4.2 Air Quality and Greenhouse Gases

The air quality section of this Environmental Impact Report (EIR) considers construction- and operation-related emissions of criteria pollutants, toxic air contaminants, greenhouse gases, and odors that could result from the Proposed Project. The Proposed Project would include site grading and earth moving, construction, and oil and gas operations and related transportation; some of these activities would occur only once, while others would occur daily. This analysis attempts to provide a reasonable worst-case scenario of potential air emissions from construction (both the Proposed Oil Project and the Proposed City Maintenance Yard Project), drilling and daily operations, and subsequently recommends mitigation to reduce those impacts. Air emission calculations are shown in detail in Appendix B. The Proposed City Maintenance Yard Project operational emissions would be equal to the current City Maintenance Yard emissions and are therefore not assessed. Air emission calculations are shown in detail in Appendix B.

Portions of the construction phases of the Proposed Oil Project, the Pipeline and the Proposed City Maintenance Yard Project would occur simultaneously, particularly during Phase 3. For example, the Proposed City Maintenance Yard Project would be constructed at the same time as the Proposed Oil Project and the pipelines are being constructed and the emissions from each of these components must be combined for comparison to the South Coast Air Quality Management District (SCAQMD) thresholds. Therefore, all of the components of the Proposed Project are assessed together under the impacts sub-section. Specific Proposed Project component options (valve boxes, pipeline and parking) are discussed at the end of the impacts section.

4.2.1 Environmental Setting

The Proposed Project is within the jurisdiction of the South Coast Air Quality Management District (SCAQMD), which encompasses 10,473 square miles, including the four-county South Coast Air Basin (the Basin) and the Riverside County portions of the Salton Sea Air Basin and the Mojave Desert Air Basin. The Basin, a subarea of SCAQMD jurisdiction, is bound by the Pacific Ocean to the west and the San Gabriel, San Bernardino, and San Jacinto Mountains to the north and east. The 6,745-square-mile Basin includes all of Orange County and the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties.

4.2.1.1 Meteorological Conditions

The climate in the Basin is characterized by sparse winter rainfall and hot summers tempered by cool ocean breezes. During the summer months, a warm air mass frequently descends over the cool, moist marine layer produced by the interaction between the ocean's surface and the lowest layer of the atmosphere.

The warm upper layer forms a cap, or inversion, over the cool marine layer and inhibits pollutants released into the marine layer from dispersing upward. In addition, light winds during summer further limit dispersion.

Sunlight triggers photochemical reactions that produce ozone, and this region experiences more days of sunlight than many other major urban areas in the nation due to climate, thereby increasing the potential for ozone formation.

Table 4.2-1 summarizes historical meteorological conditions in the Basin. Data readings were taken at the National Oceanic and Atmospheric Administration (NOAA) weather station at Los Angeles International Airport from 2001 until 2006.

Temperature and Rainfall

Temperature affects air quality in the region in several ways. Local winds are the result of temperature differences between the relatively stable ocean air and the uneven heating and cooling in the Basin from a wide variation in topography. Mean wind speed in the Basin is 7.5 miles per hour (mph). Temperature also significantly affects vertical mixing height and chemical and photochemical reaction times. Annual average temperatures throughout the Basin range from the low 40s in degrees Fahrenheit (°F) to the high 90s in °F. The coastal areas show little variation in temperature on a year-round basis due to the moderating effect of the marine influence. On average, September is the warmest month, while December and January are the coolest months of the year. Annual rainfall varies from a low of 5 inches to a high of 19 inches.

Table 4.2-1 Historical Meteorological Data

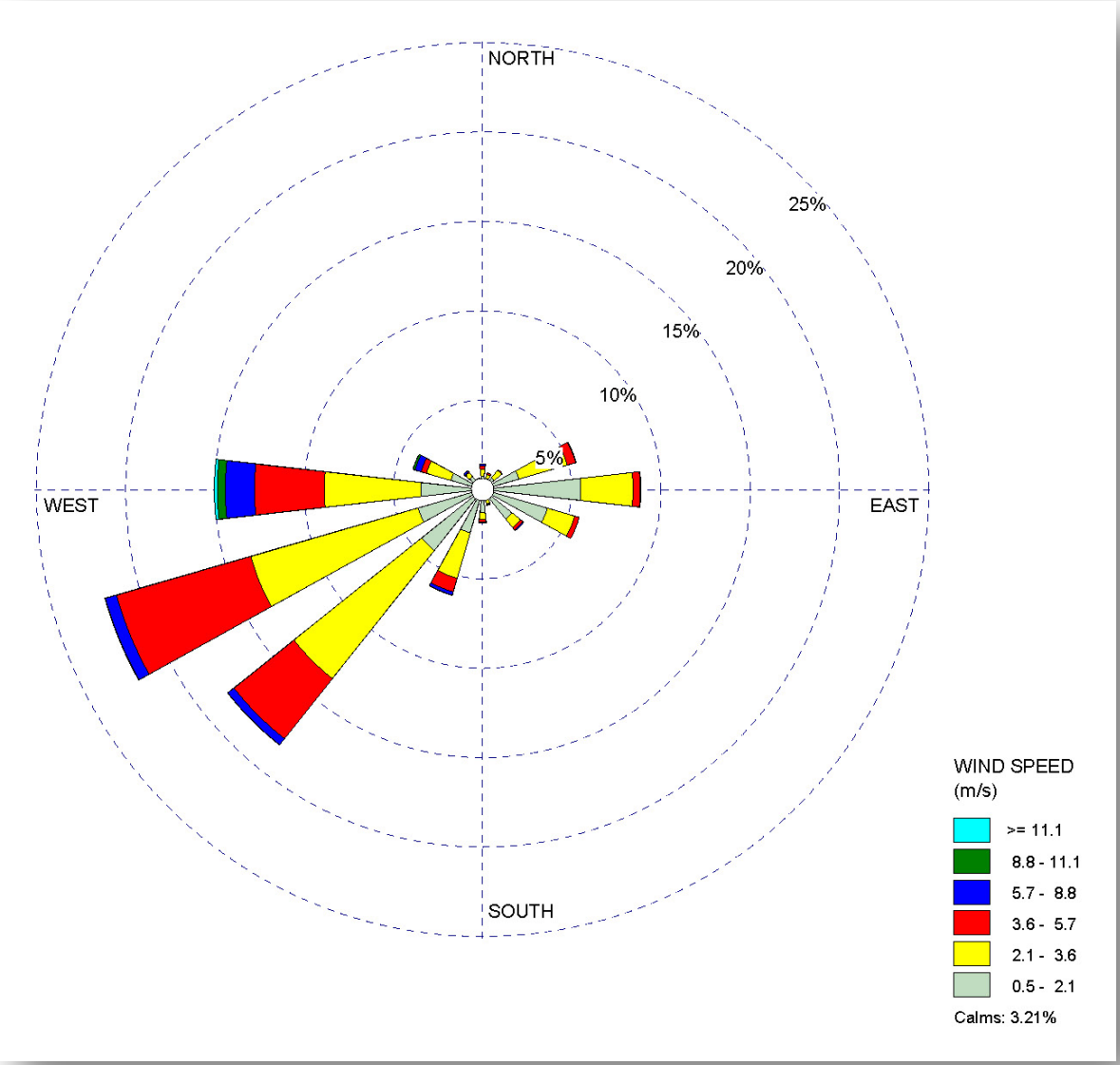
Element	Average	Range
Highest temperature	93°F	84-101°F
Lowest temperature	40°F	36-43°F
Average temperature	58°F	55-63°F
Mean relative humidity	76%	75-77%
Days with heavy fog (visibility ≤ 0.25 miles)	25	15-35
Days with thunderstorms	3	0-10
Mean wind speed	7 mph	6.4-7.5 mph
Total precipitation	13.1 inches	5.03-18.8 inches
Snow, ice pellets, hail	None	None

Notes: F = Fahrenheit, mph = miles per hour.
Source: NOAA 2001-2006

Wind Flow Patterns

Wind flow patterns play an important role in transporting air pollutants in the Basin. The winds flow from off shore and blow eastward during daytime hours. In summer, the sea breeze starts in mid-morning, peaking at 10 to 15 mph, and subsides after sundown. There is a calm period until approximately midnight, after which a land breeze commences from the northwest, typically becoming calm again around sunrise. In winter, wind flows in the same general patterns, except that wind speeds are slightly lower on average than summer wind speeds. This low wind-speed pattern is a major contributor to pollutant accumulation in the Basin. Normal wind patterns in the Basin are interrupted by unstable air accompanying passing storms during winter and infrequent strong northeasterly Santa Ana wind flows from the mountains and deserts north of the Basin. Figure 4.2-1 shows a wind rose for the King Harbor meteorological station in King Harbor, located less than a mile to the south of the Proposed Project Site. A wind rose is a graphic representation of wind conditions (speed and direction) at a specific location.

