been remanufactured yet and are older than the 1998 rule).

For the annual average, it was assumed that the locomotives that are operated for the unit trains would reflect the UPRR average mix using the average emission factors for that Tier locomotive as defined by the EPA (EPA 2009). This approach is very similar to the approach used by EMFAC2011 in estimating on-road emissions from autos and trucks. Calculations demonstrating the peak and average emission factors are shown in Appendix B.

Below are the assumptions associated with locomotive operations that were used in estimating the air emissions:

- Three line haul engines used on the mainline operating at an average load of 28%;
- Two extra line haul engines are used on the mainline between Santa Margarita and San Luis Obispo operating an average 18% load (mostly for dynamic braking coming downhill with a low load);
- Line haul engine size of 4,300 hp;
- Average line haul speed of 40 mph;
- Two locomotives used to conduct switching at the project site;
- Average load during switching of 20% based on EPA data (EPA 1998); and
- The fleet mix of locomotives used to calculate annual average emissions would be the same as the UPRR fleet mix submitted to CARB in 2009.
- The peak day assumes uncontrolled pre-Tier 0 engines.

Trains servicing the refinery could come from the south or the north along UPRR tracks. Emissions were calculated for multiple routes to the refinery. Line haul speeds and load factors for the locomotives are based on EPA (2009), and studies conducted for the Ports of Seattle and Long Beach (POS 2011, POLB 2011). Details are provided in the Air Quality Appendix (see Appendix B).

Fugitive emissions are calculated for the following components:

- Unit Train Cars;
- Train Cars Offloading Lines;
- Unit train car top valves opened during unloading;
- Offloading Collection Headers & Meters;
- Drain & Crude Drain;
- Carbon canisters (95% removal efficiency as per manufacturers information); and
- Pipeline components and delivery to the crude oil storage tanks at the SMR.

Fugitive component emission factors are based on CAPCOA (CAPCOA 1999) and EPA AP-42.

Emissions would also be associated with the carbon capture canisters, which are used to reduce ROG emissions from the unloading operation by capturing vapors originating in the loading lines and equipment during pumping and pump start-up operations. The Applicant provided estimates of vapor emissions based on loading lines volume and number of operations, assuming a crude oil vapor entrainment fraction during pumping and the volume of air entrained based on the volume of the loading lines.

Fugitive emissions from rail tank car top valve could occur if the pumping process is not continuous (thereby not producing continuous draw into the rail car tank) or the valve is left open when pumping stops. This emission source was treated as an open-ended line for a period of 5 minutes for each tank car as a worst case estimate. The EPA AP-42 emission factor for light crude oil was used as a conservative estimate for crude oils that are medium API (over API 20).

Fugitive dust would be generated during operations due to the use of vehicles on the dirt road accessing the eastern end of the rail spur. These emissions have been included in the operation emissions estimates.

Offsite vehicle emissions are calculated based on EMFAC2011 model with the following assumptions:

- Aggregate year 2013;
- Distances based on CalEEMod for SLO County (13 miles one way);
- Trucks are a T7 construction trucks with trailer (as a worst case); and,
- Average speeds of 55 mph.

The operational truck trips assumed for the air emissions includes 2 miscellaneous truck trips per week (with a peak of one per day), which would include the removal and delivery of the carbon canisters as well as delivery of diesel fuel and other miscellaneous deliveries.

The SMR is designed to handle heavy sour crude, to only partially refined crude oil to extract intermediates and gases, and uses the heavier crude oil components to produce petroleum coke.

The SMR refinery operates on an air permit from the SLOCAPCD (permit #44-52, dated November 6, 2013). This permit sets crude throughput limits for the refinery as well as emission and operational limits for the majority of the equipment at the refinery. For example, the permit sets operating emission limits on combustion devices and heat release limits on fired heaters and boilers at the refinery.

The SMR, as with all refineries, is similar to other manufacturing facilities that regularly evaluate their principal manufacturing feedstocks in terms of availability, suitability, and economics. This is certainly true of the crude oil feedstock used at the SMR. The refinery processes a range of crude oils from different sources, and the crudes have varied over time. In addition, the refinery often blends crudes from multiple sources prior to processing to assure the crude is within the processing design limits of the refinery and consistent with the limits specified in the SLOCAPCD permit.

For the SMR, key crude slate parameters that could impact air emissions include the percent of BTEX[1], vacuum resid, sulfur and metals in the crude oil. Table 4.3.13 provides the key properties of the typical crude blend and range of major crudes processed at the SMR as well as a range of typical crudes that could be delivered by rail.

Table 4.3.13 Properties of Current and Potential Future Crude Oils at the Santa Maria Refinery

Property	Unit of Measure	Current SMR Operations		Potential Crude by Rail Sources	
		Typical Crude Blend	Range of Major Crude Sources	Access Western Blend	Peace River Heavy
API Gravity	^{o}API	18.6	12.2-21.0	22.8	20.4
BTEX Percentage	Volume %	0.81	0.8-0.89	1.25	0.99
Vacuum Resid Percentage	Volume %	43	33-47	42	43
Sulfur Concentration	Weight %	4.2	2.1-5.2	4.0	5.0
Vanadium Concentration	wppm	208	41-400	190	167
Nickel Concentration	wppm	85	71-118	73	56
Total Acid Number (TAN)	mgKOH/g	1.0	0.4-4.0	1.7	2.5

1. Vacuum Resid percentages based upon available distillation curves.
2. Typical blend properties based upon 3-year average.
3. Range of major crudes represent the major sources of current crudes to the refinery and include a number of OCS and local onshore sources.
4. Both potential crudes by rail are Canadian.

Source: Data provided by Phillips 66, 2014.

An increase in the volatility of the crude oil could cause an increase in the fugitive emissions from crude oil tanks at the SMR. As the API gravity of the crude is expected to remain in the mid to heavy range, the fraction of volatile compounds is not expected to increase and fugitive emissions would be similar under a changed crude oil slate.

[1] BTEX-An acronym that stands for benzene, ethylbenzene, toluene, and xylenes. These compounds are some of the volatile organic compounds (VOCs) found in crude oil and other petroleum products.

BTEX are volatile organic compounds that are emitted as part of the fugitive emissions from the refinery and are an air toxic component that is addressed in the health risk assessment (see below). Higher levels of BTEX emissions can result in an increase in the health risk from the refinery. As the data in Table 4.3.13 shows, the BTEX levels could increase with the potential crude oil sources that would be delivered by rail.

The percentage of vacuum resid is a measure of the amount of coke that could be produced at the refinery. Coke generated at the refinery is transported from the refinery via truck and rail. Increasing levels of vacuum resid would result in increased trucking and rail transport from the refinery. As shown in Table 4.3.13 the expected percentage of vacuum resid would remain about the same as the current operations. Therefore, coke production would not be expected to increase over current operations with the implementation of the Rail Spur Project changes in crude.

A by-product of the refinery operations is elemental sulfur. The elemental sulfur that is produced by the refinery is trucked offsite. The potential crude delivered by rail could have slightly higher sulfur content then the typical crude blend that is currently being run by the refinery. However, the sulfur would be in the range of the major crude sources used at the refinery. This slight increase in sulfur content would not be expected to increase emissions from the sulfur plant, which has strict emission limits within the SLOCAPCD permit.

It is possible that with the rail project crude there would be an increase in sulfur truck trips. The truck trips for sulfur were 1,624 in 2013. The refinery is limited to a maximum of 14 truck trips per day for sulfur. They are currently averaging about 6 truck trips per day assuming five days per week for trucking sulfur. Assuming an increase of 0.8% sulfur in the crude by weight the number of additional truck trips for sulfur would be about 309 per year (about one additional truck trip per day). This potential increase in sulfur truck trips would be within the truck trips currently allowed for the refinery (14 truck trips per day).

Vapor pressure of crude oil processes at the SMR is reported to the APCD approximately annually. Rule 425 requires tanks that contain liquids above 11 psia vapor pressure to be fixed roof tanks. Historical vapor pressure ranges of the SMR crude have ranged from 1.8 to 5.3 psi between 2004 - 2014 (communication with Dean Carlson, SLOCAPCD 5/8/2015). According to Enbridge reports (Enbridge 2014), Access Western Blend crude oil, a potential crude oil that could be delivered to the SMR as part of the proposed Project, has a vapor pressure of 7 psi (True Vapor Pressure, TVP). This potential for increase in vapor pressure, if it occurs, could increase crude tank ROC emissions by about 4 pounds per day from all crude oil tanks, which would be a nominal increase in SMR fugitive emissions of about 4 percent.

Impact #	Impact Description	Phase	Impact Classification
AQ.2	Operational activities associated with the Rail Spur Project within SLOC (i.e., on the project site (SMR) and on the mainline within SLOC) would generate criteria pollutant emissions that exceed SLOCAPCD thresholds.	Operations	Class I

Criteria pollutant emissions from operational equipment at the SMR and along the mainline within SLOC are tabulated in Table 4.3.14. A summary of the criteria pollutant emissions at the refinery and along the mainline within SLOC and the corresponding SLOCAPCD thresholds is shown in Table 4.3.15. Emissions include fugitive dust from trucks operating on the rail spur road, fugitive emissions from rail operations, canister emissions from unloading, locomotive emissions, vehicle emissions and the estimated increase in sulfur trucks associated with the potential changes in crude oil.

Emissions of ROG+NO_x would be exceeded for both the daily and the annual emissions thresholds, which would be considered a significant impact. Diesel particulate emissions would exceed the daily threshold, which would be considered a significant impact. Both fugitive dust and CO emissions would be emitted at levels below the thresholds. The primary source of the emissions of ROG+NO_x and diesel particulate is the diesel powered train locomotives while operating on the refinery site and along the mainline within SLOC.

Mitigation measures to reduce emissions would have to be focused on locomotive emissions as these are the largest source of emissions associated with the project. There is a large population of locomotives throughout the country that might be used to haul the unit trains with varying degrees of emissions levels. It is possible that contractually, the Applicant could require the use of lower emission locomotives such as Tier 4 locomotives. Otherwise, SLOCAPCD approved emission reduction credits would be required.

Mitigation Measures

AQ-2a *Prior to issuance of Notice to Proceed, the Applicant shall provide a mitigation, monitoring and reporting plan updated annually. The plan shall investigate methods for reducing the onsite and offsite emissions, both from fugitive components and from locomotives or from other SMR activities (such as the diesel pumps, trucks, and compressors to reduce DPM). In addition, locomotive emissions shall be mitigated to the extent feasible through contracting arrangements that require the use of Tier 4 locomotives or equivalent emission levels. The plan shall indicate that, on an annual basis, if emissions of ROG+NO_x and DPM with the above mitigations still exceed the thresholds, as measured and confirmed by the SLOCAPCD, the Applicant shall secure SLOCAPCD-approved onsite and/or offsite emission reductions in ROG + NO_x emissions or contribute to new or existing programs to ensure that project-related ROG + NO_x emissions within SLO County do not exceed the SLOCAPCD thresholds. Coordination with the SLOCAPCD should begin at least six (6) months prior to issuance of the Notice to Proceed for the Project to allow time for refining calculations and for the SLOCAPCD to review and approve any required ROG+NO_x emission reductions.*

AQ-2b *Prior to issuance of Notice to Proceed, the Applicant shall implement a program, including training and procedures, to limit all locomotive onsite idling to no more than 15 consecutive minutes except when idling is required for safety purposes. Locomotive idling records shall be maintained and provided to the SLOCAPCD on an annual basis, along with training materials and training records.*

Table 4.3.14 Operational Emissions within SLOC, Peak Day and Annual

Source	Peak Day Emissions, lbs/day					
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Fugitive Dust	-	-	-	-	1.32	0.20
Fugitives	4.00	-	-	-	-	-
Canister	2.24	-	-	-	-	-
Locomotives Onsite	24.18	21.18	214.05	2.92	8.15	7.90
Locomotives Offsite within SLOC	28.00	34.13	346.64	1.60	16.00	15.52
Vehicles (autos and trucks and additional sulfur trucks)	0.12	1.65	2.11	0.00	0.07	0.07
Total Emissions at the SMR	*30.43*	*21.18*	*214.05*	*2.92*	*9.47*	*8.10*
Total Emissions within SLOC	***58.55***	***56.97***	***562.80***	***4.52***	***25.54***	***23.68***
Source	**Annual Emissions, tons/year**					
	ROG	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Fugitive Dust	-	-	-	-	0.17	0.03
Fugitives	0.73	-	-	-	-	-
Canister	0.28					
Locomotives Onsite	1.30	2.65	20.25	0.36	0.56	0.54
Locomotives Offsite within SLOC	1.30	4.27	28.26	0.20	0.87	0.84
Vehicles (autos and trucks and additional sulfur trucks)	0.01	0.19	0.15	0.00	0.01	0.00
Total Emissions at the SMR	*2.31*	*2.65*	*20.25*	*0.36*	*0.73*	*0.56*
Total Emissions within SLOC	***3.63***	***7.10***	***48.66***	***0.56***	***1.60***	***1.41***

Note: See Appendix B for detailed emission calculations. These emissions estimates do not include potential credits associated with SLOCAPCD approved emission reduction credits.

Table 4.3.15 Operational Emissions within SLOC and Thresholds

Pollutant	SLOCAPCD Thresholds		Project Daily, lbs	Project Annual, tons
	Daily	Annual		
ROG + NO_x	25 pounds	25 tons	621.4	52.3
Diesel Particulate Matter	1.25 pounds	-	24.2	-
Fugitive Dust (PM_{10})	25 pounds	25 tons	1.32	0.17
CO	550 pounds	-	57.0	-

Residual Impacts

The Environmental Protection Agency (EPA) has established emission standards for oxides of nitrogen (NO_x), hydrocarbons (HC), carbon monoxide (CO), diesel particulate matter (DPM) and smoke for newly manufactured and remanufactured locomotives. These standards, which are

codified at 40 CFR part 1033, include several sets of emission standards with applicability dependent on the date a locomotive is first manufactured. The first set of standards (Tier 0) applies to most locomotives originally manufactured or rebuilt before 1993, Tier 1 to 1993-2004, Tier 2 to those manufactured or rebuilt from 2004-2011, Tier 2+ or Tier 3 to those manufactured or rebuilt from 2012 to 2014 and the most stringent set of standards (Tier 4) applies to locomotives originally manufactured or rebuilt in 2015 and later.

Limits on idling would align the locomotive operations onsite with the CARB Railroad Agreement from 2005, which placed a limit on locomotive idling of 15 consecutive minutes within rail yards. Implementation of this mitigation measure would reduce the idling emissions by about 65% at the refinery. Table 4.3.16 provides an estimate of the criteria pollutant emissions at the refinery with the implementation of the mitigation measures (Tier 4 locomotive and limiting idling to no more than 15 consecutive minutes). A summary of the mitigated emissions at the refinery and the corresponding SLOCAPCD thresholds is shown in Table 4.3.17.

Use of Tier 4 engines for the locomotives and limiting idling time at the refinery to no more than 15 consecutive minutes reduces the annual ROG+NO_x and DPM emissions. Even with this mitigation ROG+NO_x and DPM emissions would remain significant for the peak day emissions.

Table 4.3.16 Mitigated Operational Emissions within SLOC, Peak Day and Annual

Source	Peak Day Emissions, lbs/day					
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Fugitive Dust	-	-	-	-	1.32	0.20
Fugitives	4.00	-	-	-	-	-
Canister	2.24	-	-	-	-	-
Locomotives Onsite	2.37	19.13	29.67	1.48	0.72	0.70
Locomotives Offsite within SLOC	3.73	40.00	34.66	1.60	0.80	0.78
Vehicles (autos and Trucks)	0.12	1.65	2.11	0.00	0.07	0.07
Total Emissions at the SMR	8.62	19.13	29.67	1.48	2.05	0.90
Total Emissions within SLOC	***12.47***	***60.78***	***66.45***	***3.08***	***2.92***	***1.74***
Source	**Annual Emissions, tons/year**					
	ROG	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Fugitive Dust	-	-	-	-	0.17	0.03
Fugitives	0.73	-	-	-	-	-
Canister	0.28					
Locomotives Onsite	0.22	2.39	3.34	0.18	0.07	0.07
Locomotives Offsite within SLOC	0.13	4.27	3.33	0.20	0.05	0.05
Vehicles (autos and Trucks)	0.01	0.19	0.15	0.00	0.01	0.00
Total Emissions at the SMR	1.23	2.39	3.34	0.18	0.24	0.10
Total Emissions within SLOC	***1.38***	***6.85***	***6.83***	***0.38***	***0.30***	***0.15***

Note: See Appendix B for detailed emission calculations.

Table 4.3.17 Mitigated Operational Emissions within SLOC and Thresholds

Pollutant	SLOCAPCD Thresholds		Project Daily, lbs	Project Annual, tons
	Daily	Annual		
ROG + NO_x	25 pounds	25 tons	78.9	8.2
Diesel Particulate Matter	1.25 pounds	-	1.60	-
Fugitive Dust (PM_{10})	25 pounds	25 tons	1.32	0.17
CO	550 pounds	-	60.8	-

Even with these emission reductions the Applicant would still need to provide emission reduction credits for ROG+NO_x. With the implementation of the mitigation measures including the application of ROG+NO_x emission reduction credits, impacts for criteria ROG+NO_x pollutants would be reduced to less than significant. Impacts from DPM would remain above the thresholds.