Figure 4.2-1 Wind Rose for King Harbor Meteorological Station



Notes: Rose denotes which direction wind is blowing from.
Source: SCAQMD

4.2.1.2 Existing Air Quality Criteria Pollutants and Toxic Air Contaminants

The SCAQMD is responsible for ensuring satisfaction and maintenance of state and federal ambient air quality standards within its geographical jurisdiction. California and the federal government established health-based air quality standards for the following air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than 10 micrometers in diameter (PM_{10}), particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$), sulfur dioxide (SO_2), and lead (the "criteria" pollutants). These standards were established to protect sensitive receptors within a margin of safety from adverse health impacts

due to exposure to air pollution. In most cases, the California standards are more stringent than the federal standards. California also established standards for sulfate, visibility, hydrogen sulfide, and vinyl chloride. Table 4.2-2 summarizes state and national ambient air quality standards (NAAQS) for each of these pollutants and their effects on health. The SCAQMD monitors levels of the aforementioned criteria pollutants at 36 monitoring stations throughout the Basin. Table 4.2-3 presents air quality data from the Southwest Coastal Los Angeles County Area monitoring station (Area 3, Station 820) in the SCAQMD, which is the closest monitoring station to the Project area, 6.8 miles to the north of the Project Site.

Carbon Monoxide

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, and reduces the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for CO aims to protect persons whose medical condition already compromises the ability of their circulatory system to deliver oxygen.

CO was monitored at 26 locations in the SCAQMD in 2012 (the most recent data available) and no location exceeded the federal or state 8-hour CO standards. The highest 8-hour average CO concentration of the year was 4.7 parts per million (ppm), measured at Source/Receptor Area Number 12, South Central Los Angeles County (Station Number 112). No area within the district has exceeded the NAAQS since 2003.

There were no exceedances of the CO standards in 2011 or 2012 at the monitoring station closest to the Project area (see Table 4.2-3).

Nitrogen Dioxide

NO_2 is a brownish gas that is formed in the atmosphere through a rapid reaction of the colorless gas nitric oxide (NO) with atmospheric oxygen. NO is primarily formed by combustion. NO and NO_2 are collectively referred to as nitrogen oxides (NOx). NO_2 can cause respiratory irritation and airway constriction, making breathing difficult.

Table 4.2-2 State and National Ambient Air Quality Standards

Air Pollutant	State Standard (concentration/ averaging time)	National Primary Standard (concentration/ averaging time)	Most Relevant Public Health Effects
Ozone (O_3)	0.09 ppm, 1-hour average > 0.070 ppm, 8-hour	0.075 ppm, 8-hour average*	(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 (CO)	20 ppm, 1-hour average > 9.0 ppm, 8-hour average >	35 ppm, 1-hour average > 9 ppm, 8-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 (NO_2)	0.18 ppm, 1-hour average, 0.03 ppm annual average >	0.053 ppm, annual arithmetic mean > 0.100 ppm hourly **	(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 (SO_2)	0.25 ppm, 1-hour. average > 0.04 ppm, 24-hour average >	75 ppb 1 hour*** 0.5 ppm 3 hour 0.14 ppm, 24-hour average > 0.030 ppm, annual arithmetic mean >	Acute respiratory symptoms and breathing difficulty leading to 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})	50 µg/m3, 24-hour average > 20 µg/m3, annual arithmetic mean >	150 µg/m3, 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/m3, annual arithmetic mean >	35 µg/m3, 24-hour average > 15 µg/m3, annual arithmetic mean >	Decreased lung function from exposures and exacerbation of symptoms in sensitive patients with respiratory disease; elderly; children.

Table 4.2-2 State and National Ambient Air Quality Standards

Air Pollutant	State Standard (concentration/ averaging time)	National Primary Standard (concentration/ averaging time)	Most Relevant Public Health Effects
Sulfates	25 µg/m3, 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/m3, 30-day average >=	1.5 µg/m3, calendar quarter> 0.15 µg/m3, rolling 3 month>	(a) Increased concentrations in people's bodies; (b) Impairment of blood formation and nerve conduction.
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. – 6 p.m. Pacific Standard Time)	No federal standard	Reduced visibility
Hydrogen Sulfide	0.03 ppm, 1-hour average >	No federal standard	Odor annoyance at low concentration, acute and potential fatality at higher concentrations.
Vinyl Chloride	0.01 ppm, 24-hour average >	No federal standard	dizziness, drowsiness, headaches, and giddiness. Known carcinogen.

Note: $\mu g/m^3$ = micrograms per cubic meter
* Effective May 27, 2008; previous standard was 0.08 ppm
** To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010)
*** Based on the 3-year average of the annual 99th percentile of 1-hour daily maximum. In addition, the EPA revoked both the existing 24-hour SO_2 standard of 0.14 ppm and the annual primary SO_2 standard of 0.030 ppm effective August 23, 2010.
Source: SCAQMD website 2013

In 2012 the SCAQMD monitored NO_2 levels at 26 stations and the maximum annual arithmetic mean measured was 0.0246 ppm in Area 10 (Pomona/Walnut Valley). The maximum 1-hour level was 0.108 ppm in Central Los Angeles. The 1-hour state standard (i.e., 0.18 ppm) was not exceeded in 2012. The district is classified as in attainment for both the state and national Ambient Air Quality Standards (AAQS). There were no exceedances of the NO_2 standards in 2012 at the monitoring station closest to the Project Site (see Table 4.2-3).

Table 4.2-3 SCAQMD Air Quality Data for Southwest Coastal LA County Sub-Region (Project Area)

Constituent	2011	2012
Ozone		
1-hour (ppm) max level	0.078	0.106
Federal Standard	(0)	NA
State Standard	(0)	(1)
8-hour (ppm) max level	0.067	0.075
Federal Standard	(0)	(0)
State Standard	(0)	(1)
Carbon Monoxide		
8-hour (ppm) max level	1.8	2.5
Federal Standard	(0)	(0)
State Standard	(0)	(0)
Nitrogen Dioxide		
1-hour (ppm) max level	0.097	0.067
Annual (ppm)	0.0134	0.0104
$PM_{2.5/10}$		
24-hour (ug/m^3) max level	41.0	31
Federal Standard	(0%)	(0%)
State Standard	(0%)	(0%)
Annual Arithmetic Mean	21.7	19.8
Lead		
30-day (ug/m^3)	0.008	NA
Quarter (ug/m^3)	0.005	NA
Sulfate		
24-hour (ug/m^3) max level	5.9 (0%)	NA

Notes: ppm = parts per million; (x) = number of days or percent of samples exceeding the standard; -- = not monitored; ug/m^3 = micrograms per cubic meter; * = Less than 12 full months of data; so data may not be representative. NA = no longer applicable
$PM_{2.5}$ monitored as PM_{10}
PM_{10} and Sulfur Dioxide are not monitored at this location.
Source: SCAQMD 2011-2012

Sulfur Dioxide

SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects of SO_2 inhalation include acute respiratory symptoms and breathing difficulty. In 2011 (2012 data was not available), seven locations monitored SO_2 levels, and neither the state nor the federal standards were exceeded.

Particulate Matter 10

PM_{10} is the coarse fraction of suspended particulate matter measuring 10 microns or less in diameter and includes a complex mixture of man-made and natural substances including sulfates, nitrates, metals, elemental carbon, sea salt, soil, organics, and other materials. Particulate matter is produced by wind-blown dust, combustion of wood or other fuels, and a range of other activities, both anthropogenic and natural, that produce dust or particulates. PM_{10} may have adverse health impacts because these microscopic particles penetrate into the respiratory system. In some cases, the particulates themselves may cause actual damage to the alveoli of the lungs, or they may contain injurious absorbed substances.

In 2012, PM_{10} was monitored at 21 locations in the district. There were no exceedances of the federal 24-hour standard (i.e., 150 micrograms per cubic meter [μg/m3]), while the state 24-hour standard (i.e., 50 μg/m3) was exceeded at all but nine monitored locations. PM_{10} is monitored at the monitoring station closest to the Project Site, and no exceedances were recorded (see Table 4.2-3).

Particulate Matter 2.5

The $PM_{2.5}$ standard is a subset of the PM_{10} standard consisting of particulate matter measuring 2.5 microns or less in diameter. In addition to the health effects of PM_{10}, $PM_{2.5}$ exposure may also cause increased respiratory symptoms, disease, and decreased lung functions. In 2012, $PM_{2.5}$ was monitored at 20 locations in the district. The federal 24-hour standard (i.e., 35 μg/m3) was exceeded at 13 locations. The federal 24-hour standard was exceeded at seven locations. In 2011-2012, at the monitoring station closest to the Project Site, $PM_{2.5}$ was not monitored (see Table 4.2-3).

Lead

In 2011 (data for the year 2012 was not available), lead was monitored at 10 locations in the district. No location in the Basin exceeded the federal quarterly average or the state monthly average standards. There have been no violations of any lead standard in the district since 1982, although there were some localized exceedances of the state standard at special monitoring stations in 1991 and 1994.

Sulfates

Sulfates, or SOx, are a group of chemical compounds containing the sulfate group, which is a sulfur atom with four oxygen atoms attached. Combustion is the primary source of sulfates. In 2011 (data for the year 2012 was not available), sulfates were monitored at 21 locations in the district. The 24-hour state sulfate standard (of 25 μg/m3) was not exceeded at any of these locations. There are no federal air quality standards for sulfates.

Volatile Organic Compounds

Since volatile organic compounds (VOC) are not classified as criteria pollutants, there are no state or national ambient air quality standards for these compounds. VOC are regulated, however, because limiting VOC emissions reduces the rate of photochemical reactions that contribute to the formation of ozone. As a precursor to ozone, VOC contribute to regional air quality impacts. In addition, VOC also transform into organic aerosols in the atmosphere,

contributing to higher PM_{10} and lower visibility levels. Although health-based standards have not been established for VOC, health effects can occur from exposures to high concentrations of VOC because of interference with oxygen uptake. VOC are produced by combustion, consumer products, and leaking hydrocarbons from a range of industrial processes.

Ozone

In addition to primary criteria pollutants, the SCAQMD monitors ozone at various locations throughout the district. 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 sunlight with VOC, NOx, O_2, and hydrocarbon materials.

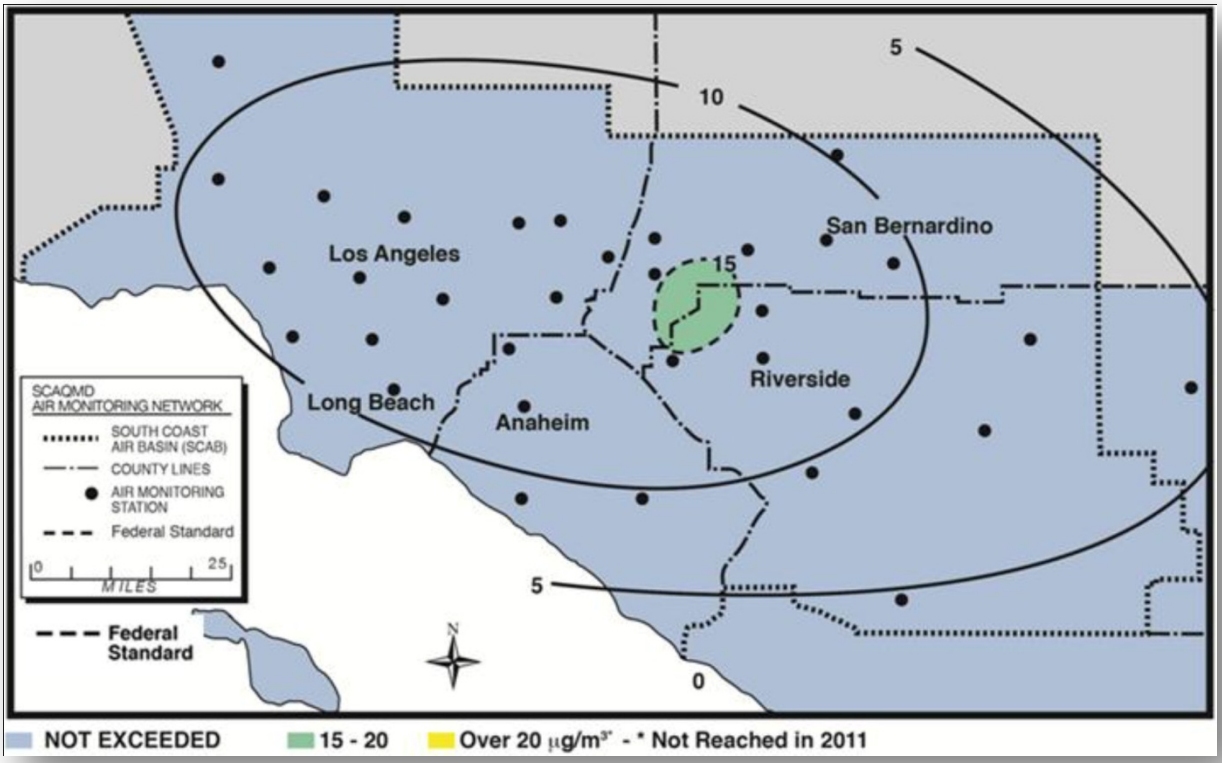
Ozone is a deep lung irritant, causing inflammation and swelling of lung passages. Exposure to ozone alters respiration, typically causing shallow, rapid breathing and decreasing pulmonary performance. Ozone reduces the respiratory system's ability to fight infection and to remove foreign particles.

Ozone levels were monitored at 31 locations in 2012. Maximum 1-hour and 8-hour average ozone concentrations in 2012 were 0.147 ppm (East San Gabriel Valley) and 0.121 ppm (San Bernardino and Santa Clarita), respectively. Ozone concentrations exceeded the state standard at all but four of the monitored locations.

At the monitoring station closest to the Project Site there was one exceedance of the state 1-hour ozone standard (see Table 4.2-3). There were no exceedances of the federal 8-hour ozone standard at the monitoring station closest to the Project Site, and there was one exceedance of the state 8-hour ozone standard in 2012 (see Table 4.2-3).

In 2012, the SCAQMD published its most recent air quality management plan report, which figuratively compares quality for selected pollutants with the standards. Figures 4.2-2 through 4.2-4 show the extent of particulate levels and ozone in the Basin for 2011. Note that most of the standards violations occurred inland from the Project Site. However, due to the movement of pollutants and the meteorology of the Basin, air pollution from sources within the entire Basin contributes to the air quality exceedances in the inland areas.

Figure 4.2-2 $PM_{2.5}$ Annual Compliance Status - 2011



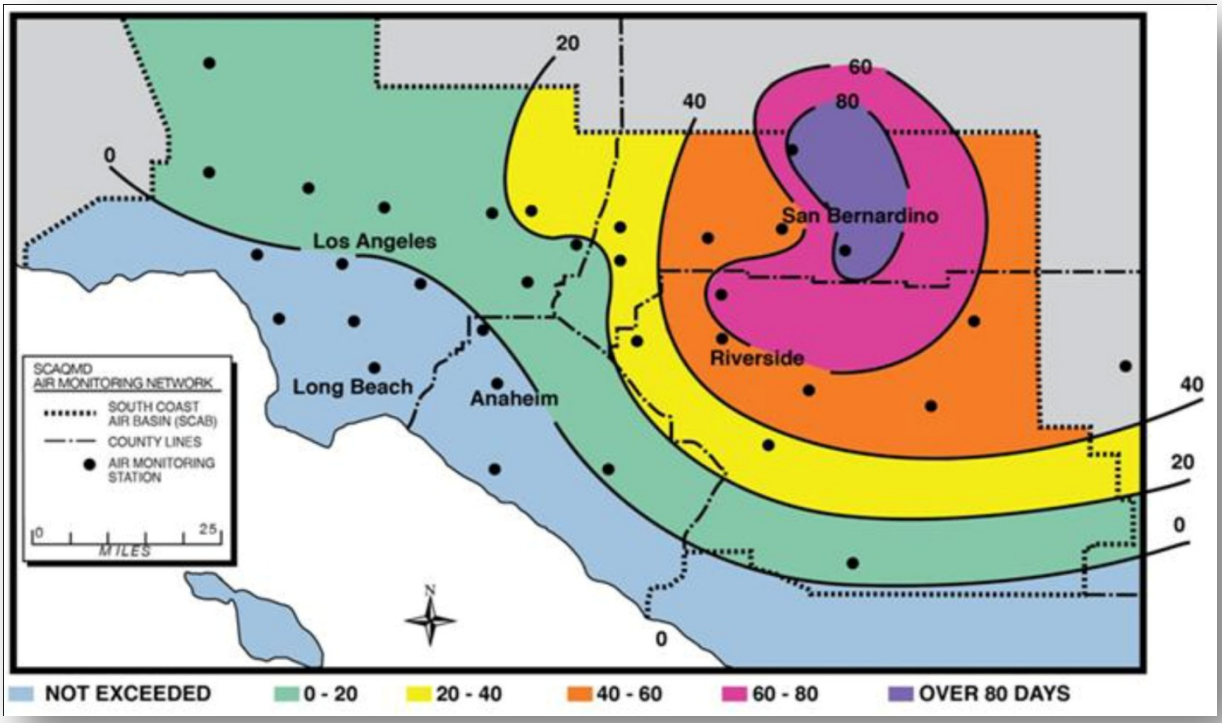
Source: SCAQMD AQMP 2012

Toxic Air Contaminants

In 1998, the California Air Resources Board (CARB) identified particulate matter from diesel-fueled engines as a toxic air contaminant. Subsequent to this determination, the SCAQMD initiated an urban toxic air pollution study, Multiple Air Toxics Exposure Study (MATES). The MATES III program is a monitoring and evaluation study conducted in the Basin by the SCAQMD (2008). MATES III includes a monitoring program, utilizing both fixed and mobile monitoring stations, an updated emissions inventory of toxic air contaminants, and a modeling effort to characterize risk across the South Coast Air Basin. The study focused on the carcinogenic risk from exposure to air toxics.