As the area is currently impacted by fugitive dust emissions from the dunes areas, causing exceedances of the PM standard at area stations (such as the CDF station, see Table 4.3.2), additional emissions of particulate matter from the project site might cause additional days of exceedance. However, as per the SLOCAPCD Annual Report in 2013, the days which cause impacts from the dunes are associated with strong winds out of the northwest, with the strong winds generating high levels of dune dust and causing PM impacts. These periods would produce substantial dispersion of the diesel PM emissions from the project site and would not correlate with the same meteorological conditions that would be associated with maximum impacts from the rail spur operations. Therefore, rail spur operations are not anticipated to contribute to additional exceedances of the PM standard.

UPRR maintains a large number of locomotives (more than 8,000 nationwide) with a wide range of emissions characteristics and Tier levels. The UPRR 2009 fleet-average emission factors were used in this analysis for the annual emissions in order to accurately assess the potential impacts when the proposed project would be operating. Since UPRR would own and operate the locomotives and they are used for interstate commerce, the requirement to use only Tier 4 locomotives may be preempted by Federal law, and therefore may not be a feasible mitigation measure. In addition, the availability of these cleaner locomotives and the ability of the applicant to ensure their use is uncertain since the locomotives are owned and operated by UPRR.

If the use of only Tier 4 locomotives cannot be implemented, then the Applicant would have to provide a larger amount of emission reduction credits for ROG+NO_x. Offsite mitigation project undertaken by the SLOCAPCD could occur anywhere within SLO County. It is also possible that Phillips 66 could use existing on site emissions credits that they have secured with the SLOCAPCD resulting from past changes in the operations at the SMR. Information from the SLOCAPCD (SLOCAPCD 2014) indicate that about 190 tons annually (greater than 1,000 pounds per day) of ROG+NOx of reduction credits are available in SLOC, with the credits associated with the SMR calciner shutdown in 2007 (66 tons) limited in use to the SMR only.

In March 2008, EPA finalized a three part program that will dramatically reduce emissions from diesel locomotives of all types -- line-haul, switch, and passenger rail. The rule will cut PM

emissions from these engines by as much as 90 percent and NOx emissions by as much as 80 percent when fully implemented. The standards are based on the application of high-efficiency catalytic after treatment technology for freshly manufactured engines built in 2015 and later.

EPA standards also apply for existing locomotives when they are remanufactured. Requirements are also in place to reduce idling for new and remanufactured locomotives. EPA has estimated that by 2041 the average nationwide emission factors for mainline locomotives would meet the Tier 4 standards (EPA 2009). This means that even if the County is preempted by Federal law from implementing the Tier 4 mitigation measure as part of the project for the locomotive emissions along the mainline, that over time the locomotive emissions will still achieve this level due to the EPA emission control requirements for locomotives.

The use of all Tier 1 locomotives would provide about a 15 percent reduction in ROG+NO_x switching emissions and no reduction in DPM over the project estimated locomotive emissions at the refinery. Use of all Tier 4 locomotives would provide about a 92 percent and 96 percent reduction in switching ROG+NO_x and DPM emissions, respectively.

The use of the rail spur to import crude oil could potentially displace crude oil from other sources that are currently being used to supply crude oil to the SMR. The majority of crude oil currently being delivered to the SMR is from offshore, Outer Continental Shelf (OCS) sources, which are delivered to the SMR by pipeline and electrically powered pumps. Some of the crude oil is delivered to the SMR via truck through the SMPS. The emissions associated with these trucks (see Table 4.3.7) are estimated to total about 51 lbs/day and 9.2 tons/year of ROG+NO_x and 1.8 lbs/day DPM within SLO County. Even if these sources of crude oil were completely displaced, and their resulting emissions eliminated, the emissions from the rail spur and associated importation of crude oil by rail would exceed the SLOCAPCD thresholds for operational ROG+NO_x emissions. DPM emissions, with this credit, would be reduced to below the thresholds with mitigation. However, these DPM emissions may still continue to be emitted within SLOC as the crude oil from these other sources may be transported to other refining locations.

Since the operation of the crude oil trains at the SMR would be on Phillips 66 property and the trains would be operated by Phillips 66, the emissions at the SMR would not be preempted, and the County can require that ROG+NO_x emissions within the SMR associated with the trains be mitigated using other onsite/offsite emission reduction credits. DPM emissions would remain significant since the SLOCAPCD does not have an emissions reduction program for DPM, and there is insufficient DPM reductions that could occur at the existing SMR operations to offset the Rail Spur DPM emissions. The daily average DPM emission reduction that could occur for the existing SMR operations would be about 0.2 pounds per day. This assumes that the 13 existing diesel engines at the SMR would be converted to natural gas.

For the mainline rail emissions in SLOC it is possible that contractually the Applicant could require the use of lower emission locomotives such as Tier 4 locomotives. However, since these are operated by UPRR on UPRR track a requirement that the Applicant enter into this type of contractual provision may be preempted by Federal law. The County may also be preempted by Federal law from requiring emission reduction credits for main line rail emissions. Due to the possible preemption by Federal law which could prevent the mitigation measures from being

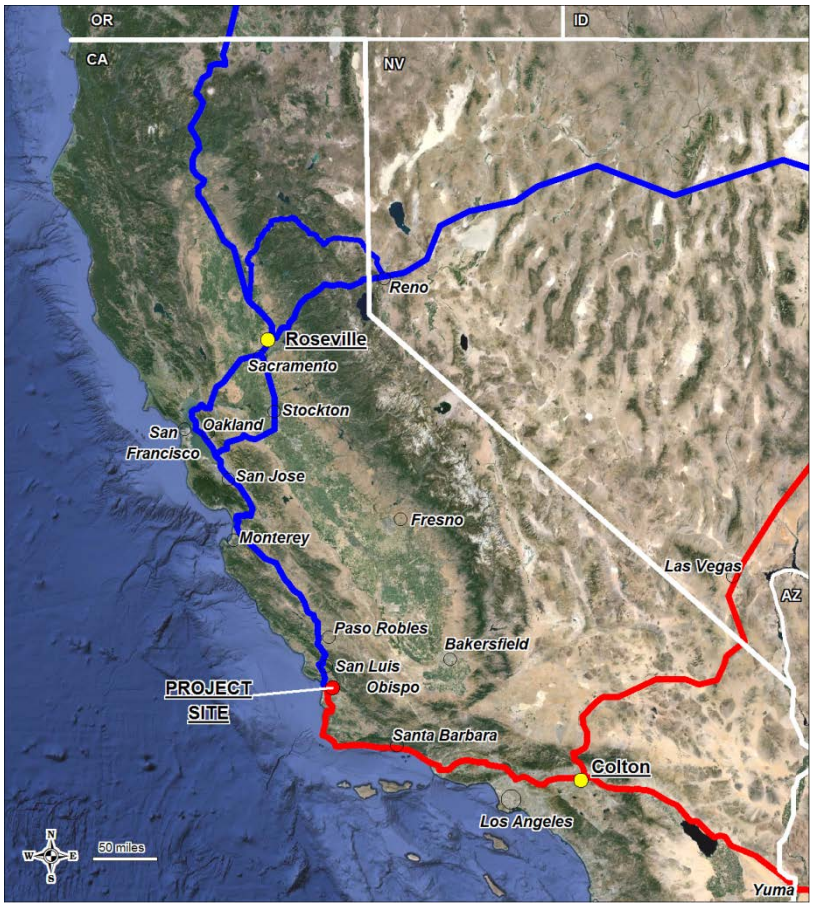
implemented (outside of the SMR facility boundary), emission reduction credits and reductions in DPM through the use of Tier 4 locomotives might not be achievable and impacts from criteria pollutant emissions within SLOC would remain *significant and unavoidable (Class I).*

Impact #	Impact Description	Phase	Impact Classification
AQ.3	Operational activities of trains along the mainline rail route outside of SLOC associated with the Rail Spur Project would generate criteria pollutant emissions that exceed thresholds.	Operations	Class I

Trains traveling to the Refinery could come from the north or the south using the UPRR coastal track. Figure 4.3-5 shows the rail routes that a train traveling to and from the Refinery would be most likely to follow. The reasons for selecting these routes are provided in Chapter 2.0, Project Description.

From the UPRR Roseville Yard, the train could follow a number of different routes through the Bay Area as discussed in the project description and shown in Figure 4.3-5.

Figure 4.3-5 Rail Routes to the Refinery



From the UPRR Colton Yard, the train is likely to follow the route shown in Figure 4.3-5. The exact route the train would take from points beyond the Roseville and Colton Yard is speculative since there are a number of routes that could be taken to get to these yards from the California border.

Mainline rail emissions are calculated for each Air District along the rail route from SMR to the UPRR Yards in the south (i.e., Colton, California, near Los Angeles) or in the north (i.e., Roseville, California, northeast of Sacramento).

Beyond the two UPRR Yards, trains could travel any number of routes (refer to Figure 2-8). Also, crude oil delivered to California by UPRR would generally pass through either of these two rail yards in route to the SMR. While the exact route the trains would take to get to these two rail yards is speculative, additional emission estimates are provided for points beyond these yards to the California border at the end of this impact discussion.

Criteria pollutant emissions from the mainline operations are tabulated in Table 4.3.18 by Air District (see Table 4.3.22 for a comparison with each of air district thresholds). As shown in Tables 4.3.18. Emissions of ROG and NOx would be emitted at levels above the daily CEQA thresholds established by most of the air districts along the route. The source of these emissions would be the diesel powered locomotives. This would be considered a significant impact.

Air Emissions beyond Roseville and Colton Yards

As discussed in the Project Description (Chapter 2.0), there are multiple routes that a crude oil unit trains could take to get from the California border to the Roseville or Colton rail yards. The route that would be taken would depend upon a number of factors including the source location of the crude.

Table 4.3.19 provides an estimate of the additional air emissions that would be associated with a crude oil unit train traveling along some of these routes between the California border and the Roseville or Colton rail yards. These emissions would add to an impact that was already found to be significant as discussed above.

Depending upon the source of the crude oil, crude oil trains could use any portion of the UPRR network outside of California. (See Figure 2-8 for a map of the UPRR rail routes in the United States.) Here again, the exact route that would be taken would depend upon a number of factors, that could include source of the crude oil, weather conditions, train traffic conditions, etc. Travel along rail routes outside of California would generate additional air emissions. Table 4.3.19 provides the estimated air emissions outside of California for a hypothetical route between the Northern California border and the Canadian border.

Table 4.3.18 Mainline Rail Emissions, Peak Day and Annual

Route/Air District	Peak Day Emissions, lbs/day					
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Northern Route Via Oakland						
Placer	0.38	0.46	4.65	0.02	0.21	0.21
Sacramento Metro	6.44	7.85	79.69	0.37	3.68	3.57
Yolo Solano	13.41	16.35	166.05	0.77	7.66	7.43
Bay Area	57.82	70.49	715.87	3.30	33.04	32.05
Monterrey Bay	47.37	57.74	586.43	2.71	27.07	26.25
Total	***125.4***	***152.9***	***1,552.7***	***7.2***	***71.7***	***69.5***
Northern Route Via Stockton						
Placer	0.38	0.46	4.65	0.02	0.21	0.21
Sacramento Metro	15.83	19.29	195.94	0.90	9.04	8.77
San Joaquin Valley	20.95	25.54	259.34	1.20	11.97	11.61
Bay Area	37.50	45.72	464.34	2.14	21.43	20.79
Monterrey Bay	47.37	57.74	586.43	2.71	27.07	26.25
Total	***122.0***	***148.7***	***1,510.7***	***7.0***	***69.7***	***67.6***
Southern Route						
Santa Barbara	45.19	55.09	559.54	2.58	25.83	25.05
Ventura	24.13	29.42	298.80	1.38	13.79	13.38
South Coast	36.79	44.85	455.55	2.10	21.03	20.39
Total	***106.1***	***129.4***	***1,313.9***	***6.1***	***60.6***	***58.8***
Route/Air District	**Annual Emissions, tons/year**					
	ROG	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Northern Route Via Oakland						
Placer	0.02	0.06	0.38	0.00	0.01	0.01
Sacramento Metro	0.30	0.98	6.50	0.05	0.20	0.19
Yolo Solano	0.62	2.04	13.54	0.10	0.42	0.40
Bay Area	2.68	8.81	58.37	0.41	1.79	1.74
Monterrey Bay	2.20	7.22	47.82	0.34	1.47	1.42
Total	***5.8***	***19.1***	***126.6***	***0.9***	***3.9***	***3.8***
Northern Route Via Stockton						
Placer	0.02	0.06	0.38	0.00	0.01	0.01
Sacramento Metro	0.73	2.41	15.98	0.11	0.49	0.48
San Joaquin Valley	0.97	3.19	21.15	0.15	0.65	0.63
Bay Area	1.74	5.71	37.86	0.27	1.16	1.13
Monterrey Bay	2.20	7.22	47.82	0.34	1.47	1.42
Total	***5.7***	***18.6***	***123.2***	***0.9***	***3.8***	***3.7***
Southern Route						
Santa Barbara	2.10	6.89	45.62	0.32	1.40	1.36
Ventura	1.12	3.68	24.36	0.17	0.75	0.72
South Coast	1.71	5.61	37.14	0.26	1.14	1.10
Total	***4.9***	***16.2***	***107.1***	***0.8***	***3.3***	***3.2***

Note: See Appendix B for detailed emission calculations.
Annual emissions within each route assume all 250 trains per year use that route.

Table 4.3.19 Mainline Rail Emissions Pass the Roseville and Colton Rail Yards, Peak Day and Annual

Route/Air District	Peak Day Emissions, lbs/day					
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Roseville to Nevada						
Placer	36.9	45.0	456.6	2.1	21.1	20.4
Nevada	12.3	15.0	152.6	0.7	7.0	6.8
Total	***49.2***	***60.0***	***609.2***	***2.8***	***28.1***	***27.3***
Roseville to Oregon						
Placer	9.3	11.4	115.4	0.5	5.3	5.2
Feather River	11.0	13.4	136.2	0.6	6.3	6.1
Butte	19.1	23.3	236.2	1.1	10.9	10.6
Tehama	16.9	20.7	209.8	1.0	9.7	9.4
Shasta	30.0	36.6	371.9	1.7	17.2	16.7
Siskiyou	37.3	45.5	462.1	2.1	21.3	20.7
Total	***123.7***	***150.8***	***1,531.7***	***7.1***	***70.7***	***68.6***
Colton to Nevada						
South Coast	8.9	10.8	109.8	0.5	5.1	4.9
Mojave	83.9	102.2	1,038.4	4.8	47.9	46.5
Total	***92.7***	***113.1***	***1,148.3***	***5.3***	***53.0***	***51.4***
California Border to Canadian Border	***200.5***	***244.4***	***2,482.3***	***11.5***	***114.6***	***111.1***
Route/Air District	**Annual Emissions, tons/year**					
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Roseville to Nevada						
Placer	1.7	5.6	37.2	0.3	1.1	1.1
Nevada	0.6	1.9	12.4	0.1	0.4	0.4
Total	***2.3***	***7.5***	***49.7***	***0.4***	***1.5***	***1.5***
Roseville to Oregon						
Placer	0.4	1.4	9.4	0.1	0.3	0.3
Feather River	0.5	1.7	11.1	0.1	0.3	0.3
Butte	0.9	2.9	19.3	0.1	0.6	0.6
Tehama	0.8	2.6	17.1	0.1	0.5	0.5
Shasta	1.4	4.6	30.3	0.2	0.9	0.9
Siskiyou	1.7	5.7	37.7	0.3	1.2	1.1
Total	***5.7***	***18.9***	***124.9***	***0.9***	***3.8***	***3.7***
Colton to Nevada						
South Coast	0.4	1.4	9.0	0.1	0.3	0.3
Mojave	3.9	12.8	84.7	0.6	2.6	2.5
Total	***4.3***	***14.1***	***93.6***	***0.7***	***2.9***	***2.8***
California Border to Canadian Border	***40.7***	***133.6***	***885.5***	***6.3***	***27.1***	***26.3***

Note: See Appendix B for detailed emission calculations.
Annual emissions within each route assume all 250 trains per year use that route.
California border to Canadian Border assumes a hypothetical route via the Midwest.

Mitigation Measures

AQ-3 *Prior to issuance of the Notice to Proceed, the Applicant shall provide a mitigation, monitoring and reporting plan. The plan shall investigate methods for reducing the locomotive emissions through contracting arrangements that require the use of Tier 4 locomotives or equivalent emission levels. The plan shall indicate that, on an annual basis, if the mainline rail emissions of ROG+NO_x with the above mitigations still exceed the applicable Air District thresholds, the Applicant shall secure emission reductions in ROG + NO_x emissions or contribute to new or existing programs within each applicable Air District, similar to the emission reduction program utilized by the SLOCAPCD, to ensure that the main line rail ROG + NO_x emissions do not exceed the Air District thresholds for the life of the project. The Applicant shall provide documentation from each Air District to the San Luis Obispo County Planning and Building Department that emissions reductions have been secured for the life of the project prior to issuance of the Notice to Proceed.*

Residual Impacts

Implementation of the use of Tier 4 engines in mitigation measures AQ-3 would serve to reduce emissions on the mainline track. Tables 4.3.20 and 4.3.21 provide an estimate of the mainline emissions with the implementation of mitigation measures requiring the use of Tier 4 locomotives.

With the implementation of the use of Tier 4 engines annual mainline rail ROG and NOx emissions would be reduced. Even with these reductions the criteria emissions associated with the mainline rail operations would remain significant in some air districts and would be reduced to below the respective thresholds in other air districts (see Table 4.3.22). The remaining ROG and NOx emissions could be mitigated by obtaining emission credits within each of the Air Districts where their respective thresholds would still be exceeded.

However, it is unknown if these other Air Districts could require emission credits since train travel through their jurisdiction does not require any permitting action. Also it is unknown, if all of the potentially affected Air Districts have available emission reduction credits that can be purchased.