The existing carcinogenic risk from air toxics in the South Coast Air Basin, based on the average concentrations at the MATES fixed-monitoring sites, is about 1,200 excess cancer cases per one million persons. This risk refers to the expected number of additional cancer cases in a population of one million individuals exposed over a 70-year lifetime. The MATES III study estimated that about 94% of the risk is attributed to emissions associated with mobile sources, and about 6% of the risk is attributed to toxics emitted from stationary sources. The results indicate that diesel exhaust is the major contributor to air toxics risk, accounting on average for about 84% of the total. The SCAQMD considers the risk of a Project to be significant if the increased cancer risk exceeds 10 excess cancer cases per million.

Figure 4.2-3 Ozone Annual Compliance Status - 2011



Source: SCAQMD AQMP 2012

MATES III identified risks in the vicinity of the Project Site due to nearby roadways, freeways (e.g., Interstate 405), and fixed facilities located in the SCAQMD emissions databases. The existing carcinogenic risk from air toxics in the vicinity of the Project Site, as per the MATES III report, is approximately 687 excess cancer cases per one million persons.

The SCAQMD published guidelines for the analysis of diesel emissions from various mobile source categories (SCAQMD 2003). Guidelines are specified for the analysis of sources such as truck idling and movements associated with truck stops, warehouse distribution centers or transit centers, ship hoteling at ports, and train idling. The emphasis of the SCAQMD guidelines is on reducing operational emissions of diesel particulate matter (DPM).

Naturally Occurring Radioactive Material

Naturally Occurring Radioactive Materials (NORM) may be present in oilfield solid or liquid wastes. NORM is primarily a concern in the Gulf of Mexico and Gulf States, such as Florida and Texas, as well as Illinois and Kansas. The USGA fact sheet shows that California has levels that are at background or marginally detectable. DOGGR conducted surveys in the 1980s of California Oil and Gas Fields (DOGGR publication) indicated that "of the 10,000 measurements taken, about 93 percent were at background levels. The remaining readings were above background levels, but low enough that only routine safety measures were considered necessary to minimize employee exposure and protect human health and the environment." Subsequent studies have confirmed these results. OSHA has requirements about testing and exposure of

workers to radiation codified in 29 CFR 1910.96. Generally, the concerns arise when produced water is disposed of in a manner that could cause environmental or human exposure, such as discharging to the environment (such as to the ocean). However, the proposed Project would inject produced water back into the reservoirs. Some NORM can occur in sludges and other wastes, which would be required to be disposed of properly by existing laws and regulations. NORM is not anticipated to be an issue for this project.

Basin Emissions

Total emissions of NOx and VOC basin-wide were estimated to be 758 and 593 tons per day, respectively, in 2008 (as per SCAQMD 2012). Almost 88% of NOx emissions and 57% of VOC emissions were due to mobile sources. Stationary sources accounted for 12% and 43% of NOx and VOC emissions, respectively. Two-thirds of mobile sources were due to on-road sources.

4.2.1.3 Existing Air Quality Greenhouse Gas Emissions

Greenhouse gases (GHGs) are defined as any gas that absorbs infrared radiation in the atmosphere, including water vapor, carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O) and fluorocarbons, the main contributors to global climate changes (IPCC 2007). These GHGs lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the "greenhouse effect". The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without natural GHGs, the Earth's surface would be cooler (CARB 2006). Emissions from human activities, such as electricity production and vehicle use, have elevated the concentration of these gases in the atmosphere.

Different GHGs have different global warming potential (GWP). The GWP is the potential of a gas or aerosol to trap heat in the atmosphere. Because GHGs 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 the "CO_2 equivalent" or CO_2e. This is the amount of GHGs emitted multiplied by the GWP. The GWP of CO_2 is defined as one, whereas the GWP of methane, for example, is 21, meaning that methane gas absorbs 21 times as much heat, and therefore has 21 times greater impact on global warming per pound of emissions, as CO_2.

Water vapor is the most abundant and variable GHG in the atmosphere. The main source of water vapor is evaporation from the oceans (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 is an odorless, colorless GHG. Natural sources of CO_2 include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human caused) sources of CO_2 include burning fuels, such as coal, oil, natural gas, and wood. Atmospheric CO_2 concentrations currently approximate 370 ppm. As stated above, CO_2 has a GWP of 1.

Methane gas is the main component of natural gas used in homes, industry and compressed natural gas (CNG) vehicles. As discussed above, it has a GWP of about 21. Natural sources of methane arise from the decay of organic matter and from geological deposits known as natural

gas fields, from which methane is extracted for fuel. Sources of decaying organic material include landfills and manure.

Nitrous oxide is a colorless gas with a GWP of about 310 that is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (nylon production, nitric acid production) also emit N_2O. It 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 (see above), and is not the same as N_2O. Very small quantities of nitrous oxide (N_2O) may be formed during fuel combustion by reaction of nitrogen and oxygen (API 2004).

Chlorofluorocarbons (CFCs) are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with either chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at the earth's surface). CFCs were first synthesized in 1928 for use as refrigerants, aerosol propellants, and cleaning solvents. They destroy stratospheric ozone; therefore, their production was stopped as required by the Montreal Protocol. Hydrofluorocarbons (HFCs) are synthetic man-made chemicals that are used as a substitute for CFCs in automobile air conditioners and refrigerants. Perfluorocarbons (PFCs) are used in aluminum production and semiconductor manufacturing. In general, fluorocarbons have a GWP of between 140 and 11,700.

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It also has the highest GWP of any gas at 23,900. 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.

Ozone is a greenhouse gas; however, unlike the other greenhouse gases, ozone in the troposphere is relatively short-lived and therefore is not global in nature. According to CARB, it is difficult to make an accurate determination of the contribution of ozone precursors (NO_x and volatile organic compounds [VOCs]) to global warming (CARB 2006).

Table 4.2-4 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 range in global warming potential over 100 years.

The total U.S. GHG emissions were 6,702 million metric tons of carbon equivalents (MMTCE) in 2011, of which 84 percent were CO_2 emissions (EPA 2013). In 2011, approximately 26 percent of GHG emissions were associated with transportation and about 32 percent with electricity generation (USEPA 2013).

In order to quantify the emissions associated with electrical generation, the "resource mix" for a particular area must be determined. The resource mix is the proportion of electricity that is generated from different sources. Electricity generated from coal or oil combustion produces greater GHG emissions than electricity generated from natural gas combustion due to coal and oil's higher carbon content. Electricity generated from wind turbines, solar, hydroelectric dams or nuclear power is assigned zero GHG emissions. Although these sources have some GHG

emissions associated with the manufacturing of wind generators, solar panels, the mining and enrichment of uranium or the displacement of forest areas for reservoirs, these emissions have not been included in the lifecycle analysis, as emissions volumes are assumed to be relatively small compared to the amount of electricity generated. Estimates of nuclear power GHG emissions associated with uranium mining and enrichment range up to about 60 lbs/MWh (pounds per megawatt hour), or about five percent of natural gas turbine GHG emissions (CNS 1998).

Table 4.2-4 Global Warming Potential of Various Gases

Gas	Life in the Atmosphere (years)	100-year GWP (average)
Carbon Dioxide	50-200	1
Methane	12	21
Nitrous Oxide	120	310
HFC-23	264	11,700
HFC-125	32.6	2,800
HFC-134a	14.6	1,300
HFC-143a	48.3	3,800
HFC-152a	1.5	140
HFC-227ea	36.5	2,900
HFC-236fa	209	6,300
HFC-4310mee	17.1	1,300
CF_4	50,000	6,500
C_2F_6	10,000	9,200
C_4F_{10}	2,600	7,000
C_6F_{14}	3,200	7,400
SF_6	3,200	23,900

Note: GWP = global warming potential
Source: USEPA 2013. The 100 year timeframe from the IPCC Second Assessment Report (1995) used for reporting under the UNFCCC values are used in this report as per the IPCC 2007 and USEPA 2013. These may be revised under the most recent CARB Scoping Plan CARB 2013.

Detailed information on power generation plants, their contribution to area electricity "resource mix" and their associated emissions have been developed by the Federal EPA in a database called the Emissions & Generation Resource Integrated Database (eGRID). eGRID is a comprehensive inventory of environmental attributes of electric power systems and is developed from a variety of data collected by the U.S. Environmental Protection Agency (EPA), Energy Information Administration (EIA), and Federal Energy Regulatory Commission (FERC). The most recent version released in 2012 contains information from as recent as 2009.

About half of the electricity in the United States is generated from coal, producing a U.S. GHG emissions level of about 1,222 lbs/MWh (pounds per mega-watt hour). The GHG emissions rate is lower for western states, primarily due to the increased use of hydroelectric and natural gas. The California area has a GHG emission rate of about 661 lbs/MWh due to the contribution of hydroelectric, nuclear and renewable sources. Table 4.2-5 shows the resource mix and the nationwide and California GHG emission rates.

The rate used in this analysis was taken from CalEEMod modeling program for Southern California Edison (SCE) and is 641 lbs/MWh.

The GHG emission rate for electricity obtained from SCE is about 45 percent less than the rate associated with direct natural gas combustion due to the electricity resource mix which includes non-GHG emission creating resources (hydroelectric and nuclear power, renewables).

Table 4.2-5 Electricity Generation Resource Mix and Greenhouse Gas Emissions

Resource Mix[a]	United States	Calif Area (CAMX)
Coal	44.5	7.3
Oil	1.1	1.4
Gas	23.3	53.0
Other Fossil	0.3	0.2
Biomass	1.4	2.7
Hydro	6.8	12.7
Nuclear	20.2	14.9
Wind	1.9	2.8
Solar	0.02	0.3
Geo	0.4	4.4
Other	0.1	0.3
Non-Renewables	69.2	62.0
Renewables	30.8	38.0
CO_2 Rate, lb/MWh	1,222	661

a. Resource Mix is the percentage of total mega-watt hours.
Source: eGRID database with modifications and updates, EPA 2012, data for year 2009, USEPA 2012

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 a global issue 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 in this analysis.

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

Indirect emissions include the emissions from vehicles (gasoline, diesel or CNG) delivering materials and equipment to the sites, the use of electricity and water use and waste disposal. Electricity produces GHG emissions because fossil fuels generate some electricity.

This report utilizes the California Climate Action Registry General Reporting Protocol and the CARB Compendium of Emission Factors and Methods to support the Mandatory Reporting of

Greenhouse Gas Emissions as methods to calculate GHG emissions (CCAR 2009, CARB 2007), which can be found at teh California Air Resources Board websites.

Indirect GHG emissions associated with solid waste and other services that might visit the Proposed Project Site are incorporated through the inclusion of the travel of trucks that would visit and service the Project Site.

Indirect emissions associated with employees commuting utilizes the CalEEMod factors (CalEEMod 2014) for average commute distance within Los Angeles County and the EMFAC2011 (CARB 2014) estimates of vehicle emissions. Vehicle counts are based on information provided in the Applicant's Application.

Statewide Greenhouse Gas Emissions

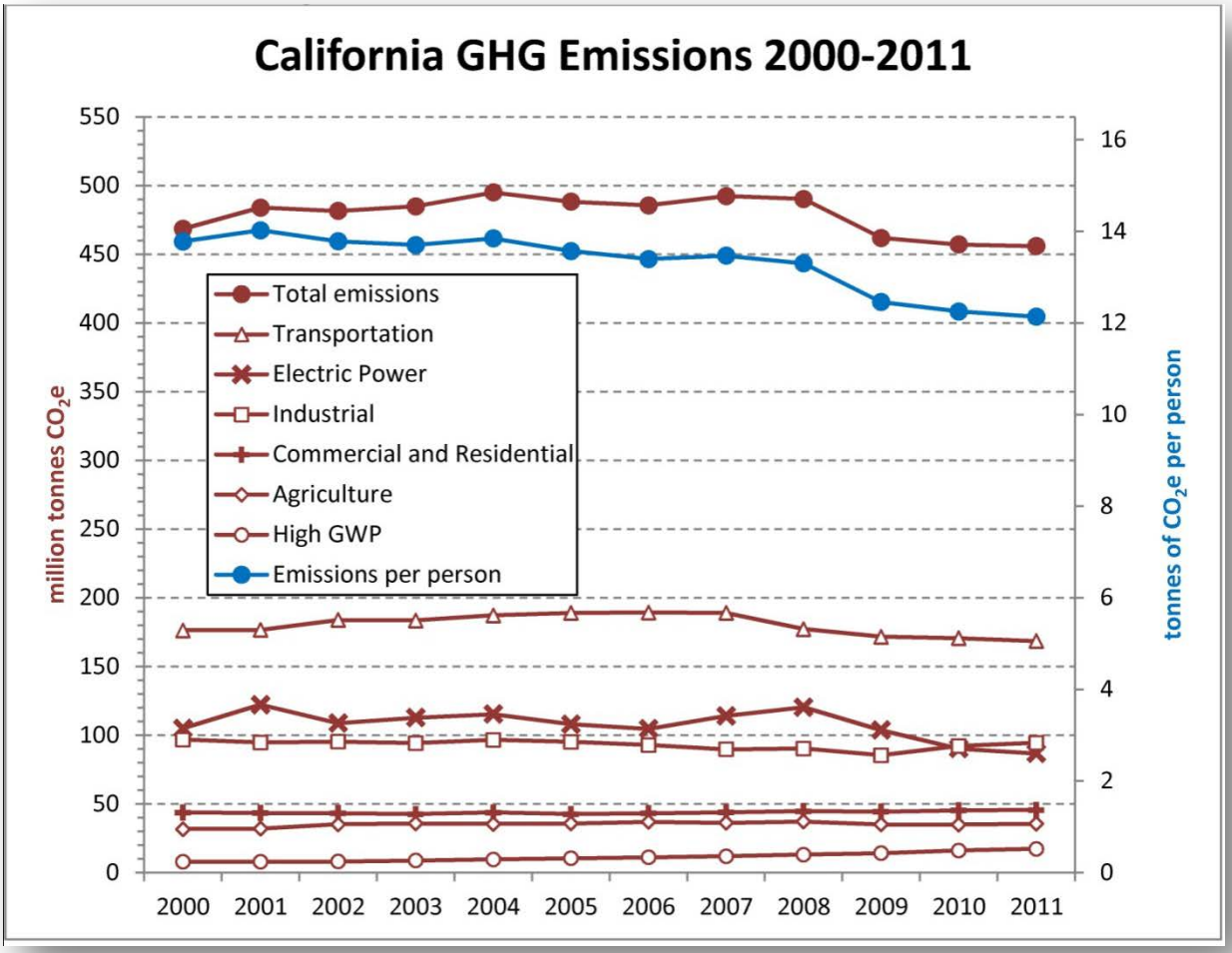
With a population of over 37 million, California is the most populous state in the United States. In 2011, California produced close to 456 MMTCE of GHG emissions (CARB 2013). Overall, over 80 percent of California's emissions are CO_2 from fossil fuel combustion (CARB 2013). The transportation sector is the single largest contributor of California's GHG emissions, producing 37 percent of the State's total GHG emissions in 2011. In contrast, electrical generation produced 19 percent. Nonetheless, California ranks fourth lowest of the 50 states in CO_2 emissions per capita. Figure 4.3-4 shows the historical GHG emissions in California.

Hermosa Beach GHG Emissions

The City of Hermosa Beach, working with the South Bay Cities Council of Governments (SBCCOG), is preparing a climate action plan of actions for reducing greenhouse gas emissions. The five milestones include: conduct a baseline inventory, adopt an emissions target, develop a local action plan, implement policies and measures, and monitor and verify results. The City of Hermosa Beach in consultation with the SBCCOG prepared greenhouse gas emissions inventories for the City and community in 2009 and 2010. Emissions are those generated within the geographic boundaries of the city (except for electricity). The Municipal Inventory Report (SBCCG 2009) with year 2005 as the baseline year, found that:

- The City of Hermosa Beach municipal operations and facilities generated approximately 1,508 metric tons of CO2e in the baseline year, 2005;
- There was an overall 2.9% increase in GHG emissions between the baseline year 2005 and the interim year 2007;
- Under a business-as-usual scenario, the City can expect emissions to rise to 1,632 metric tonnes of CO2e by 2012, equivalent to the annual GHG emissions from 299 passenger vehicles; and 1,666 metric tons of CO2e by 2015, equivalent to the annual GHG emissions from 305 passenger vehicles if the city does nothing to reduce its emissions.

Figure 4.2-4 California GHG Emissions 2000-2011



Source: CARB 2013

A community inventory was also generated (SBCCG 2009), also using the year 2005 as a baseline, and it concluded that:

- In 2005, the City of Hermosa Beach (including municipal operations and facilities) generated approximately 138,463 MTCO2e. Gasoline represents the largest source of emissions, producing 76,153 MTCO2e or 55 percent of the total share of 2005 emissions;
- In 2007, the City of Hermosa Beach generated approximately 134,253 MTCO2e representing a 3 percent decrease from the total emissions in 2005. This decrease can be attributed to less emissions from electricity and gasoline sources;
- For both years 2005 and 2007, transportation was the largest sector of emissions (scope 1, consisting of emissions under control of the community). In 2005, this sector generated approximately 81,686 MTCO2e, or 59 percent of the total 2005 emissions. In 2007, it generated approximately 79,383 MTCO2e. The majority of transportation sector emissions are the result of gasoline and diesel combustion in vehicles traveling to and from activity centers within the boundaries of Hermosa Beach;

- While short-term trends show a 3 percent reduction in emissions, long-term general trends in the absence of mitigation efforts project an increase in emissions. It is anticipated that Hermosa Beach's community emissions, under a business-as-usual scenario, will grow 2 percent by 2020, from 134,253 in 2007 to 136,944 MTCO2e in 2020.

Impacts of GHG Emissions

Global climate change is a change in the average climatic conditions reflected in changing weather patterns of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. Historical records have shown that dramatic temperature changes 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). These climate changes could lead to alterations in weather, rainfall patterns, and increasing sea levels leading to flooding. The worldwide scientific consensus is that global climate change is caused by anthropogenic GHG emissions (IPCC 2007). The issue of how best to respond to climate change and its effects is currently one of the most widely debated economic, environmental and political issues in the United States and globally.