UPRR maintains a large number of locomotives (more than 8,000 nationwide) with a wide range of emissions characteristics and Tier levels. Since UPRR would own the locomotives, which are used for interstate commerce, the requirement to use only Tier 4 locomotives and obtain emission credits is likely preempted by Federal law, and therefore may not be feasible mitigation measures.

The availability of these cleaner (Tier 4) locomotives and the ability of the Applicant to ensure their use are somewhat speculative since Union Pacific controls the locomotives and they would be traveling interstate.

Table 4.3.20 Mitigated Mainline Rail Emissions, Peak Day

Route/Air District	Peak Day Emissions, lbs/day					
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Northern Route Via Oakland						
Placer	0.05	0.54	0.47	0.02	0.01	0.01
Sacramento Metro	0.86	9.20	7.97	0.37	0.18	0.18
Yolo Solano	1.79	19.16	16.61	0.77	0.38	0.37
Bay Area	7.71	82.60	71.59	3.30	1.65	1.60
Monterrey Bay	6.32	67.67	58.64	2.71	1.35	1.31
Total	***16.72***	***179.16***	***155.27***	***7.17***	***3.58***	***3.48***
Northern Route Via Altamont						
Placer	0.05	0.54	0.47	0.02	0.01	0.01
Sacramento Metro	2.11	22.61	19.59	0.90	0.45	0.44
San Joaquin Valley	2.79	29.92	25.93	1.20	0.60	0.58
Bay Area	5.00	53.58	46.43	2.14	1.07	1.04
Monterrey Bay	6.32	67.67	58.64	2.71	1.35	1.31
Total	***16.27***	***174.31***	***151.07***	***6.97***	***3.49***	***3.38***
Southern Route						
Santa Barbara	6.03	64.56	55.95	2.58	1.29	1.25
Ventura	3.22	34.48	29.88	1.38	0.69	0.67
South Coast	4.91	52.56	45.55	2.10	1.05	1.02
Total	***14.15***	***151.60***	***131.39***	***6.06***	***3.03***	***2.94***
Route/Air District	**Annual Emissions, tons/year**					
	ROG	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Northern Route Via Oakland						
Placer	0.00	0.06	0.04	0.00	0.00	0.00
Sacramento Metro	0.03	0.98	0.77	0.05	0.01	0.01
Yolo Solano	0.06	2.04	1.60	0.10	0.02	0.02
Bay Area	0.28	8.81	6.88	0.41	0.10	0.10
Monterrey Bay	0.23	7.22	5.64	0.34	0.08	0.08
Total	***0.60***	***19.11***	***14.93***	***0.90***	***0.22***	***0.22***
Northern Route Via Altamont						
Placer	0.00	0.06	0.04	0.00	0.00	0.00
Sacramento Metro	0.08	2.41	1.88	0.11	0.03	0.03
San Joaquin Valley	0.10	3.19	2.49	0.15	0.04	0.04
Bay Area	0.18	5.71	4.46	0.27	0.07	0.06
Monterrey Bay	0.23	7.22	5.64	0.34	0.08	0.08
Total	***0.58***	***18.59***	***14.53***	***0.87***	***0.22***	***0.21***
Southern Route						
Santa Barbara	0.22	6.89	5.38	0.32	0.08	0.08
Ventura	0.11	3.68	2.87	0.17	0.04	0.04
South Coast	0.18	5.61	4.38	0.26	0.07	0.06
Total	***0.51***	***16.17***	***12.63***	***0.76***	***0.19***	***0.18***

Note: See Appendix B for detailed emission calculations.
Annual emissions within each route assume all 250 trains per year use that route.

Table 4.3.21 Mitigated Mainline Rail Emissions Past the Roseville and Colton Rail Yards, Peak Day and Annual

Route/Air District	Peak Day Emissions, lbs/day					
	ROG	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$
Roseville to Nevada						
Placer	4.9	52.7	45.7	2.1	1.1	1.0
Nevada	1.6	17.6	15.3	0.7	0.4	0.3
Total	6.6	70.3	60.9	2.8	1.4	1.4
Roseville to Oregon						
Placer	1.2	13.3	11.5	0.5	0.3	0.3
Feather River	0.6	6.2	5.4	0.2	0.1	0.1
Butte	0.9	9.5	8.2	0.4	0.2	0.2
Tehama	2.5	27.3	23.6	1.1	0.5	0.5
Shasta	2.3	24.2	21.0	1.0	0.5	0.5
Siskiyou	4.0	42.9	37.2	1.7	0.9	0.8
Total	5.0	53.3	46.2	2.1	1.1	1.0
Colton to Nevada						
South Coast	1.2	12.7	11.0	0.5	0.3	0.2
Mojave	11.2	119.8	103.8	4.8	2.4	2.3
Total	12.4	132.5	114.8	5.3	2.6	2.6
California Border to Canadian Border	***26.7***	***286.4***	***248.2***	***11.5***	***5.7***	***5.6***
Route/Air District	**Annual Emissions, tons/year**					
	ROG	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
Roseville to Nevada						
Placer	0.2	5.6	4.4	0.3	0.1	0.1
Nevada	0.1	1.9	1.5	0.1	0.0	0.0
Total	0.2	7.5	5.9	0.4	0.1	0.1
Roseville to Oregon						
Placer	0.0	1.4	1.1	0.1	0.0	0.0
Feather River	0.0	0.7	0.5	0.0	0.0	0.0
Butte	0.0	1.0	0.8	0.0	0.0	0.0
Tehama	0.1	2.9	2.3	0.1	0.0	0.0
Shasta	0.1	2.6	2.0	0.1	0.0	0.0
Siskiyou	0.1	4.6	3.6	0.2	0.1	0.1
Total	0.2	5.7	4.4	0.3	0.1	0.1
Colton to Nevada						
South Coast	0.0	1.4	1.1	0.1	0.0	0.0
Mojave	0.4	12.8	10.0	0.6	0.1	0.1
Total	0.4	14.1	11.0	0.7	0.2	0.2
California Border to Canadian Border	***1.0***	***30.6***	***23.9***	***1.4***	***0.4***	***0.3***

Note: See Appendix B for detailed emission calculations.
Annual emissions within each route assume all 250 trains per year use that route.
California border to Canadian Border assumes a hypothetical route via the Midwest.

In March 2008, EPA finalized a three part program that will dramatically reduce emissions from diesel locomotives of all types -- line-haul, switch, and passenger rail. The rule will cut PM emissions from these engines by as much as 90 percent and NOx emissions by as much as 80 percent when fully implemented. The standards are based on the application of high-efficiency catalytic after treatment technology for locomotives built in 2015 and later.

EPA standards also apply for existing locomotives when they are remanufactured. Requirements are also in place to reduce idling for new and remanufactured locomotives. EPA has estimated that by 2041 the average nationwide emission factors for mainline locomotives would meet the Tier 4 standards (EPA 2009). This means that even if the County is preempted by Federal law from implementing the Tier 4 mitigation measure as part of the project, that over time the locomotive emissions will achieve this level due to the EPA emission control requirements for locomotives.

Since AQ-3a may not be implemented due to Federal preemption, and it is uncertain if the other Air Districts could require emission reduction credits, the impacts associated with the mainline rail operation would remain *significant and unavoidable (Class I).*

Health Impacts of Significant and Unavoidable Emissions

As discussed under impact AQ.3, emissions of NO_x would remain above the significance thresholds within all Air Districts except Yolo/Solano. As these emissions would remain above the thresholds even after mitigation, an analysis is presented below to clarify the potential health impacts of these emissions. NO_x is a criteria pollutant that reacts in the atmosphere, along with ROGs, to produce ozone. Ozone has a number of health impacts including loss of pulmonary function. Increases in NO_x and ROG emissions associated with the proposed project could cause incremental increases in the ozone concentrations which could cause an increase in the ppm concentrations and the number of days per year exceeding the ambient air quality standards. NO_x emissions from the proposed project would be emitted in a number of Air Districts (see Table 4.3.18), contributing to the pollutants measured at basin-wide monitoring stations. Ozone formation is a complex and complicated phenomena where emissions from one area could contribute to increased ozone levels at different locations depending on meteorology and atmospheric chemistry. The respective Districts have established thresholds of pollutant emissions from new projects that are based on modeling of the projected emissions basin-wide and the resulting impact on pollutant concentrations at the monitoring stations. The Districts, through their respective Management Plans, are pursuing actions that can be implemented over the next few years to work towards meeting the 8-hour ozone standards.

In order to estimate the potential health effects of the proposed projects mainline emissions on the population, the projects emissions are compared to the district-wide emissions and are assumed to generate an equivalent amount of ozone on a tons/year basis (a linear relationship in ozone generation to emissions). District-wide emissions of NO_x and VOC/ROG are shown in Table 4.3.22. The proposed project total NO_x+ROG emissions would total a small percentage of the total daily emissions within each district. This level would cause an increase in the ozone concentration of up to 0.05 ppb (for districts in non-attainment) and would not produce a change in the number of days of exceedance annually in the applicable Districts air quality standards.

Table 4.3.22 Health Impacts of Significant Emissions

Air District	Thresholds of Significance						Incremental Increase in ozone, ppb	Mortality per 1,000 persons	Morbidity per 1,000 persons
	NO_X		VOC/ROG		Significant?*				
	Daily (lbs)	Annual (tons)	Daily (lbs)	Annual (tons)	NOx	ROG /VOC			
SCAQMD	55		55		Y/N	N/N	0.00	0.01	0.01
VCAPCD	25		25		Y/Y	N/N	0.01	0.03	0.05
SBCAPCD	240	-	240	-	Y/N	N/N	0.04	0.13	0.15
SLOAPCD	25	25	25	25	Y/N	Y/N	0.02	0.06	0.06
MBUAPCD	137		137		Y/N	N/N	0.02	0.06	0.08
SMAQMD	65		65		Y/N	N/N	0.01	0.02	0.03
SJVAPCD		10		10	Y/N	N/N	0.00	0.01	0.01
YSAQMD		10		10	N/N	N/N	0.06	0.18	0.23
BAAQMD	80	15	80	15	Y/N	N/N	0.01	0.02	0.02
PCAPCD	82		82		Y/N	N/N	0.05	0.17	0.19
N. Sierra	25 .		25 .		Y/N	N/N	0.02	0.08	0.08
Feather R	25 .		25 .		Y/N	N/N	0.00	0.01	0.01
Butte	25 .		25 .		Y/N	N/N	0.03	0.17	0.13
Tehama	25 .		25 .		Y/N	N/N	0.05	0.26	0.21
Shasta	25 .		25 .		Y/Y	Y/N	0.04	0.20	0.17
Siskiyou	25 .		25 .		Y/Y	Y/N	0.09	0.46	0.36
Mojave	137 .	25	137 .	25	Y/N	N/N	0.04	0.13	0.17

* for unmitigated/mitigated emissions. Incremental ozone and mortality/morbidity based on unmitigated emissions. Mitigated emissions include the use of Tier 4 locomotives.
SCAQMD-South Coast Air Quality Management District ;VCAPCD-Ventura County Air Pollution Control District; SBCAPCD-Santa Barbara County Air Pollution Control District; SLOAPCD-San Luis Obispo County Air Pollution Control District; MBUAPCD-Monterey Bay Unified Air Pollution Control District; SMAQMD –Sacramento Metropolitan Air Quality Management District; SJVAPCD-San Joaquin Valley Air Pollution Control District; Yolo-Solano Air Quality Management District; BAAQMD-Bay Area Air Quality Management District; PCAPCD-Placer County Air Quality Management District.

The California Air Resources Board (CARB) evaluated potential health impacts associated with incremental differences in ozone concentrations (CARB, 2005). Most of the epidemiologic studies used in this EIR have used a log-linear model to represent the relationship between ozone exposure and the health endpoint. In this case, the relationship between ozone levels and the natural logarithm of the health effect is estimated by a linear regression. This regression model generates a beta coefficient that relates the percent change in the health outcome to a unit increase in ozone. Existing studies have reported either a beta coefficient for a unit change in exposure or a relative risk (RR) for a specified change in ozone concentrations, such as 10 ppb 1-hour maximum. The RR is defined as the ratio of the health effect predicted from the higher exposure relative to some baseline exposure. Health effect estimates presented in a given study as RR for a specified change in ozone, Δ O3, were converted into an estimated beta using the equation:

$$\beta = \ln (RR) / \Delta O3$$

The daily change in ozone at each monitoring site i.e., the difference between current ozone and the standard (= ΔO3) was used to calculate RR:

$$RR = \exp(\beta \Delta O3)$$

Then, the RR estimates were used to determine the population attributable risk (PAR), which represents the proportion of the health effects in the whole population that may be prevented if the cause (ozone pollution in our case) is reduced by a given amount. Specifically,

$PAR = (RR - 1) / RR$

Ultimately, the estimated impact on the health outcome is calculated as follows:

$\Delta y = PAR \times y0 \times pop$

where:

Δy = changes in the incidence of a health endpoint corresponding to a particular change in ozone,

y0 = baseline incidence rate/person within a defined at-risk subgroup, and

pop = population size of the group exposed.

The parameters in the functions differ depending on the study. In order to establish potential changes in mortality rates, data from the World Health Organization (WHO), as presented in CARB (2005) was used to establish the beta coefficient for a unit change in exposure or a relative risk for a specified change in ozone concentrations, such as 10 ppb 1-hour maximum. The WHO focused on 15 European time-series studies using all ages. Their meta-estimates indicate a relative risk of 1.003 (95% CI = 1.001 – 1.004) for a 10 μg/m3 change in 8-hour ozone. The WHO estimate implies a 0.44% change in daily mortality (95% CI = 0.15 – 0.59%) per 10 ppb change in 1-hour maximum ozone. Making the conversions, the WHO estimate implies a 1.13% change (95% CI = 0.38 - 1.51) in daily mortality per 10 ppb change in 24-hour ozone. The WHO also provided an estimate correcting for possible publication bias using a trim and fill technique. Under an assumption that bias was present, the adjusted estimate is 0.75 % (95% CI = 0.19 – 1.32) per 10-ppb change in 24-hour ozone. Potential changes in potential morbidity rates were based on the CARB (2005) study where Anderson et al. (1997) reported a relative risk of 1.04 (95% CI= 1.02-1.07) for hospital admissions for Chronic Obstructive Pulmonary Disease for all ages for a 50 μ/m3 change in ozone. This converts to 2.05% per 10 ppb change in 1-hour maximum ozone.

Following the methodology described by the CARB (2005), project-related ozone increases are shown in Table 4.3.22. Adverse human health impacts that are likely to result from the proposed project's air quality impacts include an increase in ozone, morbidity, and mortality.

Impact #	Impact Description	Phase	Impact Classification
AQ.4	Operational activities at the Refinery associated with the Rail Spur Project would generate toxic emissions that exceed SLOCAPCD thresholds.	Operations	Class I

Operational activities would produce emissions of toxic materials from fugitive emissions sources containing Benzene, Toluene, etc, and from the diesel combustion used for the

locomotives. As part of the EIR analysis a health risk assessment (HRA), utilizing the HARP2 (version 15197) modeling program, was conducted to estimate the impacts of the fugitive and locomotive diesel emissions, in combination with the existing SMR and truck traffic emissions, on nearby offsite worker and agricultural areas and residential parcels. The HARP2 model is a health risk assessment model and is recommended in CARB's Health Risk Assessment Guidance for Rail Yard and Intermodal Facilities (CARB, 2006a) as well as the CAPCOA HRA Guidelines for Land Use projects (mentioned in the SLOCAPCD CEQA Guidelines). A detailed report on the HARP2 analysis in the format recommended by OEHHA is presented in Appendix B.2.

Assumptions made in the HRA include the following:

- Used regulatory default options in the dispersion modeling;
- Used volume sources for locomotive switching placed end-to-end along the rail spur line;
- Used point sources for the idling locomotive engines with upward plume velocity and buoyancy;
- Receptors located at a spacing of 100 meters out to 6 km;
- The emissions associated with unloading were arranged to be concentrated near the unloading activities. Emissions associated with locomotive switching and idling associated with train re-arrangement activities were assigned along the rail spur based upon the train sequencing discussed in Project Description (Chapter 2 of the EIR).

The HRA was prepared in accordance to the methodology in Health Risk Assessments for Proposed Land Use Projects (CAPCOA 2009), Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Emissions (SCAQMD, 2002), and ARB Health Risk Assessment Guidance for Rail Yard and Intermodal Facilities (CARB, 2006a). The estimation of cancer risk levels is based upon a person being exposed to the air toxin at one location from the third-trimester of pregnancy through the 30th year of life. See Appendix B.2 for details on the modeling assumptions.

Meteorological data utilized were from the Nipomo station for 5 years (2008-2012) obtained from the SLOCAPCD. HARP files from the 2011 HRA were obtained as a starting point for the analysis.

The BTEX levels, which are part of the volatile organic compounds, in the potential rail delivery crudes could increase from current operations, which could increase the impacts associated with air toxic emissions. An assumed increase in BTEX fraction from 0.81 to 1.25% was assumed to occur at the refinery (see Table 4.3.13), affecting fugitive emissions from tanks and components. This increase was included in the HARP2 modeling runs.

The data in Table 4.3.13 shows that both the vanadium and nickel concentration in the Canadian crudes would be less than the typical crude blend currently being processed at the SMR. Both of these heavy metals end up in the coke, which is produced at the refinery. The coke is stored in piles prior to being loading on to trucks or rail cars. As specified in the Memorandum of Agreement for Coke and Sulfur Storage and Handling Plan, dated May 11, 2011, the coke piles

must be kept moist to prevent any dust. As such, the change in heavy metal content of the crude would not result in any change in the fugitive dust composition for the coke piles. Therefore, the impact from any increase in vanadium and nickel concentration would be nominal.