Atmospheric CO_2 concentrations are currently around 392 ppm (based on the NOAA global annual mean calculated June 2013, NOAA 2013) and concentrations may increase to 540 ppm by 2100 as a direct result of anthropogenic sources (IPCC 2007).

Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice and rising global average sea level. The linear warming trend over the 50 years from 1956 to 2005 (0.13 °C per decade) is nearly twice that for the 100 years from 1906 to 2005. Global average sea level rose at an average rate of 1.8 mm per year over 1961 to 2003 and at an average rate of about 3.1 mm per year from 1993 to 2003 (IPCC 2007).

CARB (CARB 2008) notes that a warming California climate would generate more smoggy days by contributing to ozone formation while also fostering more large brush and forest fires. Continuing increases in global greenhouse gas emissions at "business-as-usual" rates would result, by late in the century, in California losing 90 percent of the Sierra snowpack, average sea level rising by more than 20 inches, and a three to four times increase in heat wave days. Increases in temperature will also lead to increased concentrations and emissions of pollutants in California.

In the Findings and Declarations for Assembly Bill 32 (AB 32, see below), the California 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."

AB 32 addresses the results of studies conducted by the Intergovernmental Panel on Climate Change (IPCC 2001, 2007) that examined a range of scenarios and projected an increase in

globally averaged surface temperature of 0.5 to 11.5°F over the period 1990 to 2100 with ocean rise between 0.6 to 1.9 feet over the same timeframe.

The IPCC Studies (2007) 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°F by the year 2100 and would require global anthropogenic CO_2 emissions to drop below the year 1990 levels within a few decades (by 2020). If GHG emissions, and atmospheric CO_2 levels, were kept to this "Category I" level (producing increases in global average temperature of less than 1.8-5.4 °F above 1980-1999 levels) impacts to gross domestic product (GDP) are projected to "produce market benefits in some places and sectors while, at the same time, imposing costs in other places and sectors" (IPCC 2007). Higher levels of CO_2, ranging above 700 ppm with corresponding temperature increases of 7°F, could cause a reduction in global GDP of more than 5%, with regional losses substantially higher. Reductions in GHG emissions between the year 2000 and the year 2050 would need to be 50-85% in order to be kept in this "Category 1" level (IPCC 2007 Table 5.1 and Figure 5.1), with global GHG emissions peaking in the years 2010 to 2015.

Therefore, stabilizing GHG emissions levels at 1990 levels over the next two decades, and reducing GHG emissions by 50-85% 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. The 10,000 MTCO2E threshold has been adopted by three air quality districts in California as their approach to reducing GHG emissions to less than significant levels. It was originally adopted as an interim threshold by the SCAQMD in 2008. The SCAQMD's 10,000 MTCO2E threshold is based on a goal of a 90 percent emission "capture rate", meaning that 90 percent of basin-wide emissions that are estimated to be proposed as new projects in the future would be subject to the GHG thresholds. The emission threshold was determined by the SCAQMD to be low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions (SCAQMD 2008).

The impacts of GHG emissions are worldwide. Climate change could occur at many different locations throughout the world due to, in very small part, the additional GHG emissions from this Proposed Project. A lifecycle approach to understanding the effects of this Project on global GHG emissions is very complex. For example, driving a more efficient automobile would reduce GHG emissions from automobiles here, with more reductions in GHG emissions at an area refinery due to processing less crude oil to make the gasoline and fewer emissions of ocean tankers to bring the crude oil from Saudi Arabia, for example, and fewer emissions from drilling and production of the crude oil in Saudi Arabia. However, the hybrid automobile might require special batteries and more manufacturing effort and more recycling efforts, thereby increasing GHG emissions.

In addition, markets are evolving, with higher crude oil prices increasing domestic production, regulations requiring cleaner fuels and energy sources that could substantially alter the

environment for fuels in the near future. Producing natural gas and crude oil locally (not having to transport gas or crude oil from out-of-state or out-of-country) also could reduce the lifecycle GHG emissions. Although these activities may have some validity, they are not generally recognized when submitting GHG inventory information to the State or Federal Agencies and are not included when assessing requirements under the "cap-and-trade" system in California (see Regulatory section above). From a California Environmental Quality Act (CEQA) standpoint, generally these types of "out-of-state" credits are not assessed.

4.2.1.4 Existing Site Emissions

The current City Maintenance Yard operations involve the use of a nominal amount of consumer level solvents and paints, emissions of which would be minimal. Emissions are also associated with the use of vehicles on the site and offsite for maintenance operations, as well as electricity consumption, water and wastewater use and treatment and solid waste generation. No other emissions sources are associated with the operations. The Hermosa Self-Storage facility located at the site of the proposed permanent City Maintenance Yard, currently uses a nominal amount of electricity, energy associated with water and wastewater use and treatment, and solid waste generation.

4.2.2 Regulatory Setting

The regulatory setting includes regulations promulgated by federal, state, and the local governments for criteria pollutants. This section discusses criteria pollutants and greenhouse gas emissions.

4.2.2.1 Criteria Pollutants Regulatory Setting

Federal Authority

EPA: The EPA enforces the Federal Clean Air Act and the associated National Ambient Air Quality Standards (NAAQS) for CO, NO_2, ozone, SO_2, PM_{10}, $PM_{2.5}$, and lead. These air quality standards are concentrations above which the pollutant is known to cause adverse health effects.

The Project Site is within the South Coast Air Basin, which is currently designated as "severe nonattainment" status for the Federal 8-hour ozone ambient air quality standard and is required to achieve the national standard by 2021. For PM_{10} the Basin was designated as serious nonattainment for the Federal standard, is now designated as "unclassified" and has met the PM_{10} standards at all stations and a request for re-designation to attainment is pending with U.S. EPA (SCAQMD 2012). The Basin is in nonattainment for $PM_{2.5}$ and had until 2010 to achieve the national standard, but will be filing a five-year extension to 2015 (SCAQMD 2012). The Basin is in attainment for NO_2. The Basin has met the Federal standards for CO and the SCAQMD was designated in attainment for CO in May 2007 by the EPA.

State Authority

California Air Resources Board: CARB is the state agency that: (1) establishes and enforces emission standards for motor vehicles, fuels, and consumer products; (2) establishes health-based air quality standards; (3) conducts research; (4) monitors air quality; (5) identifies and promulgates control measures for toxic air contaminants; (6) provides compliance assistance for businesses; (7) produces education and outreach programs and materials; and (8) oversees and assists local air quality districts that regulate most non-vehicular sources of air pollution. CARB approves the regional Air Quality Management Plans (AQMP) for incorporation into the State Implementation Plan (SIP) and is responsible for preparing those portions of the SIP related to mobile source emissions. CARB implements the California Clean Air Act (CCAA) requirements, regulating emissions from motor vehicles and setting fuel standards. The CCAA established ambient air quality standards for ozone, PM_{10}, $PM_{2.5}$, CO, NO_2, SO_2, lead, visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. California standards are generally stricter than national standards.

California Health and Safety Code § 44300 (AB2588) requires facilities that emit large quantities of criteria pollutants and any amount of non-criteria pollutants to provide the local air district an inventory of toxic air contaminants. Such facilities may also be required to prepare a quantitative health risk assessment to address the potential health risks involved. The CARB and the SCAQMD will ensure implementation of these requirements for the oil field through various permitting, rules, and regulations.

The California Health and Safety Code mandates that the California Environmental Protection Agency (Cal/EPA) establish safe exposure limits for toxic, non-criteria air pollutants and identify the best available methods for their control (Sections 39650 et seq.). These laws also require that the rules for new emission sources for each air district include regulations establishing procedures to control the emission of these pollutants. The CARB California Toxic Emissions Factors (CATEF) database lists toxic air contaminants from oil field operations. Cal/EPA has developed specific cancer potency estimates for assessing their related cancer risks at specific exposure levels. For non cancer-causing toxic air pollutants, Cal/EPA established specific no-effects levels (known as reference exposure levels) for assessing the likelihood of producing health effects at specific exposure levels. Such health effects would be considered significant only when exposure exceeds these reference levels.

Local Authority

SCAQMD: The SCAQMD is the regional agency responsible for the regulation and enforcement of federal, state, and local air pollution control regulations in the Basin. The SCAQMD operates monitoring stations in the Basin, develops and enforces rules and regulations for stationary sources and equipment, prepares emissions inventory and air quality management planning documents, and conducts source testing and inspections. The SCAQMD AQMP includes control measures and strategies to be implemented to attain state and federal ambient air quality standards in the Basin. The SCAQMD then implements these control measures as regulations to control or reduce criteria pollutant emissions from stationary sources or equipment.

In addition, the SCAQMD receives and investigates odor complaints from residents.