Health risks associated with exposure to carcinogenic compounds can be defined in terms of the probability of developing cancer as a result of exposure to a chemical at a given concentration. Consistent with the OEHHA guidance, the cancer risk was calculated using an exposure duration of 30 years for residential and 25 years for offsite (non-SMR) workers. The analysis utilized the OEHHA Tier 1 approach (see Appendix B.2) as there are schools located within the 1 in a million cancer contour.

Health risks associated with the acute and chronic non-cancer risks are adverse health effects evaluated by comparing the contaminant concentration of each compound with the appropriate Reference Exposure Level (REL). The most recent (July 2015) REL's promulgated by OEHHA were considered in the assessment (and included in the HARP2 model health database version HEALTH15076). To quantify non-carcinogenic impacts, the hazard index approach was used. To calculate the hazard index from pollutant exposure, the modeled concentration of pollutant is divided by the chronic REL by the HARP2 model to generate the hazard index. Acute impacts were determined in a similar method by the HARP2 model. When the hazard index equals or exceeds one, a health hazard is presumed to exist.

Current regulations associated with diesel locomotives and currently being implemented would produce substantial emission reductions in locomotives over the next few decades. As the cancer risks examine the exposure to DPM over a 30 year timeframe, an accurate depiction of the risk levels must address the changing DPM emissions over the 30 year timeframe. The EPA (EPA 2009) estimates the average emission factors through the year 2040. The long-term average emission factor was calculated and was used to estimate the cancer risks in the HARP2 model (see Appendix B). For acute and chronic risks, the current emission factors were used instead of the long-term average. See Appendix B.2 for more details.

For diesel trucks entering and leaving the facility as part of the current/baseline conditions, the current fleet average emission factor was calculated and was used to estimate the cancer risks in the HARP2 model (see Appendix B.2). For acute and chronic risks, the current fleet average emission factors were also used. Truck volumes included the increase in sulfur trucks trips discussed above.

DPM impacts for cancer and chronic emissions utilized the OEHHA assessments for DPM included in the HARP2 model. For acute impacts, the DPM was speciated and the HARP2 model was run separately for the acute impacts to address the potential acute impacts from DPM (OEHHA does not have a reference exposure level for acute DPM exposure).

The HARP model was run for two different scenarios:

1. Scenario 1 - No Mainline: The current SMR operations + the Rail Spur Project + the trucks entering and leaving the SMR (and traveling offsite along Highway 1 and Willow) + increased BTEX levels but excluding the mainline locomotive emissions.

2. Scenario 2 - With Mainline: The current SMR operations + the Rail Spur Project + the trucks entering and leaving the SMR (and traveling offsite along Highway 1 and Willow) + increased BTEX levels + the mainline locomotive emissions.

As per SLOCAPCD and the CAPCOA Guidance (CAPCOA 2009), for CEQA, the thresholds apply to all facilities including vehicle emissions, which would be Scenario 2 above. Therefore, Scenario 2 impacts are those used to determine significance. Because mainline emissions mitigation may be preempted by Federal law, Scenario 1 was also included to address potential impacts without the mainline emissions.

For the current+rail spur operations (for both Scenario 1 and Scenario 2), the results of the HRA showed that acute impacts would have a health index (HI) of less than 1.0 at all parcel boundary points and at residential receptors and the offsite worker receptors located to the north and at the agricultural fields to the south of the SMR (peak acute of 0.48 at the parcel boundary and 0.28 at the closest residence).

For the current+rail spur operations (for both Scenario 1 and Scenario 2), the results of the HRA showed that chronic impacts would have a health index (HI) of less than 1.0 at all parcel boundary and residential receptors and the worker receptors located at the agricultural fields to the south (peak chronic of 0.07 at the parcel boundary).

As a note, the increase in BTEX at the facility affects acute and chronic health hazard index minimally (0.04 and 0.003 increases respectively). The results of the HARP2 modeling for cancer are shown in Table 4.3.23 for scenarios 1 and 2.

Table 4.3.23 Health Risk HARP Modeling Results: Proposed Project Cancer Risk, Risk per Million

Scenario	PMI	MEIR	Offsite Worker	Louise Ln	Trilogy Prkwy	Monadella St.	Olivera Ave	Sig?
Scenario 1 - Rail Spur + SMR + trucks	134.6	23.9	1.59	4.7	3.2	21.4	23.9	Yes
Scenario 2 - Rail Spur + SMR + trucks+ Mainline	139.0	26.5	1.67	4.9	3.3	26.5	25.5	Yes

SMR emissions include the increased fraction of BTEX to 1.25% from 0.81%
See Appendix B for detailed emission calculations.
Use of HARP2 model version 15197
PMI -Point of Maximum Impact, the highest value along the facility fenceline.
MEIR-Maximally Exposed Individual Resident

For Scenarios 1 and 2, the highest cancer risks (Point of Maximum Impact; PMI) occur at the SMR parcel boundary immediately south of the rail spur location due to the diesel emissions from the rail spur operations. This is not a significant impact because no residential receptors are located there. Offsite worker risks to the south of the SMR would be less than 10 and would be acceptable (see Table 4.3.23). As per SLOCAPCD Rule 219, impacts are assessed at the "maximum exposed individual and the nearest receptor". The highest cancer risk at a residential or sensitive receptor occurs to the north of the facility. Residences along Louise Lane, Trilogy Parkway, Olivera Ave and Monadella Street are shown in Table 4.3.23. Residential risk values

are above the SLOCAPCD threshold (the threshold is 10.0 in a million as per SLOCAPCD CEQA Air Quality handbook and Rule 219).

Although agricultural fields are located immediately next to the SMR parcel boundary, the closest offsite (non-SMR) worker location where workers assemble and might be in one place for any length of time was determined to be the agricultural assembly site located to the south-west of the rail spur approximately 1,900 feet from the rail spur location or at the Fire Station located near the entrance to the SMR. The offsite worker cancer risk values would not exceed the SLOCAPCD threshold.

Proposed project related sulfur truck trip increases increased peak cancer risk by 0.2 cancer cases per million for the unmitigated case. Potential BTEX increases increased cancer risk by 0.1 cancer cases per million.

Figure 4.3-6 shows the cancer health risk contours for Scenario 2 (which includes the mainline rail emissions). The impacts would be above the APCD thresholds for residential receptors and would be significant. Impacts for chronic, acute and worker cancer risks would be less than the thresholds.

As the OEHHA Guidance and the HARP2 model have been released since the issuance of the October 2014 Recirculated Draft EIR (RDEIR) for this project, the model changes have produced changes to the estimated risk values. In the RDEIR, as the OEHHA HARP2 model had not been released, the effects of the 2012 OEHHA guidance documents on the modeling risk levels (from the earlier HARP model) were estimated with adjustment factors. In addition, the models used to estimate the air dispersion have changed from the ISC model used in earlier HARP version to the AERMOD model used in HARP2.

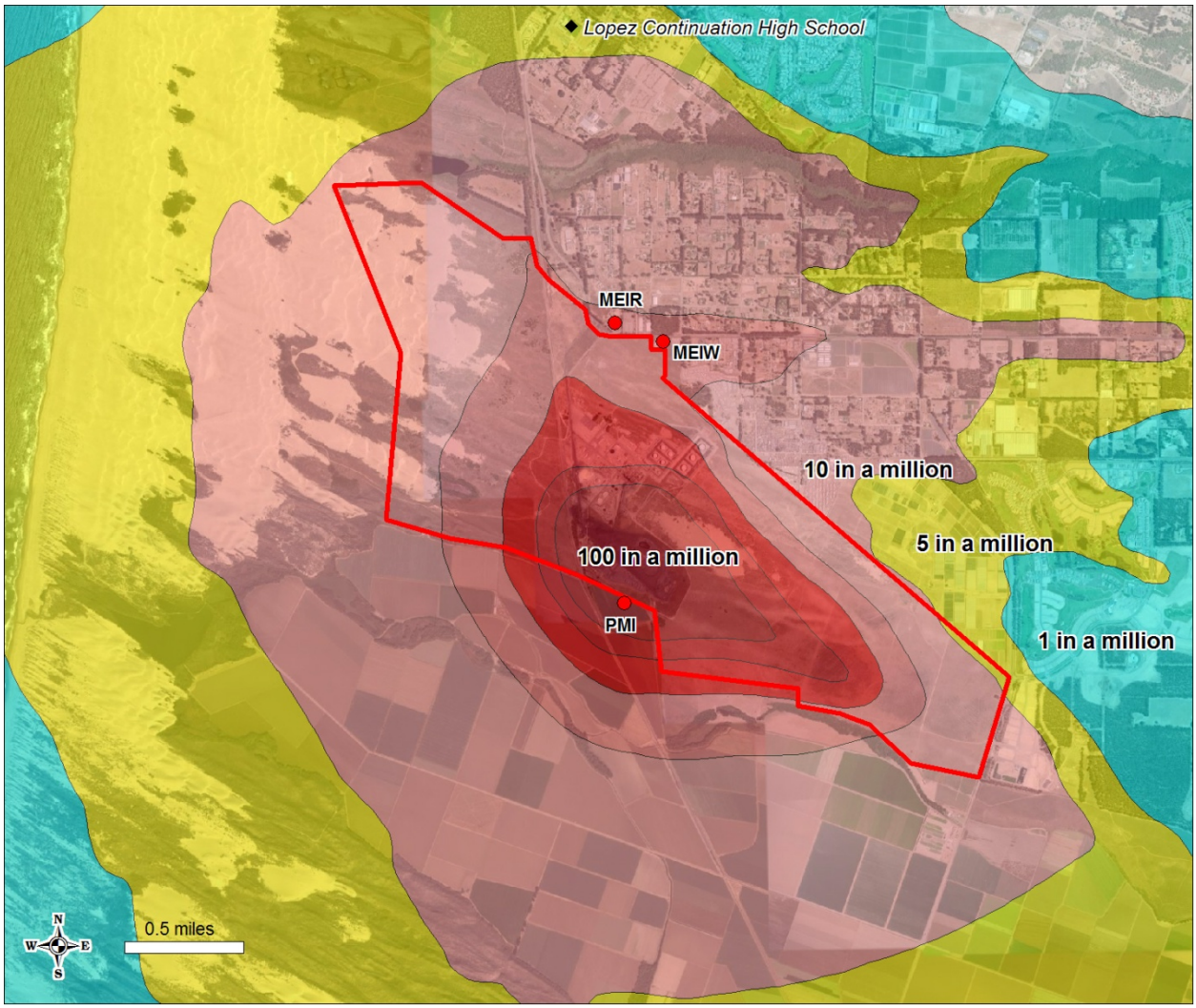
In addition, the EIR preparers worked extensively with the SLOCAPCD to define the modeling inputs and these changed from the RDEIR as well, utilizing the urban/rural factors within the meteorological data instead of the urban/rural designation located within the dispersion model (the RDEIR utilized a rural setting, whereas the FEIR utilizes the AERMOD default values). Although the peak facility boundary cancer risk increased, this is more due to the distribution of the cancer risk as opposed to an increase in the total cancer levels throughout the area, as the use of the AERMOD default model setting causes cancer risks to spread out more than the RDEIR modeling settings.

Mitigation Measures

AQ-4a *Implement measures AQ-2a and AQ-2b.*

AQ-4b *All trucks under contract to the SMR for moving coke and sulfur shall meet EPA 2010 model year NOx and PM emission requirements and a preference for the use of rail over trucks for the transportation of coke shall be implemented to the extent feasible in order to reduce offsite emissions. Annual truck trips associated with refinery operations and their associated model year and emissions shall be submitted to the SLOCAPCD annually.*

Figure 4.3-6 Rail Spur Project Cancer Health Risk with Mainline – Unmitigated



PMI-Point of Maximum Impact
MEIR- Maximally Exposed Individual Resident
MEIW- Maximally Exposed Individual Worker
Based upon HARP2 model version 15197.

AQ-4c *If mitigation measure AQ-2a (the use of Tier 4 locomotives only) is not implemented, then crude oil train unloading and switching activities at the SMR shall be limited to the period of 7 a.m. to 7 p.m. to reduce the emissions during periods of calm meteorological conditions. Reports shall be submitted to the County and APCD indicating the time of arrival, the start and end time of train switching break-apart and unloading and departure time. These time limits do not apply to pull-in of the unit trains from the mainline. When a unit train is pulled in between 7 p.m. and 7 a.m., the locomotives shall shut down until the allowed unloading time starting at 7 a.m. No switching or breaking apart of trains or any other locomotive activity is allowed between 7 p.m. and 7 a.m. except for the minimum activity needed to move the unit train onto the SMR property.*

Residual Impacts

The use of all Tier 4 locomotives (AQ-2a) and limits on locomotive idling time (AQ-2b) would reduce DPM emissions, which are the main driver of the health risk cancer impacts. As part of the Throughput EIR project, the SMR is beginning to implement mitigation measure AQ.1-2 from the Throughput EIR, which required the use of newer model year trucks. Mitigation measure AQ-4b above is an extension of this mitigation measure to ensure that trucks utilize the most recent, cleanest engines. Truck emissions were estimated utilizing the EMFAC model (see Appendix B.2). The meteorological stations indicate that calm meteorological conditions occur during the nighttime periods at the SMR. During these calm periods, emissions from the SMR activities impact a larger area due to the reduced mixing, thereby increasing cancer risks. By limiting activities to daytime hours, the cancer risks are reduced.

Cancer risk levels are shown in Table 4.3.24 assuming the use of Tier 4 locomotives, limits on locomotive idling time and cleaner model year diesel trucks (AQ-2a, 2b and 4b), which would allow for the unloading of rail cars 24 hours per day. In addition, due to the uncertainties associated with the preemption and the Tier 4 locomotives, the cancer risk levels with only the reduced idling, no nighttime unloading and cleaner model year diesel trucks mitigation AQ-2b, AQ-4b and AQ-4c (with no Tier 4 mitigation) are also provided in Table 4.3.24. The no nighttime unloading mitigation measure AQ-4c would only be required if the required use of Tier 4 locomotives are preempted as the cancer risk levels would be less than significant with the use of all Tier 4 locomotives (see Table 4.3.24).

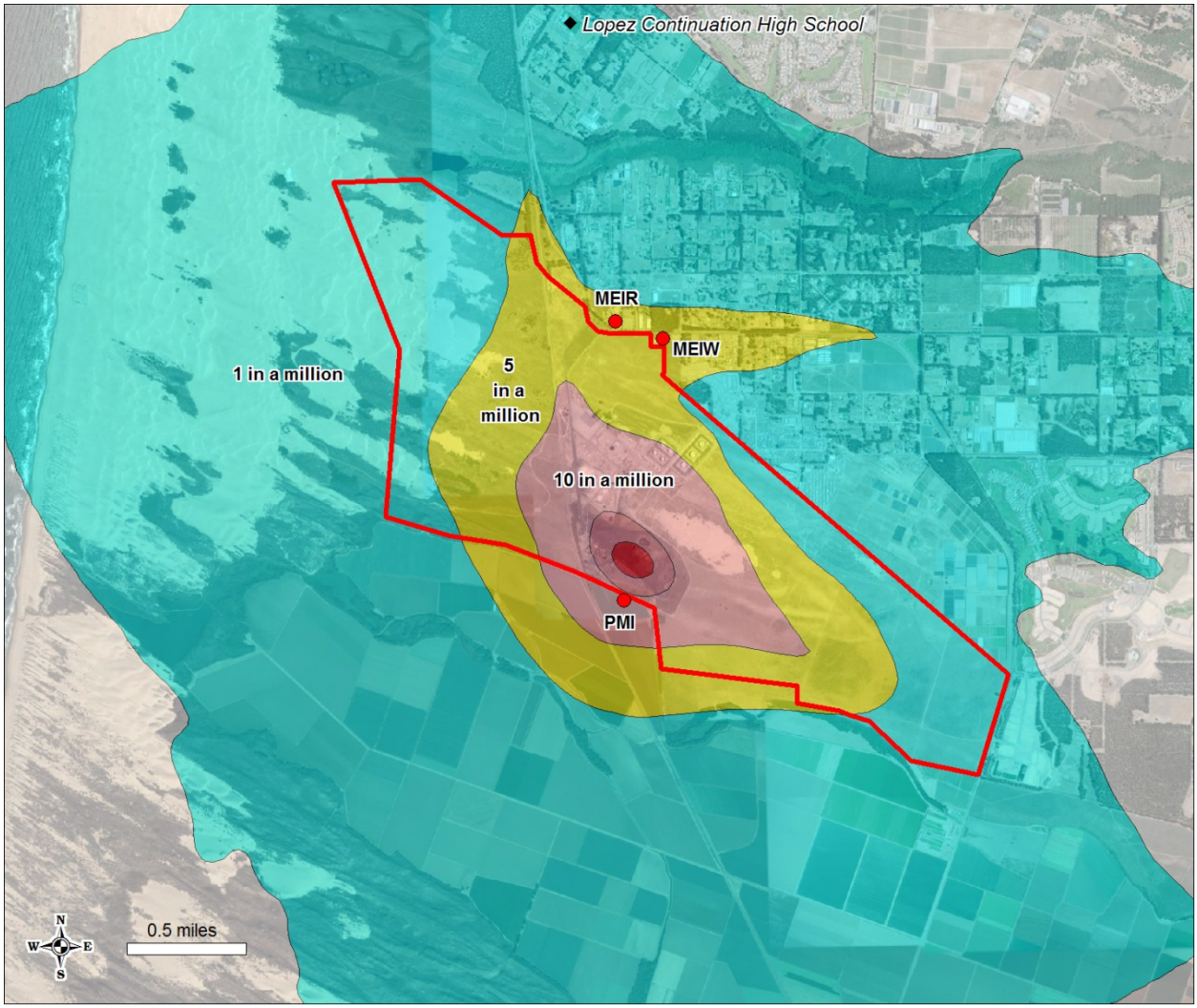
Table 4.3.24 Mitigated Health Risk HARP Modeling Results: Cancer Risk