The SCAQMD has rules and regulations that would apply to an oil and gas facility. These include the following:

- Rule 402. Nuisance - A person shall not discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons;
- Rule 462. Organic liquid loading emission limits;
- Rule 463. Organic liquid storage emission control requirements;
- Rule 1110.2. Emissions From Gaseous- And Liquid-Fueled Engines limits;
- Rule 1118. Control of emissions from refinery flares;
- Rule 1134. Emissions of oxides of nitrogen from stationary gas turbines limits;
- Rule 1148.1. Oil and gas production wells - addresses emissions of volatile organic compounds (VOCs) from the wellheads, the well cellars and the handling of produced gas at oil and gas production facilities;
- Rule 1148.2. Notification And Reporting Requirements For Oil And Gas Wells And Chemical Suppliers;
- Rule 1166. Volatile organic compound emissions from decontamination of soil procedures and requirements;
- Rule 1173. Control of volatile organic compound leaks and releases from components at petroleum facilities and chemical plants;
- Rule 1176. VOC emissions from wastewater systems limits and required controls; and
- Rule 1178. Further reductions of VOC emissions from storage tanks at petroleum facilities.

The SCAQMD adopted Regulation XX - Regional Clean Air Incentive Market (RECLAIM), which changed the framework of air quality rules and permits (SCAQMD 1993). The RECLAIM program is a pollution credit trading program that applies to the largest sources of NOx and SOx emissions within SCAQMD jurisdiction.

Rules and regulations applicable to the Proposed City Maintenance Yard would be primarily associated with construction and fugitive dust emissions.

4.2.2.2 GHG Regulatory Setting

International GHG 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 GHG Regulations

Clean Air Act

In the past, the US EPA has not regulated GHG under the Clean Air Act. However, in 2007 the US Supreme Court 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.

Code of Federal Regulation (CFR) 40 CFR Section 98 specifies mandatory reporting requirements for a number of industries. The final 40 CFR Section 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 $MTCO_2e$ (or 10,000 $MTCO_2e$ for combustion and process source emissions).

State GHG Regulations and Programs

Executive Order S-3-05

The 2005 California Executive Order S-3-05 established the following GHG emission-reduction goals 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.

Executive Order B-16-2012

The 2012 California Executive Order B-16-2012 directed that all State entities support and facilitate the rapid commercialization of zero-emission vehicles. The directive ordered state

agencies to work with the Plug-in Electric Vehicle Collaborative and the California Fuel Cell Partnership to achieve by 2015 that the State's major metropolitan areas will be able to accommodate zero-emission vehicles, each with infrastructure plans and streamlined permitting and that by 2020:

- The State's zero-emission vehicle infrastructure will be able to support up to one million vehicles; and
- The costs of zero-emission vehicles will be competitive with conventional combustion vehicles; and
- Zero-emission vehicles will be accessible to mainstream consumers; and
- There will be widespread use of zero-emission vehicles for public transportation and freight transport; and
- Transportation sector greenhouse gas emissions will be falling as a result of the switch to zero-emission vehicles; and
- Electric vehicle charging will be integrated into the electricity grid; and
- The private sector's role in the supply chain for zero-emission vehicle component development and manufacturing within the State will be expanding.

And that by 2025:

- Over 1.5 million zero-emission vehicles will be on California roads and their market share will be expanding; and
- Californians will have easy access to zero-emission vehicle infrastructure; and
- The zero-emission vehicle industry will be a strong and sustainable part of California's economy; and
- California's clean, efficient vehicles will annually displace at least 1.5 billion gallons of petroleum fuels.

The Order also directs that California target for 2050 a reduction of greenhouse gas emissions from the transportation sector equaling 80 percent less than 1990 levels, that at least 10 percent of California's state vehicle fleet purchases of light-duty vehicles be zero-emission by 2015 and at least 25 percent of fleet purchases of light-duty vehicles be zero-emission by 2020.

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.

Assembly Bill 32

AB 32 codifies California's GHG emissions 2020 goal by requiring 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 Senate Bill (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 Preliminary 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 project, and if so, quantify or estimate the GHG emissions by type and source. Second, the lead agency must assess whether those emissions are 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 Proposed 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 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. The numerous measures in the Scoping Plan approved by the Board are being implemented in phases with Early Action Measures that have already been implemented. 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.

The Scoping Plan provides an approach to reduce emissions to achieve the 2020 target, and to initiate the transformations required to achieve the 2050 target. The 2008 Scoping Plan indicated that a 29 percent reduction below the estimated "business as usual" levels would be necessary to return to 1990 levels by 2020. The 2011 supplement (Functional Equivalent Document) to the Scoping Plan emission inventory revisions indicated that a 16 percent reduction below the

estimated "business as usual" levels would be necessary to return to 1990 levels by 2020. This revision was due to the slowing economy between 2008 and 2010 and to reduction measures that were already in place (CARB, 2011a, p. 10). An update of the Scoping Plan is currently ongoing with a release of a Draft Discussion Document in October, 2013. Another update is required in 2018.

CARB underwent an extensive and rigorous process in developing and approving the Scoping Plan. (For detailed discussion of this process, see *Association of Irritated Residents et. al. v. State Air Resources Board et. al.*, 206 Cal. App. 4th 1487; "AIR."). Among other things, CARB considered several alternatives to achieve the mandated maximum technologically feasible and cost-effective reductions in GHGs and submitted its analyses and recommendations for peer review and public comment on many occasions (AIR pp. 1498-1499). In affirming CARB's adoption of the Scoping Plan, the Court of Appeal of California concluded as follows:

> "The Governor and the Legislature have set ambitious goals for reducing the level of greenhouse gas emissions in California and to do so by means that are feasible and most cost-effective. The challenges inherent in meeting these goals can hardly be overstated. *[C]* ARB has been assigned the responsibility of designing and overseeing the implementation of measures to achieve these challenging goals. The scoping plan is but an initial step in this effort, to be followed by the adoption of regulations, the first of which are already in effect, and plan updates no less than every five years. As the plan itself indicates, there is still much to be learned that is pertinent to minimizing greenhouse gas emissions. It is hardly surprising that the scoping plan leaves some questions unanswered and that opinions differ as to *[the]* many complex issues inherent in the task. After reviewing the record before us, we are satisfied that the Board has approached its difficult task in conformity with the directive from the Legislature, and that the measures that it has recommended reflect the exercise of sound judgment based upon substantial evidence. Further research and experience likely will suggest modifications to the blueprint drawn in the scoping plan, but the plan's adoption in 2009 was in no respect arbitrary or capricious." (AIR, pp. 1505.)

Executive Order S-03-05 sets a goal that California emit 80 percent less GHGs in 2050 than it emitted in 1990. CARB's Scoping Plan, including the October, 2013 Discussion Draft, provides additional direction and insight as to how it anticipates California will achieve the 2050 reduction goal in Governor Schwarzenegger's Executive Order S-03-05:

> "Reducing our greenhouse gas emissions by 80 percent will require California to develop new technologies that dramatically reduce dependence on fossil fuels, and shift into a landscape of new ideas, clean energy, and green technology. The measures and approaches in this plan are designed to accelerate this necessary transition, promote the rapid development of a cleaner, low carbon economy, create vibrant livable communities, and improve the ways we travel and move goods throughout the state." (CARB, 2008, p. ES-2.)
>
> "[T]he measures needed to meet the 2050 goal are too far in the future to define in detail." (Ibid.) The CEC and CARB also have published an alternative fuels plan that identifies challenging but plausible ways to meet 2050 transportation goals. The majority

> of the measures identified by the CEC/CARB (renewable power requirements, the low carbon fuel standard, and vehicle emissions standards) relate to technology improvements beyond both the control of the project applicant [or Lead Agency] and the scope of the proposed project. But these technological improvements would reduce the demand for crude oil through a reduction in demand for gasoline and diesel fuels.

California businesses are required to report their annual GHG emissions. This requirement is contained within sections 95100-95133 of Title 17, California Code of Regulations. It establishes who must report GHG emissions to the CARB and sets forth the requirements for measuring, calculating, reporting and verifying those emissions. The rule specifies a reporting threshold of 25,000 $MTCO_2e$ or 10,000 $MTCO_2e$ for combustion and process source emissions.

Scoping Plan 2013 Draft Discussion Document

A Draft Discussion Document Scoping Plan was released in October, 2013, as a preliminary document to the 2013 Scoping Plan update. The Discussion Document addresses issues such as a revision to the GWP for gasses (to a 20 year instead of the 100 year timeframe), the establishment of a mid-term, 2030 goal (of between 33-40% reduction over 1990 levels), and the development of post-2020 emissions caps related to Cap-and-Trade to reflect the establishment of a 2030 midterm target.

California Air Resource Board Cap-and-Trade Regulation

The California Air Resource Board has implemented a cap-and-trade type program, pursuant to the AB-32 directed Scoping Plan, applicable to specific industries that emit more than 25,000 $MTCO_2e$. 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 $MTCO_2e$ 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.

Cap-and-Trade is designed to reduce the emissions from a substantial percentage of GHG sources (about 80% of GHG emissions will come under the program) within California through a market trading system. The system would reduce GHG emissions by reducing the available GHG "allowances" over time up until the year 2020. The program beyond the year 2020 has not been designed yet, but the program is intended to extend beyond that timeframe.

Facilities are required to obtain an "allowance", either through purchasing on auction or through freely allocated "industry assistance" allowances from CARB, for each $MTCO_2e$ of GHG they emit.