Scenario	PMI	MEIR	Worker	Louise Ln	Trilogy Prkwy	Monadella Street	Olivera Ave	Sig?
Mitigation: Tier 4 Locomotives, idling restrictions, clean trucks (AQ-2a, 2b and 4b)								
Scenario 1 - Rail Spur + SMR + trucks	23.2	6.0	0.27	1.1	1.0	5.1	3.8	No
Scenario 2 - Rail Spur + SMR + trucks+ Mainline	24.4	6.5	0.31	1.1	1.0	6.5	4.2	No
Partial Mitigation: idling restrictions, daytime unloading only and clean trucks (AQ-2b, 4b, 4c)								
Scenario 1 - Rail Spur + SMR + trucks	54.7	10.4	0.63	2.5	1.8	9.6	9.6	Yes
Scenario 2 - Rail Spur + SMR + trucks+ Mainline	58.0	13.6	0.69	2.6	1.9	13.6	10.9	Yes

See Appendix B for detailed emission calculations.
SMR emissions include the increased fraction of BTEX to 1.25% from 0.81%
Use of HARP2 model version 15197
PMI -Point of Maximum Impact, the highest value along the facility fenceline.
MEIR-Maximally Exposed Individual Resident

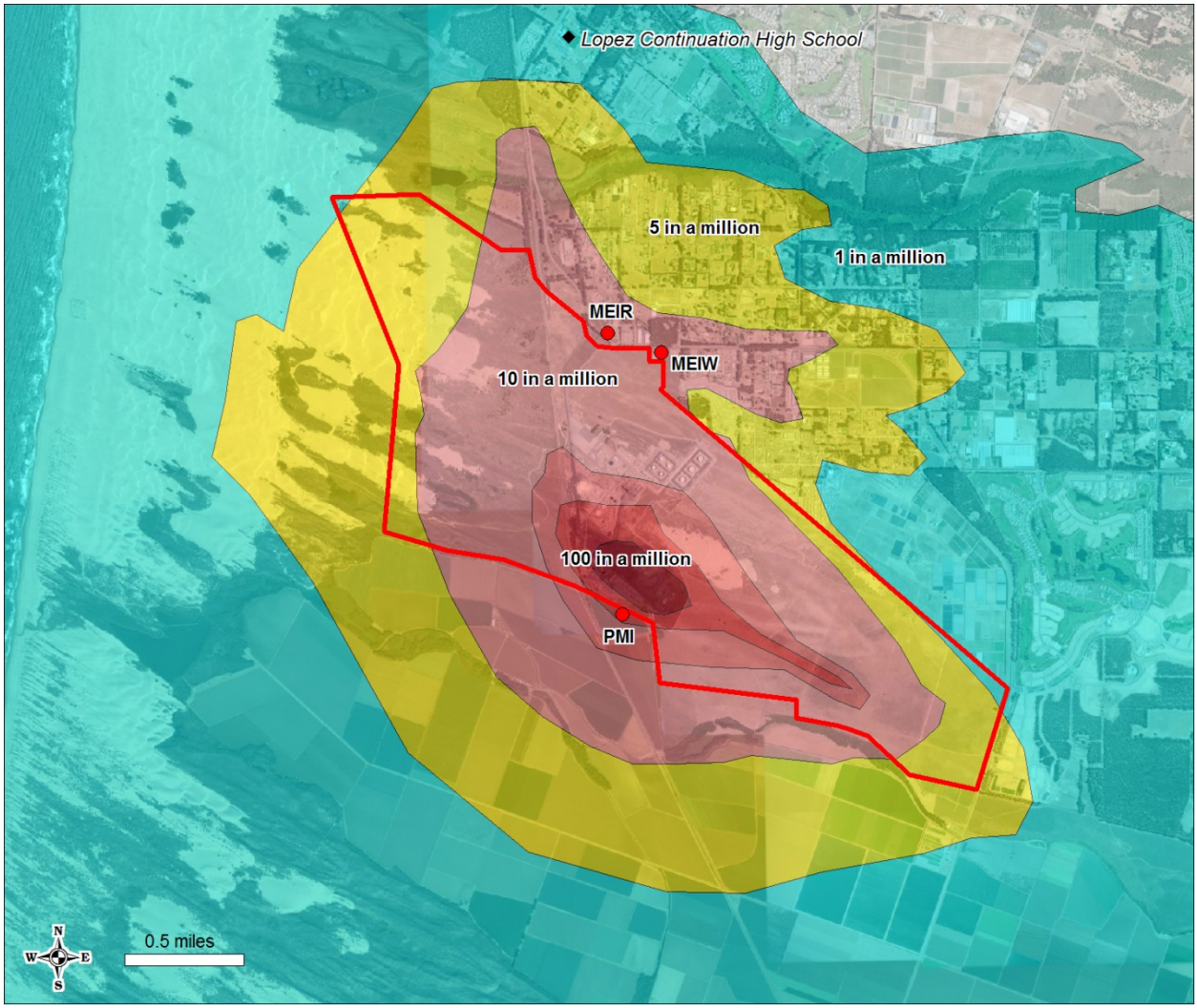
Figure 4.3-7 shows the cancer health risk contours for Scenario 2 (including the mainline rail emissions) with mitigation including the use of only Tier 4 locomotives (mitigation measures AQ-2a, AQ-2b, AQ-4b). Figure 4.3-8 shows the cancer risk contours for Scenario 2 without the use of Tier 4 locomotives (mitigation measure AQ-2b, AQ-4b and AQ-4c only), including limits on nighttime unloading.

Figure 4.3-7 Rail Spur Project Cancer Health Risk with Mainline –Mitigation with Tier 4 Locomotives and 24 Hour Unloading (Mitigation Measures AQ-2a, 2b, 4b)



PMI-Point of Maximum Impact
MEIR- Maximally Exposed Individual Resident
MEIW- Maximally Exposed Individual Worker
Based upon HARP2 model version 15197.

Figure 4.3-8 Rail Spur Project Cancer Health Risk with Mainline –Mitigation without Tier 4 Locomotives and Daytime Only Unloading (Mitigation Measures AQ-2b, 4b, 4c)



PMI-Point of Maximum Impact
MEIR- Maximally Exposed Individual Resident
MEIW- Maximally Exposed Individual Worker
Based upon HARP2 model version 15197.

UPRR maintains a large number of locomotives (more than 8,000 nationwide) with a wide range of emissions characteristics and Tier levels. Since UPRR would own the locomotives and they are used for interstate commerce the requirement to use only Tier 4 locomotives may be preempted by Federal law, and therefore may not be a feasible mitigation measure.

In addition, the availability of these cleaner locomotives and the ability of the Applicant to ensure their use are somewhat speculative since Union Pacific controls the locomotives and they would be traveling interstate.

In March 2008, EPA finalized a three part program that will dramatically reduce emissions from diesel locomotives of all types -- line-haul, switch, and passenger rail. The rule will cut DPM emissions from these engines by as much as 90 percent and NO_x emissions by as much as 80 percent when fully implemented. The standards are based on the application of high-efficiency catalytic after treatment technology for freshly manufactured engines built in 2015 and later.

EPA standards also apply for existing locomotives when they are remanufactured. Requirements are also in place to reduce idling for new and remanufactured locomotives. EPA has estimated that by 2041 the average nationwide emission factors for mainline locomotives would meet the Tier 4 standards (EPA 2009). This means that even if the County is preempted by Federal law from implementing the Tier 4 mitigation measure as part of the project, that over time the locomotive emissions will achieve this level due to the EPA emission control requirements for locomotives.

In 2015, the SMR began implementing a portion of mitigation measure AQ-4b and indicates that the use of model year 2010 truck is feasible and the trucks are available. This mitigation measure reduces the contribution of trucks to the cancer risks along the area roadways to the north of the SMR.

With the implementation of mitigation, including the Tier 4 locomotives, idling restrictions and the use of 2010 trucks (mitigation measures AQ-2a, AQ-2b and AQ-4b), the cancer risks would be reduced to below the thresholds. However, with just the limits on locomotive idling time, the cleaner trucks and the limits on nighttime unloading (AQ-2b, AQ-4b and AQ-4c), if the Tier 4 locomotives mitigation measure AQ-2a is preempted and cannot be implemented, even with daytime unloading only, the highest cancer risk at a residential or sensitive receptor would be *significant and unavoidable (Class I).*

Impact #	Impact Description	Phase	Impact Classification
AQ.5	Operational activities of trains along the mainline rail route associated with the Rail Spur Project would generate toxic emissions that exceed thresholds.	Operations	Class I

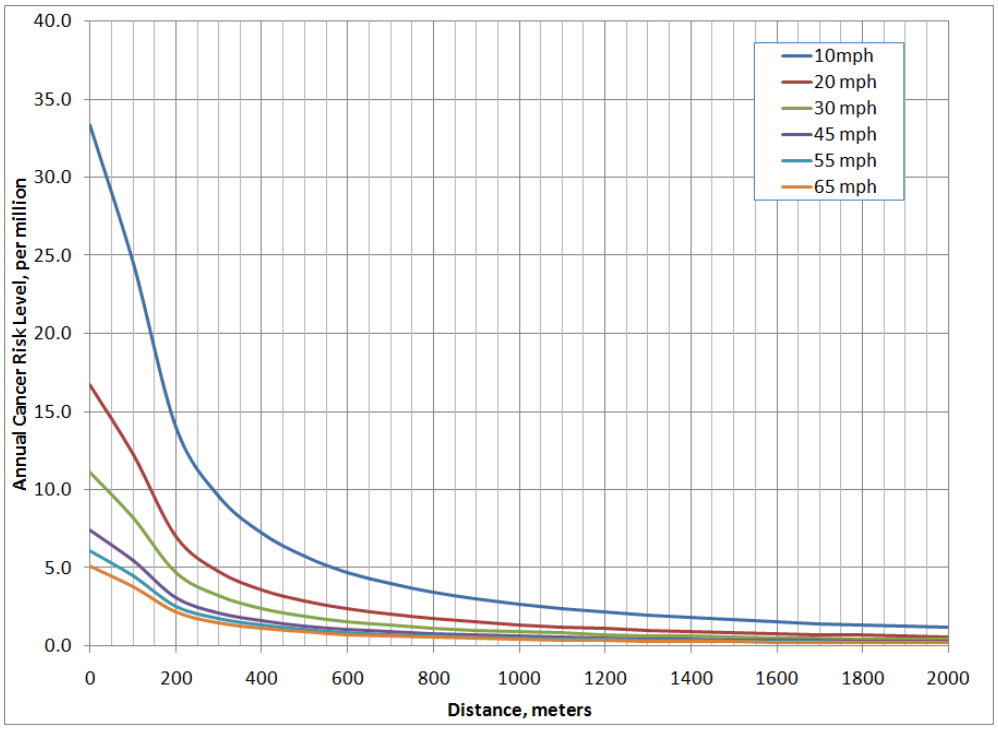
Movement of the locomotives on the mainline to and from the SMR would also contribute to health risks along the mainline due to the emissions of DPM. Modeling of rail emissions was conducted for a hypothetical rail mainline for a range of locomotive speeds and distances from

the mainline (all for a unit train with 3 locomotives and five trains per week). The results are shown in Figure 4.3-9 and show that for trains traveling about 30 mph or greater the cancer risk would be below the SLOCAPCD threshold for areas outside of the railroad right-of-way.

For slower speeds (when more emissions occur per length of rail due to the slower speeds), cancer risks would exceed the SLOCAPCD thresholds beyond the railroad right-of-way. There are areas along the mainline rail route that have reduced speed limits for trains that pass in proximity of sensitive receptors. For example, in the City of San Luis Obispo, trains are limited to a speed of 25 miles per hour. In the City of Davis, there are stretches of track that are limited in speed to 10 mph. In these areas where there are permanent speed limits for trains that are below 30 mph and they are located in proximity to sensitive receptors, the health risk impacts could be significant.

For most of the mainline route trains are expected to have an average speeds between 30 and 40 mph, and in these areas the health risk impact would be less than significant. This average speed is consistent with the speed limits in the USDOT proposed rulemaking for crude oil unit trains, which is proposing speeds between 30 and 50 miles per hour depending on location and tank car design (USDOT 2014).

Figure 4.3-9 Mainline Locomotive Cancer Risk, by speed and distance from Mainline



Notes: Based on 3 locomotives per train, 250 round train trips per year, Nipomo meteorological dataset (1994-1996) and 30 year average locomotive emission factor (as per EPA). Includes OEHHA 2015 methodology.

Mitigation Measures

AQ-5 Implement measures AQ-3.

Residual Impacts

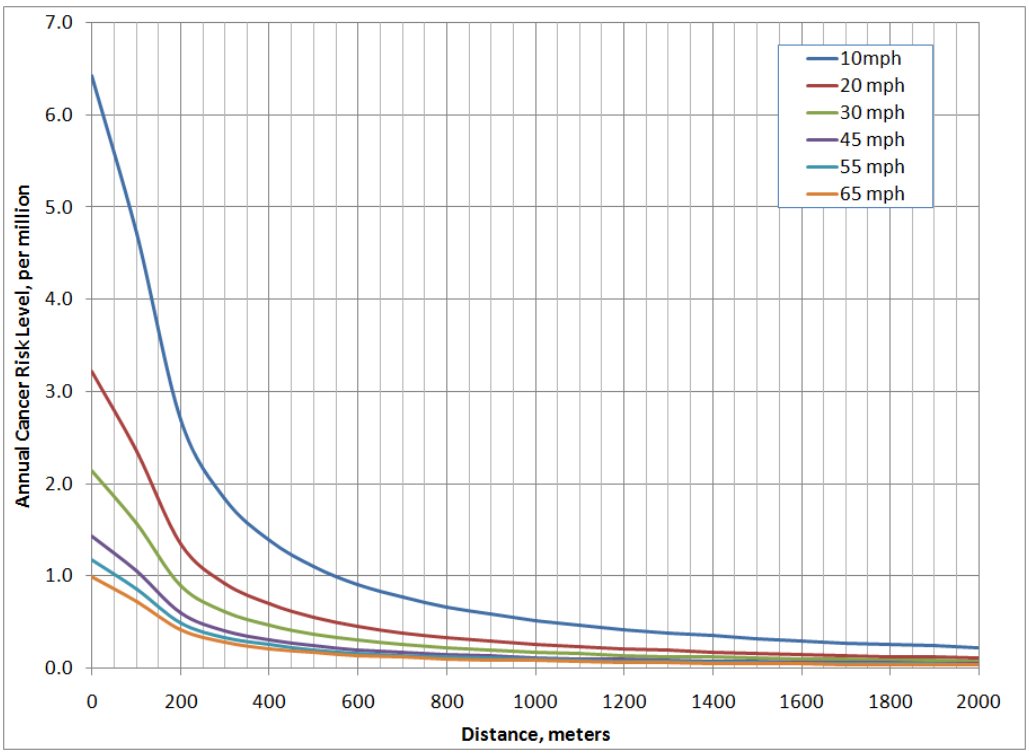
The use of Tier 4 locomotives would serve to reduce the toxic emissions associated with the locomotive operations along the mainline. The use of all Tier 4 locomotives would reduce DPM emissions, which are the main driver of the health risk impacts.

Figure 4.3-10 shows the health risk impacts along the mainline as a function of speed and distance with the use of Tier 4 locomotives. With this mitigation the health risk would be less than the SLOCAPCD threshold for all speeds.

UPRR maintains a large number of locomotives (more than 8,000 nationwide) with a wide range of emissions characteristics and Tier levels. Since UPRR would own and locomotives and they are used for interstate commerce the requirement to use only Tier 4 locomotive may be preempted by Federal law, and therefore may not be a feasible mitigation measures.

In addition, the availability of these cleaner locomotives and the ability of the Applicant to ensure their use are somewhat speculative since Union Pacific controls the locomotives and they would be traveling interstate.

Figure 4.3-10 Mitigated Mainline Locomotive Health Risk, by speed and distance from Mainline



Notes: Based on 3 locomotives per train, 250 round train trips per year, Nipomo meteorological dataset (1994-1996) and Tier 4 locomotive emission rate. Includes OEHHA 2015 methodology.

In March 2008, EPA finalized a three part program that will dramatically reduce emissions from diesel locomotives of all types -- line-haul, switch, and passenger rail. The rule will cut PM emissions from these engines by as much as 90 percent and NO_x emissions by as much as 80 percent when fully implemented. The standards are based on the application of high-efficiency catalytic after treatment technology for freshly manufactured engines built in 2015 and later.

EPA standards also apply for existing locomotives when they are remanufactured. Requirements are also in place to reduce idling for new and remanufactured locomotives. EPA has estimated that by 2041 the average nationwide emission factors for mainline locomotives would meet the Tier 4 standards (EPA 2009).

This means that even if the County is preempted by Federal law from implementing the Tier 4 mitigation measure as part of the project, that overtime the locomotive emissions will achieve this level due to the EPA emission control requirements for locomotives.

Given that the County may be preempted by Federal law from requiring the use of Tier 4 locomotives, the health risk impacts along the mainline rail routes would be *significant and unavoidable (Class I).* This would apply to all areas along the mainline where train speeds are limited to less than 30 mph and the mainline rails are in close proximity to sensitive receptors.

Impact #	Impact Description	Phase	Impact Classification
AQ.6	Operational activities associated with the Rail Spur Project would generate GHG emissions that exceed SLOCAPCD thresholds.	Operations	Class I

Emissions of GHG at the refinery and along the mainline would result from onsite activities (locomotives, etc.), vehicles (employee automobiles and occasional truck deliveries of materials), locomotives along the mainline, and from electricity consumption (to run pumps and other equipment). Table 4.3.25 shows the GHG emissions associated with the Rail Spur Project.

The total GHG emissions within SLOC associated with the Rail Spur Project would not exceed the SLOCAPCD thresholds for GHG emissions. However, emissions within California would exceed the thresholds and therefore would be considered significant. Since the State does not have a GHG threshold, this EIR has used the SLOCAPCD threshold for determining the significance of GHG emissions.

Changes in crude oil quality can change the amount of GHG emissions at a refinery by increasing the energy consumption for processing each barrel of oil. Replacing conventional crude oil with heavy oil and tar sand oil can increase the amount of energy needed to process each barrel of oil, thereby increasing CO_2 emissions, the major component of GHG emissions. The higher CO_2 emissions come from burning more fuel to process each barrel of crude (Karras, 2010).

Table 4.3.25 Operational GHG Emissions , metric tonnes

Source	CO_2	CH_4	N_2O	$MTCO_2E$
Emissions within SLOC				
Construction Amortized	38.4	0.01	0.00	38.6
Fugitives	0.0	0.01	0.00	0.3
Locomotives onsite	800.1	0.06	0.02	807.7
Locomotives along mainline within SLOC	1,472.0	0.1	0.0	1,486.0
Electricity	676.2	0.03	0.01	678.9
Vehicles (autos and trucks and sulfur trucks)	44.7	0.0	0.0	45.1
Project Total at SMR only	***1,514.7***	***0.12***	***0.03***	***1,525.5***
Project Total within SLOC	***3,031.3***	***0.2***	***0.1***	***3,056.6***
Route Totals (including SLOC emissions)				
Northern Route via Oakland	10,063.9	0.8	0.2	10,156.3
Northern Route via Altamont Pass	9,885.6	0.8	0.2	9,976.3
Southern Route	7,682.6	0.6	0.2	7,752.3
Within California[1]	16,568.9	1.3	0.4	16,723.3
Within United States[2]	66,248.5	5.2	1.7	66,880.7

1. Assumes northern route via Oakland to Washington State Boarder, which is the longest route.
2. Assumes a hypothetical route to the Canadian border via the Midwest, which would be the longest route.

See Appendix B.1 for detailed GHG emission calculations.

$MTCO_2E$-metric tons CO_2 equivalent.

Making light, hydrogen-rich motor fuels from the carbon-dense, hydrogen-poor components of crude requires rejecting carbon and adding hydrogen. This requires aggressive processing that uses lots of energy. As the crude oil gets heavier refiners have to put a larger share of the denser, heavier crude barrel through energy-intensive carbon rejection, hydrogen addition, and supporting processes (Karras, 2011).

The SMR is somewhat unique for a refinery in California since it does not produced any finished motor grade fuels. The refinery was designed to process the heavy sour crude from the Santa Maria Basin and the Santa Barbara OCS into intermediate products (naphtha and gas oils). As such the refinery does not have any processing equipment that adds hydrogen to the heavier oil components.

Hydrogen addition process such as hydrocracking and hydrotreating of gas oil and resid oil are aggressive hydrogen addition processes, which add hydrogen to make fuels and remove sulfur and other refinery process catalyst poisons. These hydrogen adding processes are major consumers of energy and emitters of GHG emissions. (Karras 2011).

In a 2011 paper on Refinery CO_2 performance measurements California refineries were estimated to generate an average of between about 120 and 140 pounds of CO_2 per barrel of oil produced (Karras, 2011). In 2007 the SMR generated about 37 lbs of CO_2 per barrel processed based upon the SLOCAPCD GHG Inventory and the throughput at the SMR. Based upon data in the EIR prepared for the Throughput Increase Project at the SMR the CO_2 emission rate per barrel of oil processed is expect to be reduce slightly to about 34 lbs. (SLOC, 2012). This reduction is primarily a result of the permanent shutdown of the calciner unit in 2007.

The CO_2 emissions per barrel of oil processed is lower for the SMR than the other California refineries since the SMR does not have a lot of the aggressive processing that is need to produce light, hydrogen-rich motor fuels. Therefore, the fuel use per barrel processed is lower.

As the data in Table 4.3.13 shows, the SMR historically has processed and currently processes primarily heavy, sour crudes, although these are sometimes blended with other lighter, sweeter crudes in small amounts.

Phillips 66 expects to continue to receive, blend and process a comparable range of crudes in the future, and will select future crude to be delivered by rail based upon a number of factors including availability, suitability, and economics. The potential range of crudes that could be delivered by rail (see Table 4.3.13) have very similar properties in terms of sulfur and vacuum resid, which are the two key drivers in fuel use at the refinery (fuel use is the primary source of CO_2 emissions). Since the level of sulfur and vacuum resid in the crude oil that would be delivered by train would be similar to the historic crude mix that has been processed at the SMR, the CO_2 emissions would not be expect to change.

The use of the rail spur to import crude oil could potentially displace crude oil from other sources that are currently being used to supply crude oil to the SMR. The majority of crude oil currently being delivered to the SMR is from offshore, OCS sources, which are delivered to the SMR by pipeline and electrically powered pumps. Some of the crude oil is delivered to the SMR via truck through the Santa Maria Pump Station (SMPS). The GHG emissions associated with these trucks (see Table 4.3.8) are estimated to total about 1,742 $MTCO_2e$ per year and indirect emissions (electricity) associated with pumping from the OCS ranging from 5,000-10,000 MTCO2e per year. However, it is speculative as to whether these trucks trips or OCS production would be eliminated as the crude oil from these sources might just be re-directed to locations in Los Angeles or Bakersfield.

Mitigation Measures

AQ-6 *Prior to issuance of the Notice to Proceed, the Applicant shall provide a GHG mitigation, monitoring and reporting plan. The plan shall indicate that, on an annual basis, if GHG emissions exceed the thresholds, the Applicant shall provide GHG emission reduction credits for all of the project GHG emissions. Coordination with the San Luis Obispo Planning and Building Department should begin at least six (6) months prior to issuance of operational permits for the Project to allow time for refining calculations and for the San Luis Obispo Planning and Building to review and approve the emission reduction credits.*

Residual Impacts

Since the operation of the crude oil trains at the SMR would be on Phillips 66 property and the trains would be operated by Phillips 66, the County can require that GHG emissions within the SMR associated with the trains be mitigated using emission reduction credits.

For the mainline rail GHG emissions it is possible that contractually the Applicant could require GHG emission reduction credits. However, the County may also be preempted by Federal law from requiring emission credits for main line rail GHG emissions. Due to the possible preemption by Federal law which could prevent the mitigation measure from being implemented

(outside of the SMR facility boundary), emission reduction credits might not be achievable and impacts would remain *significant and unavoidable (Class I).*

Impact #	Impact Description	Phase	Impact Classification
AQ.7	Operational activities associated with the Rail Spur Project could generate odors.	Operations	Class II

Sources of odors from the facility would be related to emissions of hydrocarbons, hydrogen sulfide and emissions of diesel exhaust. Emissions of fugitive hydrocarbons from the Rail Spur Project would be substantially less than that from the existing refinery (1 tons/yr verses 33 tons/year). The Applicant indicates the expected H_2S content of the crude oil vapor could be about one percent by weight (refer to Table 4.3.13). The release of material that contains even small amounts of sulfur compounds (H_2S) or hydrocarbons produces an odor. Sulfur compounds, found in oil and gas, have very low odor threshold levels. For instance, H_2S can be detected by humans at concentrations from 0.5 parts per billion [ppb] (detected by 2 percent of the population) to 40 ppb, qualified as annoying by 50 percent of the population. Above these levels, H_2S would be detected by most people (AIHA 1989). A conservative H_2S odor limit of 2 ppb has been used in this analysis with a significant impact being assigned to levels that could exceed the 50% odor threshold (1 ppb).

As crude oil vapors would be mixed with entrained air before the canisters, crude oil vapors would only constitute about 500 ppm of the canister input stream (with remaining composition being entrained air). With a 1% weight percent H2S, this would lead to an H_2S concentration of the vapor going to the carbon canisters of about 4.8 ppmV. The carbon canisters would remove at least 95% of this H_2S vapor. Therefore, emissions of odiferous H_2S from the canisters would be very low and would not produce offsite H_2S levels that could produce odors.

Crude oil vapors from fugitive components, however, would not be mixed with air and would therefore have a potentially substantial amount of H_2S, leading to a source of odors. SCREEN3 modeling indicates that, assuming a 1% H_2S concentration and worst case meteorological parameters (F stability and 1 m/s), fugitive emissions would produce H_2S levels at the nearby property line (the agricultural areas south of the SMR) of between 1 - 1.7 ppb (for 60 minute and 3 minute averaging times, respectively). As the odor threshold of H_2S ranges down to a few ppb, this level would be on the edge of producing odor impacts. Therefore, under worst case meteorological conditions and high H_2S levels, fugitive emissions could cause odor impacts offsite and odor emissions would be potentially significant. Note that at residences to the north and east, located farther away, impacts would be less than 1 ppb and would not produce potential odor impacts due to the rail spur fugitive emissions.

Odors could also result from accidents (spills of crude oil) or maintenance operations, such as removing materials by vacuum truck or line openings. Railcar unloadings could also produce odors if rail tank car unloading procedures are not followed correctly (i.e., top valves are left open when the unloading pumps are shut-down). Any of these maintenance procedures, if not conducted properly with respect to odor minimizations, could cause offsite odors.

Mitigation Measures

AQ-7 *Prior to issuance of Notice to Proceed, the Applicant shall ensure that any new odor sources be added to the existing Refinery Odor Control Plan and submitted to the SLOCAPCD for review and approval before the start of construction. Mitigation shall include carbon canisters on all vacuum trucks, arrival and pre-departure inspection of all rail cars for fugitive leaks, monitoring of rail car top vents during unloading, and methods to reduce and eliminate odors associated with maintenance activities. Monitoring of odors from the rail facility and the other portions of the SMR potentially affected by a change in crude oil slate, shall be included in the Plan and shall be conducted by an independent third party monitor, retained by the County of San Luis Obispo Department of Planning, for the first three months of operation during each unit train visit. The APCD shall be notified of monitoring and unit train activity. Monitoring activities can be reduced, in coordination and agreement with the APCD, after the facility startup if odors are not determined to affect areas offsite. In addition to monitoring, the amended Odor Control Plan shall also detail control measures and/or operating procedures that will be implemented to reduce odor impacts if odors are a concern. The Plan shall also include an implementation schedule for incorporating additional measures if needed. The Plan measures shall include leak detection (if not already implemented), lower leak detection and repair threshold limits (to 100 ppm), increased component monitoring frequency (monthly), component replacement with lower leak levels and improved vapor control systems and these measures shall be discussed in the Odor Control Plan.*

Residual Impacts

Hydrogen sulfide within the crude oil is not expected to produce substantial impacts beyond possible OSHA related worker exposure issues or potential odor issues. OSHA related worker issues are outside the scope of the EIR. As per Applicant submittals, H_2S levels in crude vapors could be substantial and potentially could produce offsite odor issues. If H_2S levels are elevated, additional measures would be addressed under the Refinery Odor Control Plan to reduce the emissions from valves and components. Leak detection reduces emission by an estimated 80%. Addition measures, such as lower leak detection and repair thresholds or monitoring frequency, would reduce emissions by an additional 40% (from 80% to 88% control), reducing offsite impacts to less than significant. Odor impacts associated with the project would therefore be *less than significant with mitigation (Class II).*

Impact #	Impact Description	Phase	Impact Classification
AQ.8	Cumulative criteria pollutant and GHG emissions at the SMR could exceed SLOCAPCD thresholds.	Operations	Class II

The Throughput Increase Project would increase criteria, toxic pollutants, and GHG emissions over the current baseline. Table 4.3.26 provides a summary of the Throughput Increase and Rail Spur Project emissions combined. The cumulative emissions for the two projects would exceed the daily SLOCAPCD threshold for ROG+NO_x and diesel particulate matter, and the annual threshold ROG+NO_x and GHG.

The permit issued for the Throughput Increase Project requires that: (1) best available technology (BACT) be installed on the crude heaters, coke heaters and boiler, vacuum heaters and superheaters; (2) trucks meet EPA 2010 or 2007 model year NO_x and DPM emission requirements to the extent feasible; and (3) any emissions that remain above the threshold must be mitigated using offsite mitigation per the SLOCAPCD guidelines.

Mitigation measures AQ-2a and AQ-2b require the Applicant to reduce ROG+NO_x and DPM emissions through the use of Tier 4 engines and reduced idling and on-site refinery measures. Any remaining ROG+NO_x emissions would be mitigated by either onsite or offsite emissions credits. Therefore, with the mitigation required by the Throughput Increase permit and the mitigation required for the Rail Spur Project, cumulative criteria pollutant emissions would be less than significant.

As shown in Table 4.3.26 the cumulative annual GHG emissions would exceed the SLOCAPCD threshold, primarily due to the Throughput Increase Project. The permit issued for the Throughput Increase Project requires the Applicant to implement: (1) a program to increase efficiency of the refinery stationary combustion devices; (2) use of more efficient model year trucks or alternative fueled vehicles for hauling vehicles; and (3) off-site mitigation of GHG emissions such that the additional GHG emissions associated with the Throughput Increase Project is less than 10,000 metric tonnes per year.

Table 4.3.26 Cumulative Criteria Pollutant and GHG Emissions at the SMR and Thresholds

Project	Peak Day Emissions (lbs/day)				
	ROG+NO_x	CO	Diesel Particulate Matter	Fugitive Dust (PM_{10})	$MTCO_2E$
Throughput Increase Project	128.1	22.1	2.7	0.1	--
Rail Spur Project	244.5	21.2	8.1	1.3	--
Total	372.6	43.3	10.8	1.4	--
SLOCAPCD Threshold	25	550	1.25	25	--
Significant?	Yes	No	Yes	No	--
Project	**Annual Emissions (tons/year)**				
	ROG+NO_x	CO	Diesel Particulate Matter	Fugitive Dust (PM_{10})	$MTCO_2E$
Throughput Increase Project	23.4	--	--	0.02	20,470
Rail Spur Project	22.6	--	--	0.17	3,057
Total	46.0	--	--	0.19	23,527
SLOCAPCD Threshold	25	--	--	25	10,000
Significant?	Yes	--	--	No	Yes

Emissions for Throughput Increase Project from Final EIR 2012. GHG Emissions within SLOC

Given that the Throughput Increase permit only requires the GHG emissions to be reduced to less than 10,000 metric tonnes per year, any increase in GHG emissions associated with the Rail Spur Project would be considered cumulatively significant.

The cumulative health risk associated with the Rail Spur and Throughput Increase Projects are discussed below in the cumulative analysis.

Mitigation Measures

AQ-8 *Prior to issuance of the Notice to Proceed, the Applicant shall provide a GHG mitigation, monitoring and reporting plan. The plan shall investigate methods to bring the Rail Spur Project GHG emissions at the refinery to zero for the entire project each year. The plan shall indicate that, on an annual basis, if after all onsite mitigations are implemented, the GHG emissions from the Rail Spur Project still exceed zero, then SLOCAPCD-approved off-site mitigation will be required. Methods could include the contracting arrangement that increases the use of more efficient locomotives, or through other, onsite measures. Coordination with the SLOCAPCD should begin at least six (6) months prior to issuance of operational permits for the Project to allow time for refining calculations and for the SLOCAPCD to review and approve the mitigation approach.*

Residual Impacts

The residual cumulative criteria pollutant emissions at the refinery would be *less than significant (Class III)*. The residual impacts associated with the cumulative GHG emissions are the refinery would be *less than significant with mitigation (Class II).*

4.3.5 Cumulative Analysis

The Phillips 66 Pipeline Project, Freeport-McMoRan Oil & Gas Oil Field Expansion, and the Guadalupe Oil Field Remediation would all generate construction and operational criteria pollutant air emissions that would likely be significant. Trucking NOx and ROG emissions associated with the Guadalupe Project are required to be offset through an agreement with SLOCAPCD. Regional operational impacts from the other cumulative projects could be realized since multiple projects would emit into the South Central Coast Air Basin at the same time. All of the cumulative projects are within the South Central Coast Air Basin and most of these projects are also within the South County planning area. All projects within the South Coast planning area are subject to the air quality impact program as detailed in the Air Quality Handbook (SLOCAPCD 2012) through standard mitigation measures and off-site mitigation which identifies improvements that will help reduce some of the cumulative air quality impacts.

All cumulative projects within SLOC must comply with SLOCAPCD rules and regulations that include air emission reduction strategies for the basin. These, in concert with individual project mitigation measures, will help reduce air quality impacts. However, until the San Luis Obispo area as a whole attains all federal and state standards, it is likely that the criteria pollutant air emissions from the cumulative projects would be regionally significant and unavoidable.

The Rail Spur Project would be required to provide emission reduction credits for all the significant construction and operational criteria pollutant emissions at the refinery, the County may be preempted from mitigating the mainline rail emissions within San Luis Obispo County. These additional project related criteria pollutant emissions would be considered cumulatively significant and unavoidable since the area is in non-attainment with some of the federal and state standards air quality standards.

Most of the cumulative projects outside of the refinery are far enough from the project site to not result in overlapping toxic emissions that would impact the health risk near the refinery.

However, the Guadalupe Project trucking along Willow Road would add additional toxic emissions in the project area. HARP2 was used to analyze the Guadalupe Project trucking health risk impacts along Highway 1 and Willow Road based on the trucking emissions in the 2014 Guadalupe Trucking Addendum EIR. Impacts at the closest residence along Willow Road were estimated to add 1.5 in a million cancer cases due to the Guadalupe Trucking project only. The combined cancer risk for the Rail Spur Project and Guadalupe Trucking would therefore be less than the cumulative threshold of 89 in a million (see Table 4.3.27).

Table 4.3.27 Cumulative Health Risk HARP Modeling Results: Cancer Risk

Scenario	PMI	MEIR	Worker	Louise Ln	Trilogy Prkwy	Monadella Street	Olivera Ave
Baseline[1]	21.9	18.1	0.62	1.33	1.57	10.8	4.2
Baseline + Proposed Project Mitigated[2]	58.0	13.6	0.69	2.6	1.9	13.6	10.9
Throughput Increase[3]	0.0	0.2	0.0	0.0	0.0	0.2	0.1
Guadalupe Trucking Project	-	1.5	-	1.2	0.7	0.4	0.8
Combined Risk Levels	58.0	14.2[4]	0.69	4.8	2.6	14.0	11.7
Cumulative Significance Threshold[5]	-	89.0	89.0	89.0	89.0	89.0	89.0
Cumulatively Significant?[5]	-	No	No	No	No	No	No

Notes: 1) Baseline includes SMR, trucks and coke trains. Does not include any mitigation. 2) Mitigation includes clean trucks, locomotive idling restrictions, and daytime only crude rail car unloading. Proposed project includes BTEX increase, rail spur related mainline locomotives and sulfur trucks. 3) Increased cancer risk from the Throughput increase project only. Includes additional trucks and increased use of specific refinery equipment. 4) MEIR is the maximum combined resident, which occurs at different locations for the project and the cumulative Guadalupe trucks. 5) Cumulative significance is based on the SLOCAPCD threshold of 89 in a million for Type B projects (see SLOCAPCD 2012). Impacts associated with emissions associated with only the SMR (SMR baseline, Rail Spur Project and the Throughout Project) are compared to the thresholds of 10 in a million for Type A projects.

Toxic emissions associated with the Throughput Increase Project were determined in the Throughput Project's FEIR to be less than significant. As part of the Throughput Increase EIR an updated HRA utilizing 2010 emission data was developed. The HRA indicated that the highest cancer risks at the facility fence line would be 2.1 in a million, and that chronic and acute risks would be 0.02 and 0.38, respectively, associated with the Throughput Increase operations.

HARP2 modeling was conducted as part of this EIR with the SMR operating at the Throughput Increase Project permit level along with the rail spur project, including increases in BTEX and additional sulfur trucks. Most of the SMR health risk levels for the current operations are from the diesel engines (fire water pumps, backup generators). Operation of the fire water pump and backup generators would not change with the Throughput Increase Project and therefore risk levels from the SMR associated with the Throughput Increase Project would be similar to the Proposed Project risk levels. The Throughput Increase Project included an increase in trucking (about 6 percent). This increase in trucking was added to the proposed Rail Spur Project risk levels and produced a peak increase in cancer risk of 0.2 cancer cases per million under the mitigated case. As the impacts associated with the Rail Spur Project would be significant and unavoidable, with the addition of the Rail Spur Project, the cumulative health risk impact with the Throughput Project would also be significant and unavoidable for the SMR site.

There is the potential for cumulative impacts associated with the crude by rail projects discussed in Chapter 3. The Valero Benicia and Kinder Morgan crude by rail projects could use the same UPRR tracks as the Rail Spur Project from the Roseville Yard to the Bay Area if the trains servicing the SMR come from the north. These two projects could have up to three unit trains per day. Assuming the air emissions for each train are similar to the unit trains for the Rail Spur Project, then the air emission from these trains would exceed the NO_x emission significance thresholds in the Bay Area Quality Management District (BAAQMD), Yolo-Solano Air Quality Management District (YSAQMD), Sacramento Metropolitan Air Quality Management District (SMAQMD), Placer County Air Quality Management District (PCAPCD), and the cumulative impacts within the Sacramento and Bay Area Basins would be significant. In addition, trains servicing the Alon, Targa, and Plains crude by rail projects would also pass through some of these same air districts on their way south to the San Joaquin Valley contributing additional NO_x emissions to the Sacramento basin. For ROG/VOC emissions the cumulative impacts of the crude by rail projects could be cumulatively significant in the BAAQMD since the combined ROG/VOC emissions would exceed the daily threshold of 80 lbs per day.

With the cumulative crude by rail projects an additional eight one-way crude trains per day would be added to the section of track between the northern Bay Area and Sacramento. An additional 16 one-way crude trains would be added to the mainline track from Sacramento to Roseville and along the mainline track from Roseville to Oregon or Nevada depending upon the route taken. These cumulative rail trips (including those from the proposed Project) would generate between 604 and 3,551 pounds per day of NO_x in different air districts along the routes, and a total of 93,000 MTCO2e within California.

Cumulative toxic air emission for trains operating on the same tracks could be potentially significant and unavoidable. On the stretch of track west of the Roseville rail yard there could be as many as about 2,800 crude oil trains per year (7.7 trains per day). Even where the train travels at the maximum speed limit of 55 mph, the 30-year cancer risk would be above the threshold of 10 in a million out as far as 2,000 feet from the tracks and would be considered significant and unavoidable. For train travel below 45 mph, this level of train traffic would also exceed the cumulative threshold (89 in a million as the SLOCAPCD threshold). Utilizing only Tier 4 locomotives, risk levels would be below the cumulative threshold at all speeds and below the 10 in a million threshold at 300 feet (at 55 mph).

None of the other cumulative crude by rail projects would use tracks within the Ventura County Air Pollution Control District VCAPCD, Santa Barbara County Air Pollution Control District (SBCAPCD), San Luis Obispo County Air Pollution Control District (SLOCAPCD), and Monterey Bay Unified Air Pollution Control District (MBUAPCD).

For the Rail Spur Project mitigation measure have been provided that would require the Applicant to obtain emission credits for all main line rail NO_x emissions. If these emission credits were obtained then the Rail Spur Project's contribution to the cumulative NO_x and ROG/VOC emission impacts would be less than significant.

However, the County may be preempted by Federal law from mitigating rail emissions outside of the SMR, and therefore may not have the authority to require offsite emission credits for the UPRR mainline emissions. In this case the Rail Spur Project's contribution to cumulative NO_x

emissions associated with the URPP mainline emissions would also be significant and unavoidable in all of the air basins that the train would cross. The Rail Spur Project's ROG/VOC emissions would be cumulatively significant in the Bay Area and the San Luis Obispo County air basins.

The California Air Pollution Control Officers Association consider greenhouse gas (GHG) emissions impacts to be exclusively cumulative impacts (CAPCOA, 2008); as such, assessment of significance is based on a determination of whether the GHG emissions from a project represent a cumulatively considerable contribution to the global atmosphere. The Rail Spur Project would result in a net increase of 16,723 metric tonnes carbon dioxide equivalents (CO_2e) per year within the State of California (of which 1,570 would be at the SMR and 15,153 tonnes would be from mainline rail operations). The Applicant would be required to provide emission reduction credits for the GHG emissions at the SMR. A mitigation measure is also proposed that would require the Applicant to provide emissions reduction credits for all GHG emissions within California.

However, the County may be preempted by Federal law from mitigating rail emissions outside of the SMR, and therefore may not have the authority to require offsite emission credits for the UPRR mainline emissions. Therefore, when compared to the SLOCAPCD significance threshold of 10,000 metric tonnes CO_2e, the Project's contribution to GHG impacts would be cumulatively considerable, and there would be a significant cumulative GHG impact associated with the Project.

The additional crude oil supplied by northern Santa Barbara County oil fields would be transported by both trucks and pipeline from the oil fields to the SMR. Installation of the ERG Pipeline would increase the amount of crude oil transported by pipeline. Additional crude oil production at other onshore fields might utilize the SMPS unloading facility if the crude oil is delivered by truck instead of pipeline, and could cause the permit limits at the SMPS to be exceeded. This might cause some displacement of crude oil to other refineries if the SMPS permit limits are exceeded. However, historical operations at the SMPS indicate that there is plenty of excess capacity at the SMPS and within the pipelines to handle additional crude oil (a permit limit of 26,000 bpd of truck unloading at the SMPS with 2010 throughput levels of less than 7,000 bpd).

Combined crude oil production from northern Santa Barbara County fields as well as SLOC fields (Freeport-McMoRan Oil & Gas Oil Field Expansion) could increase area crude oil production by 20-30,000 bpd. With the two pipeline projects from the Arroyo Grande Field and the Cat Canyon Field, emissions from truck trips would most likely not increase under the cumulative scenarios. However, until the San Luis Obispo area as a whole attains all federal and state standards, it is likely that the criteria pollutant air emissions from the cumulative projects at the respective oil fields would increase and be regionally significant and unavoidable. Criteria pollutant emissions from the Freeport-McMoRan Oil & Gas Oil Field Expansion project, for example, would increase ROG + NOx emissions by more than 300 pounds/day.

If Phillips 66 elects to utilize the rail spur to its capacity, there would only be about a remaining 12,000 bpd of capacity at the SMR. This could then redirect some crude oil from proposed area projects to other destinations, most likely south to Los Angeles, via a reversal of the Sisquoc

pipeline to allow for transportation of crude oil to Los Angeles area refineries via the All American Pipeline (a Sisquoc Pipeline reversal project was proposed in 2001). Transportation of crude oil by pipeline to Los Angeles would continue to involve movement of trucks to the SMPS and offloading of crude oil at the SMPS, as is currently the case for trucked crude oil. Additional trucking to the SMPS associated with these projects would increase emissions. However, until the San Luis Obispo area as a whole attains all federal and state standards, it is likely that the criteria pollutant air emissions from the cumulative projects would be regionally significant and unavoidable.

Although reversal of the Sisquoc pipeline is the most likely scenario, it is possible that crude oil development projects would utilize trucks to transport crude oil to Bakersfield or Los Angeles. This would equate to up to 120 truck trips per day (round trips). These truck trips could generate up to 948 lbs/day of NOx and close to 24,000 MTCO2e annually, if all of the crude oil were transported to Los Angeles area refineries. This would also increase emissions in the area and would also be a cumulatively significant impact.

4.3.6 Mitigation Monitoring Plan

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
AQ-1a	Prior to issuance of grading and construction permits, and throughout project construction, as applicable, the Applicant shall implement the following construction emission reduction measures: a. Properly maintain all construction equipment according to manufacturer's specifications; b. Fuel all off-road and portable diesel powered equipment with CARB-certified motor vehicle diesel fuel (non-taxed version suitable for use off-road); c. Applicant shall include the following, in addition to complying with state Off-Road Regulations, in order to reduce peak daily/quarter ROG+NOx emissions: 1) Use CARB Tier 4 certified diesel construction equipment off-road heavy-duty diesel engines and 2) Stagger the construction schedule to prevent peak day/quarter emissions from exceeding the threshold (for example, no site preparation during grading and soil transport); d. Use CARB 2010 or cleaner certified on-road heavy-duty diesel trucks to the extent feasible and comply with state On-Road Regulations; e. If construction or trucking companies that are awarded the bid or are subcontractors for the project do not have equipment to meet the above two measures, the impacts from the dirtier equipment shall be addressed through SLOCAPCD approved off-site or other mitigation measures; f. All on- and off-road diesel equipment shall not idle for more than 5 minutes. Signs shall be posted in the designated queuing areas and job sites to remind	Review of construction plan documents Site Inspection	Prior to grading permits	SLO County Planning and Building SLOCAPCD

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	drivers and operators of the 5 minute idling limit; g. Diesel idling within 1,000 feet of sensitive receptors is not permitted (Sensitive receptors are defined in the SLOCAPCD Handbook as people that have an increased sensitivity to air pollution or environmental contaminants. Sensitive receptor locations include schools, parks and playgrounds, day care centers, nursing homes, hospitals, and residential dwelling units); h. Staging and queuing areas shall not be located within 1,000 feet of sensitive receptors; i. Equipment shall be electrified when feasible; j. Substitute gasoline-powered or diesel hybrids in place of diesel-powered equipment, where feasible; and k. Use alternatively fueled construction equipment on-site where feasible, such as compressed natural gas (CNG), liquefied natural gas (LNG), propane, or biodiesel.			
AQ-1b	Prior to issuance of grading and construction permit, the Applicant shall ensure SLOCAPCD regulations that prohibit developmental burning of vegetative material within San Luis Obispo County are followed for the life of the project.	Review of design documents and plans Site Inspection	Prior to grading permits	SLO County Planning and Building SLOCAPCD
AQ-1c	Prior to issuance of grading and construction permit, the Applicant shall ensure that portable equipment and engines 50 horsepower or greater, used during grading and construction activities must have a California portable equipment registration (issued by the ARB) or a SLOCAPCD permit. Proof of registration must be provided to the SLOCAPCD prior to the start of grading or construction or a permit secured from the SLOCAPCD prior to the start of grading or construction. The following list is as a guide to equipment and operations that may have permitting requirements, but it is not exclusive: a. Power screens, conveyors, diesel engines, and/or crushers; b. Portable generators and equipment with 50-horsepower or greater engines; c. Internal combustion engines; d. Unconfined abrasive blasting operations; e. Concrete batch plants; f. Rock and pavement crushing; g. Tub grinders; and h. Trommel screens.	Review of construction plan documents Site Inspection	Prior to grading permits	SLO County Planning and Building SLOCAPCD
AQ-1d	Prior to issuance of grading and construction permit, the Applicant shall ensure that all grading and construction equipment greater than 100 bhp be equipped with CARB Level 3 diesel particulate filters (DPF), or equivalent, to achieve an 85 percent reduction in diesel particulate emissions from an uncontrolled engine. If CARB verified	Review of construction plan documents Site	Prior to grading permits	SLO County Planning and Building SLOCAPCD

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	Level 3 DPFs cannot be secured for all of the equipment greater than 100 hp then the applicant will offset the added DPM with measures including but not limited to schedule modifications, implementation of no idling requirement, or other applicable measures providing a total reduction equivalent to an 85 percent reduction from uncontrolled engines as approved by the SLOCAPCD.	Inspection		
AQ-1e	Prior to issuance of grading and construction permits, or during construction, if emissions of ROG+NOx with the above mitigations still exceed the thresholds, the Applicant shall secure SLOCAPCD-approved onsite or off-site reductions in ROG + NOx emissions to ensure that ROG + NOx emissions do not exceed the SLOCAPCD quarterly thresholds. Coordination with the SLOCAPCD should begin at least six (6) months prior to issuance of grading and/or construction permits for the Project to allow time for refining calculations and for the SLOCAPCD to review and approve the Construction Activity Management Plan (CAMP) and on-site or off-site mitigation approach.	Review of construction plan documents Site Inspection	Prior to grading permits During construction	SLO County Planning and Building SLOCAPCD
AQ-1f	Prior to issuance of applicable grading permit, the Applicant shall prepare a Dust Control Plan to be approved by the APCD and County Health and include requirements in the SLOCAPCD CEQA Handbook identified as fugitive dust mitigation measures and shall include a combination of the following, as approved by the SLOCAPCD and County Health: a. Reduce the amount of the disturbed area where possible. b. Use of water trucks or sprinkler systems in sufficient quantities to prevent airborne dust from leaving the site. An adequate water supply source must be identified. Increased watering frequency would be required whenever wind speeds exceed 15 mph. Reclaimed (non-potable) water should be used whenever possible. c. All dirt stockpile areas should be sprayed daily as needed, covered, or a SLOCAPCD-approved alternative method will be used. (90 percent reduction from no dust control). d. Permanent dust control measures identified in the approved Project revegetation and landscape plans should be implemented as soon as possible following completion of any soil disturbing activities and shall use native species that have been shown to reduce particulate emissions to the extent feasible. e. Exposed ground areas that will be reworked at dates greater than one month after initial grading should be sown with a fast-germinating non-invasive grass seed and watered until vegetation is established. f. All disturbed soil areas not subject to revegetation should be stabilized using approved chemical soil	Review of construction plan documents Site Inspection	Prior to grading permits	SLO County Planning and Building County Health SLOCAPCD

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	binders, jute netting, or other methods approved in advance by the SLOCAPCD. g. All roadways, driveways, etc. to be paved should be completed as soon as possible. In addition, equipment pads should be laid as soon as possible after grading unless seeding or soil binders are used. h. Vehicle speed for all construction vehicles shall not exceed 15 mph on any unpaved surface at the construction site. i. All trucks hauling dirt, sand, soil, or other loose materials are to be covered or should maintain at least 2 feet of freeboard (minimum vertical distance between top of load and top of trailer) in accordance with CVC Section 23114. j. Install wheel washers where vehicles enter and exit unpaved roads onto streets, or wash off trucks and equipment leaving the site. k. Sweep streets at the end of each day if visible soil material is carried onto adjacent paved roads. Water sweepers with reclaimed water should be used where feasible l. Apply water every 3 hours to disturbed areas within the construction site in order to achieve a 61 percent reduction in particulate emissions. In addition, when drought conditions are present, fugitive dust control measures need to be modified by utilizing soil binders or other equivalent measures, to conserve water resources while still providing the necessary emission reductions. m. In support of APCD standard fugitive dust mitigation measures, the applicant shall designate a Visible Emission Evaluation certified person or persons to monitor the fugitive dust emissions and enhance the implementation of the measures as necessary to minimize nuisance violations from dust complaints (Rule 402) and to reduce visible emissions below the APCD's Rule 401 requirement that opacity not exceed 20% for greater than 3 minutes in any 60 minute period. Their duties shall include holidays and weekend periods when work may not be in progress. The name and telephone number of the designated monitor shall be provided to the SLOCAPCD Compliance Division and the Department of Planning and Building prior to the start of any grading, earthwork, or demolition. n. All PM10 mitigation measures required shall be shown on grading and building plans. o. Between June 1 and November 30, when Valley Fever rates of infection are the highest, additional dust suppression measures (such as additional water or the application of additional soil stabilizer) will be implemented prior to and immediately following			

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	ground disturbing activities if wind speeds exceed 15 miles per hour (mph) or temperatures exceed 95 degrees Fahrenheit for three consecutive days. The additional dust suppression will continue until winds are 10 mph or lower and outdoor air temperatures are below 90 degrees for at least two consecutive days. The additional dust suppression measures will be incorporated into the Final Dust Control Plan. The Plan will be submitted to the County for review and approval. p. The primary project construction contractor will prepare and implement a worker training program that describes potential health hazards associated with Valley Fever, common symptoms, proper safety procedures to minimize health hazards, and notification procedures if suspected work-related symptoms are identified during construction. The worker training program will identify safety measures to be implemented by construction contractors during construction. Safety measures will include: 1) Providing HEPA-filtered air-conditioned enclosed cabs on heavy equipment. 2) Train workers on proper use of cabs, such as turning on air conditioning prior to using the equipment. 3) Providing communication methods, such as two-way radios, for use by workers in enclosed cabs. 4) Providing personal protective equipment (PPE), such as half-mask and/or full-mask respirators equipped with particulate filtration, to workers active in dusty work areas. 5) Providing separate, clean eating areas with hand washing facilities for construction workers. 6) Cleaning equipment, vehicles, and other items before they are moved offsite to other work locations. 7) Providing training for construction workers so they can recognize the symptoms of Valley Fever and promptly report suspected symptoms of work related Valley Fever to a supervisor. 8) Directing workers that exhibit Valley Fever symptoms to immediately seek a medical evaluation. q. Construction activities that will generate dust shall be limited to periods when good air quality is forecasted to the maximum extent feasible. The 6 day forecast for the CDF forecast zone shall be utilized as available from the APCD website, slocleanair.org. This information should be used by all on-site workers to plan construction activities for days when the air quality is forecast to be good.			
AQ-1g	Prior to issuance of applicable grading permit, the Applicant shall submit a geologic evaluation under the CARB ATCM for Construction, Grading, Quarrying, and Surface Mining Operations, to determine if Naturally	Review of geological evaluation	Prior to grading permits	SLO County Planning and Building

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	Occurring Asbestos (NOA) is present within the area that will be disturbed. NOA has been identified as a toxic air contaminant by the CARB. If NOA is not present, an exemption request must be filed with the SLOCAPCD. If NOA is found at the site, the Applicant must 1) comply with all requirements outlined in the Asbestos ATCM. This may include development of an Asbestos Dust Mitigation Plan and an Asbestos Health and Safety Program for approval by the SLOCAPCD; and 2) conduct a geological evaluation prior to any grading. Technical Appendix 4.4 of the SLOCAPCD CEQA Handbook includes a map of zones throughout the County where NOA has been found. More information on NOA is available at http://www.slocleanair.org/business/asbestos.php.	Review of Plan and Program Site Inspection		SLOCAPCD
AQ-1h	Prior to issuance of demolition permits, if required, the Applicant shall comply with asbestos containing material (ACM) requirements. Demolition activities can have potential negative air quality impacts, including issues surrounding proper handling, demolition, and disposal of ACM. ACM could be encountered during demolition or remodeling of existing buildings. Asbestos can also be found in utility pipes and pipelines (transite pipes or insulation on pipes). If utility pipelines are scheduled for removal or relocation or a building(s) is proposed to be removed or renovated, various regulatory requirements may apply, including the requirements stipulated in the National Emission Standard for Hazardous Air Pollutants (40CFR61, Subpart M - asbestos NESHAP). These requirements include but are not limited to: (1) notification to the SLOCAPCD; (2) an asbestos survey conducted by a Certified Asbestos Inspector; and (3) applicable removal and disposal requirements of identified ACM. More information on asbestos is available at http://www.slocleanair.org/business/asbestos.php.	Review of asbestos survey Site Inspection	Prior to demolition permits	SLO County Planning and Building SLOCAPCD
AQ-1i	Should hydrocarbon contaminated soil be encountered during construction activities, the SLOCAPCD must be notified as soon as possible and no later than 48 hours after affected material is discovered to determine if an SLOCAPCD Permit will be required. In addition, the following measures shall be implemented immediately after contaminated soil is discovered: 1) Covers on storage piles shall be maintained in place at all times in areas not actively involved in soil addition or removal; 2) Contaminated soil shall be covered with at least six inches of packed uncontaminated soil or other TPH – non-permeable barrier such as plastic tarp. No headspace shall be allowed where vapors could accumulate; 3) Covered piles shall be designed in such a way to eliminate erosion due to wind or water. No openings in the covers are permitted; 4) During soil	Site Inspection	During construction	SLO County Planning and Building SLOCAPCD

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	excavation, odors shall not be evident to such a degree as to cause a public nuisance; and, 5) Clean soil must be segregated from contaminated soil. The notification and permitting determination requirements shall be directed to the SLOCAPCD Enforcement Division.			
AQ-2a	Prior to issuance of Notice to Proceed, the Applicant shall provide a mitigation, monitoring and reporting plan updated annually. The plan shall investigate methods for reducing the onsite and offsite emissions, both from fugitive components and from locomotives or from other SMR activities (such as the diesel pumps, trucks, and compressors to reduce DPM). In addition, locomotive emissions shall be mitigated to the extent feasible through contracting arrangements that require the use of Tier 4 locomotives or equivalent emission levels. The plan shall indicate that, on an annual basis, if emissions of ROG+NOx and DPM with the above mitigations still exceed the thresholds, as measured and confirmed by the SLOCAPCD, the Applicant shall secure SLOCAPCD-approved onsite and/or offsite emission reductions in ROG + NOx emissions or contribute to new or existing programs to ensure that project-related ROG + NOx emissions within SLO County do not exceed the SLOCAPCD thresholds. Coordination with the SLOCAPCD should begin at least six (6) months prior to issuance of the Notice to Proceed for the Project to allow time for refining calculations and for the SLOCAPCD to review and approve any required ROG+NOx emission reductions.	Review of operational plan documents Signing of agreement with the Applicant that covers emission reduction credits	Prior to notice to proceed	SLOCAPCD
AQ-2b	Prior to issuance of Notice to Proceed, the Applicant shall implement a program, including training and procedures, to limit all locomotive onsite idling to no more than 15 consecutive minutes except when idling is required for safety purposes. Locomotive idling records shall be maintained and provided to the SLOCAPCD on an annual basis, along with training materials and training records.	Review of operational plan documents Site Inspections	Prior to notice to proceed	SLOCAPCD
AQ-3	Prior to issuance of the Notice to Proceed, the Applicant shall provide a mitigation, monitoring and reporting plan. The plan shall investigate methods for reducing the locomotive emissions through contracting arrangements that require the use of Tier 4 locomotives or equivalent emission levels. The plan shall indicate that, on an annual basis, if the mainline rail emissions of ROG+NOx with the above mitigations still exceed the applicable Air District thresholds, the Applicant shall secure emission reductions in ROG + NOx emissions or contribute to new or existing programs within each applicable Air District, similar to the emission reduction program utilized by the SLOCAPCD, to ensure that the main line rail ROG + NOx emissions do not exceed the Air District thresholds for the life of the project. The Applicant shall provide	Review of operational plan documents Signing of agreement with the Applicant that covers emission reduction credits. Letter from other Air	Prior to notice to proceed	County Planning and Building

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	documentation from each Air District to the San Luis Obispo County Planning and Building Department that emissions reductions have been secured for the life of the project prior to issuance of the Notice to Proceed.	Districts covering emission reduction credits		
AQ-4a	Implement measures AQ-2a and AQ-2b.	Review of operational plan documents Site Inspections	Prior to notice to proceed	SLOCAPCD
AQ-4b	All trucks under contract to the SMR for moving coke and sulfur shall meet EPA 2010 model year NOx and PM emission requirements and a preference for the use of rail over trucks for the transportation of coke shall be implemented to the extent feasible in order to reduce offsite emissions. Annual truck trips associated with refinery operations and their associated model year and emissions shall be submitted to the SLOCAPCD annually.	Review of annual truck emission data	Prior to notice to proceed Annually during operations	SLOCAPCD County Planning and Building
AQ-4c	If mitigation measure AQ-2a (the use of Tier 4 locomotives only) is not implemented, then crude oil train unloading and switching activities at the SMR shall be limited to the period of 7 a.m. to 7 p.m. to reduce the emissions during periods of calm meteorological conditions. Reports shall be submitted to the County and APCD indicating the time of arrival, the start and end time of train switching break-apart and unloading and departure time. These time limits do not apply to pull-in of the unit trains from the mainline. When a unit train is pulled in between 7 p.m. and 7 a.m., the locomotives shall shut down until the allowed unloading time starting at 7 a.m. No switching or breaking apart of trains or any other locomotive activity is allowed between 7 p.m. and 7 a.m. except for the minimum activity needed to move the unit train onto the SMR property.	Review of operational plan documents Review of train unloading logs	Prior to Operation Ongoing during operations	County Planning and Building
AQ-6	Prior to issuance of the Notice to Proceed, the Applicant shall provide a GHG mitigation, monitoring and reporting plan. The plan shall indicate that, on an annual basis, if GHG emissions exceed the thresholds, the Applicant shall provide GHG emission reduction credits for all of the project GHG emissions. Coordination with the San Luis Obispo Planning and Building Department should begin at least six (6) months prior to issuance of operational permits for the Project to allow time for refining calculations and for the San Luis Obispo Planning and Building to review and approve the emission reduction credits.	Review of operational plan documents Site Inspections	Prior to notice to proceed	County Planning and Building
AQ-7	Prior to issuance of Notice to Proceed, the Applicant shall ensure that any new odor sources be added to the existing Refinery Odor Control Plan and submitted to the	Review of Odor Control Plan	Prior to construction	SLOCAPCD

Mitigation Measure	Plan Requirements and Timing	Compliance Verification		
		Method	Timing	Responsible Party
	SLOCAPCD for review and approval before the start of construction. Mitigation shall include carbon canisters on all vacuum trucks, arrival and pre-departure inspection of all rail cars for fugitive leaks, monitoring of rail car top vents during unloading, and methods to reduce and eliminate odors associated with maintenance activities. Monitoring of odors from the rail facility and the other portions of the SMR potentially affected by a change in crude oil slate, shall be included in the Plan and shall be conducted by an independent third party monitor, retained by the County of San Luis Obispo Department of Planning, for the first three months of operation during each unit train visit. The APCD shall be notified of monitoring and unit train activity. Monitoring activities can be reduced, in coordination and agreement with the APCD, after the facility startup if odors are not determined to affect areas offsite. In addition to monitoring, the amended Odor Control Plan shall also detail control measures and/or operating procedures that will be implemented to reduce odor impacts if odors are a concern. The Plan shall also include an implementation schedule for incorporating additional measures if needed. The Plan measures shall include leak detection (if not already implemented), lower leak detection and repair threshold limits (to 100 ppm), increased component monitoring frequency (monthly), component replacement with lower leak levels and improved vapor control systems and these measures shall be discussed in the Odor Control Plan.	Site Inspection		
AQ-8	Prior to issuance of the Notice to Proceed, the Applicant shall provide a GHG mitigation, monitoring and reporting plan. The plan shall investigate methods to bring the Rail Spur Project GHG emissions at the refinery to zero for the entire project each year. The plan shall indicate that, on an annual basis, if after all onsite mitigations are implemented, the GHG emissions from the Rail Spur Project still exceed zero, then SLOCAPCD-approved off-site mitigation will be required. Methods could include the contracting arrangement that increases the use of more efficient locomotives, or through other, onsite measures. Coordination with the SLOCAPCD should begin at least six (6) months prior to issuance of operational permits for the Project to allow time for refining calculations and for the SLOCAPCD to review and approve the mitigation approach.	Review of operational plan documents Signing of agreement with the Applicant that covers emission reduction credits.	Prior to notice to proceed	County Planning and Building

4.3.7 References

AEP 2007. Recommendations by the Association of Environmental Professionals (AEP) on How to Analyze Greenhouse Gas Emissions and Global Climate Change in CEQA Documents. Comment Draft. White Paper. March.

American Industrial Hygiene Association, ODOR Thresholds for Chemicals with Established Occupational Health Standards, 1989.

API 2004 American Petroleum Institute. Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Gas Industry.

Booz-Allen Hamilton, 1992 Report on Locomotive Emission Inventory: Locomotive Emissions by County. August 1992.

CARB 2005. Review of the California Ambient Air Quality Standard for Ozone Volume IV Appendix B. March 11, 2005.

CARB 2006, California Air Resources Board AB 32 Text, September 27, 2006.

CARB 2007, California Air Resources Board. Climate Change: Information Regarding ARB's Climate Change Program Pursuant to 2006 Assembly Bill 32. Available from www.arb.ca.gov/cc/cc.htm.

CalEPA 2006, California Environmental Protection Agency. Climate Action Team, Executive Summary. Climate Action Team Report to Governor Schwarzenegger and the California Legislature; March; Sacramento, CA.

CAPCOA, 2008. California Air Pollution Control Officers Association (CAPCOA), CEQA and Climate Change, January 2008. http://www.arb.ca.gov/cc/scopingplan/document/scopingplandocument.htm

CAPCOA 2009, Health Risk Assessments for Proposed Land Use Project, July 2009

CARB 2011a, California Air Resources Board, Attachment D: Final Supplement to the AB 32 Scoping Plan Functional Equivalent Document, August 19, 2011. http://www.arb.ca.gov/cc/scopingplan/fed.htm

CARB 2011b "Status of Scoping Plan Recommended Measures," July 2011. http://www.arb.ca.gov/db/search/search_result.htm?q=Status+of+Scoping+Plan+Recommended+Measures&which=arb_google&cx=006180681887686055858%3Abew1c4wl8hc&srch_words=&cof=FORID%3A11&submit.x=15&submit.y=10

CARB 2012, Regulation For The Mandatory Reporting Of Greenhouse Gas Emissions, http://www.arb.ca.gov/cc/reporting/ghg-rep/ghg-rep.htm

CARB, 2008. California Air Resources Board, Climate Change Scoping Plan, December 2008.

CARB 2013 website data on locomotives, http://www.arb.ca.gov/msprog/offroad/loco/loco.htm

ConocoPhillips 2007, AB2588 Health Risk Assessment 2004 Emissions Inventory ConocoPhillips Santa Maria Facility San Luis Obispo County, California, July

EPA 1998, Locomotive Emission Standards-Regulatory Support Document, EPA, April 1998 (EPA-420-R-98-101)

EPA 2009, United States Environmental Protection Agency. Emission Factors for Locomotives. Office of Transportation and Air Quality. EPA-420-F-09-025.April 2009.

EPA 2013, EPA U.S. GHG Inventory 200-2011, http://www.epa.gov/climatechange/ghgemissions/usinventoryreport.html

IPCC 2007, Intergovernmental Panel on Climate Change (. Climate change 2007: The physical science basis, summary for policy makers. Working Group 1 Fourth Assessment Report; February. Available from http://www.ipcc.ch/SPM2feb07.pdf.

Karras, Greg. 2010. Combustion Emissions from Refining Lower Quality Oil: What is the Global Warming Potential? 2010.

Karras, Greg. 2011. Oil Refining CO_2 Performance Measurement. September 2011.

Kiparsky, M. 2003 and P.H. Gleick. Climate Change and California Water Resources: A Survey and Summary of the Literature. Oakland, CA: Pacific Institute for Studies in Development, July 2003.

NOAA, 2013. National Oceanic and Atmospheric Administration (NOAA), 2013, website for global climate data, Earth System Research Lab. http://www.esrl.noaa.gov/gmd/ccgg/trends/global.html#global_growth.

OEHHA 2012. Air Toxic Hot Spots Program Risk Assessment Guidelines-Technical Support Document for Exposure Assessment and Stochastic Analysis. August 2012.

OEHHA 2013. TSD for non-cancer RELS, Appendix B. Acute, 8-Hour, and Chronic Reference Exposure Levels (RELs) Summary Table

OEHHA 2015, Air Toxics Hot Spots Program Risk Assessment Guidelines, Guidance Manual for Preparation of Health Risk Assessments - Air, Community, and Environmental Research Branch, Office of Environmental Health Hazard Assessment California Environmental Protection Agency, February 2015

POLA 2011, Port of Los Angeles Inventory of Air Emissions 2010, Port of Los Angeles, July 2011

POS 2011, Carbon Footprint Study for the Asia to North America Intermodal Trade, Port of Seattle (POS), June, 2011

SLOC 2010, San Luis Obispo County Department of Planning and Building. California Valley Solar Ranch Final Environmental Impact Report. State Clearinghouse No. 2009021009. Prepared by Aspen Environmental Group.

SLOC 2014, Guadalupe Trucking Addendum EIR

SLOCAPCD 2001, Clean Air Plan, December

SLOCAPCD 2010, South County Phase 2 Particulate Study, February

SLOCAPCD, 2010&2011 Annual Air Quality Report

SLOCAPCD 2012, CEQA Handbook, April 2012

SLOCAPCD 2012, GHG Thresholds and Supporting Evidence, March 28, 2012

SLOCAPCD 2014, Email with Mr. Don Carlson at the APCD regarding ERC availability, 12/18/2014.

US DOT. 2014. Proposed Rulemaking-Enhanced Tank Car Standards and Operational Controls for High-Hazard Flammable Trains. September 2014.