CARB issues the "industry assistance" allocations for free for a number of industries. These are based, in part, on a pre-defined "benchmark" of GHG emissions per unit of production. For the

oil recovery production sector, allowances are provided as a function of the amount of crude oil produced, thereby establishing, in effect, a level of efficiency in regards to GHG emissions for that sector. Other sectors are also allocated allowances based on their own respective activities.

If an operation within the sector operates less efficiently than the specified "benchmark", thereby receiving an insufficient number of "free" allowances to cover their emissions, they would be required to implement efficiency improvements or purchase additional allowances from the CARB auction. Some availability of "offsets" is also included in the program which can be obtained from specific, allowable offset programs, such as GHG reduction projects related to forestry, livestock and ozone depleting chemicals. Offsets outside of these three options are not allowed at this time.

The first group of sectors began trading in allowances in 2012. That group includes the oil and gas sector as well as most stationary sources. A second group is planned to begin the program in 2015, which would include the transportation fuels sector. CARB auctioned about 23 million allowances in November 2012 to be used for the 2013 year.

For subsequent periods after the initial 2013 period, allowances are planned to be distributed freely through the "industry assistance" program or auctioned off. Industry assistance allowances would decrease each year as per a "cap adjustment factor". The cap adjustment factor would be about 2-3% annually through 2020. The total allowances allowed to be allocated each year (either freely allocated or auctioned) are limited by the defined allowance budget, which decreases each year through 2020 and is current set at about 163 million $MTCO_2e$ for the year 2013.

An operator is required to participate in the Cap-and-Trade program if its facility emits more than 25,000 $MTCO_2e$ annually. Annual reporting of GHG emissions is required under the CARB Mandatory Reporting Rule.

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 CARB 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 $MTCO_2e$ or 10,000 $MTCO_2e$ for combustion and process source emissions.

City of Hermosa Beach

The City of Hermosa Beach is involved in efforts to reduce its greenhouse gases. Some of these include:

- Cool Cities Program: The City Council became a participant in the 'Cool Cities Program' in 2006. The 'Cities for Climate Protection' Campaign helps local governments to adopt policies and implement changes that reduce local greenhouse gas emissions, improve air quality, and enhance urban livability;
- International Council for Local Environmental Initiatives: The City is a member of ICLEI, an international association of local governments that have made a commitment to sustainable development;
- Carbon Neutral Initiative: The City Council in 2010 declared its intent to pursue the path to make city operations carbon neutral.
- Hermosa Beach Sustainability Plan: The City's ad hoc Green Task Force prepared this plan and it was accepted by the City Council in 2011 and is being implemented. It proposes ways to meet AB 32 targets.
- City of Hermosa Beach – The City Council adopted a Clean Fleet Policy and Action Plan on June 11, 2013.
- Energy reduction retrofits: The City is engaged in the SCE Energy Leadership Program and continues to implement energy reduction programs and retrofits at municipal facilities.
- City Hermosa Beach Carbon Neutral Scoping Plan (UCLA, 2013): This plan was prepared as a senior student practicum class project to advise the city on paths to carbon neutrality.
- Integrated General Plan and Coastal Land Use Plan focused on Sustainability and a Carbon Neutral Future: The City obtained a Strategic Growth Council Sustainable Communities Planning Grant to revise and integrate these plans around sustainability and carbon neutrality.[1]
- Carbon Neutrality Road Map: The City Council's Strategic Plan adopted in 2013 identifies development of a carbon neutral road map as a top priority.
- Green Building Codes: The City adopted Tier 1 amendments in 2010 requiring increased energy reduction measures.

The Sustainability Plan (accepted in 2011) includes strategies to reduce greenhouse gas emissions including emission reduction targets. To comply with AB32, the Plan indicates that municipal emissions must be reduced by 26 MYCO2e annually and community emissions by 1,630 MYCO2e annually by 2020. The major strategies for achieving these goals include energy efficiency in buildings, increased municipal employee carpooling, conversion of City vehicles to electricity (Clean Feet Policy adopted June 11, 2013), increased community electric and hybrid vehicles and bicycling, building retrofits for reduced energy consumption, embedding sustainability into the City's General Plan and 'DNA, among others. The Council's stated goal in 2010, Strategic Plan adopted in 2013, and steady progress affirm the commitment to carbon neutrality, while the target date is under study.

[1] The grant title stated 'low carbon' future; however, the City Council has indicated its desire to pursue carbon neutrality.

4.2.3 Significance Criteria

Appendix G of the CEQA Guidelines provides these key questions to guide evaluation of impacts related to air quality. Does the Project:

- Conflict with or obstruct implementation of the applicable air quality plan?
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
- Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
- Expose sensitive receptors to substantial pollutant concentrations?
- Create objectionable odors affecting a substantial number of people?

The SCAQMD, in its role as the agency responsible for regulating air emissions locally, has developed detailed criteria to address air quality issues relevant to the regional air basin and which establish quantitative thresholds which address the CEQA Appendix G questions listed above. This EIR applies the significance thresholds established by the SCAQMD to determine whether an impact is significant.

The SCAQMD makes significance determinations based on the maximum daily emissions during the Proposed Project construction period, which provides a worst-case analysis of the construction emissions. Similarly, significance determinations for operational emissions are based on maximum daily emissions during the Proposed Project operational phase.

To determine whether or not air quality impacts from the Proposed Project are significant, emissions are evaluated and compared to the SCAQMD air quality significance thresholds (see Table 4.2-6). If impacts exceed any of the criteria, they will be considered significant and all feasible mitigation measures will be identified and implemented to reduce significant impacts to the maximum extent feasible.

The SCAQMD has developed a localized significance threshold methodology to evaluate the potential localized impacts of criteria pollutants from construction activities (SCAQMD 2007). The localized significance threshold methodology requires an analysis regarding whether or not emissions of specified criteria pollutants exceed ambient air quality standards at a sensitive receptor. SCAQMD defines sensitive receptors as offsite locations where persons may be exposed to the emissions from project activities. Receptor locations include residential, commercial, and industrial land use areas and any other areas where persons could be situated for an hour or more at a time. These other areas include parks, bus stops, and sidewalks but would not include building tops, roadways, or permanent bodies of water such as oceans or lakes.

The localized significance threshold analysis is performed for emissions of CO, NO_2, and particulates, both PM_{10} and $PM_{2.5}$, associated with proposed projects. The SCAQMD has developed localized significant thresholds lookup tables that utilize the allowable concentrations of pollutants (shown in Table 4.2-6) combined with distances and construction or operational areas to calculate allowable emission rates. The lookup tables are specific for the

source/receptor area in the Basin as it also includes pollutant background and meteorological data specific to the area.

Table 4.2-6 SCAQMD Air Quality Significance Thresholds

Mass Daily Thresholds		
Pollutant	**Construction**	**Operation**
NOx	100 pounds/day	55 pounds/day
VOCs	75 pounds/day	55 pounds/day
PM_{10}	150 pounds/day	150 pounds/day
$PM_{2.5}$	55 pounds/day*	55 pounds/day*
SO_x	150 pounds/day	150 pounds/day
CO	550 pounds/day	550 pounds/day
Lead	3 pounds/day	3 pounds/day
Toxic Air Contaminants and Odor Thresholds		
Toxic Air Contaminants (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk > 10 in 1 million The risk per year shall not exceed 1/70 of the maximum allowable risk Maximum Cancer Burden >0.5 Hazard Index > 1.0 (Project increment)	
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402. Nuisance defined as more than six odor events per year.	
Ambient Air Quality for Criteria Pollutants(a)		
NO_2 1-hour average annual average	In attainment; significant if Project causes or contributes to an exceedance of any following standard: 0.18 ppm (state) 0.03 ppm (state)	
PM_{10} and $PM_{2.5}$ 24-hour annual (PM_{10} only)	 10.4 µg/m3 (recommended for construction)(b) 2.5 µg/m3 (operation) 1.0 µg/m3	
Sulfate 24-hour average	 25 µg/m3	
CO 1-hour average 8-hour average	In attainment; significant if Project causes or contributes to an exceedance of any following standard: 20 ppm (state) 9.0 ppm (state/federal)	
Greenhouse Gas Emissions		
CO_2, N_2O, CH_4, etc	If the Project's GHG emissions are less than or mitigated to less than 10,000 metric tonnes CO_2 equivalent per year the Project is presumed to be insignificant for GHG	

Ambient air quality thresholds for criteria pollutants based on SCAQMD Rule 1303, Table A-2 unless otherwise stated.
Ambient air quality threshold based on SCAQMD Rule 403.
µg/m3 = micrograms per cubic meter; lbs/day = pounds per day; ≥ greater than or equal to
* Based on SCAQMD 2006 "Final –Methodology to Calculate Particulate Matter (PM) 2.5 and $PM_{2.5}$ Significance Thresholds" regional thresholds, October 2006
Source: SCAQMD CEQA website

4.2.4 Project Impacts and Mitigation Measures

The Proposed Project would generate air emissions during the following activities:

- Construction of the Proposed Oil Project during Phase 1 and Phase 3;
- Demolition of the Existing City Maintenance Yard;
- Construction of the Proposed City Maintenance Yard Project;
- Phase 2 test drilling;
- Phase 2 operations/testing;
- Phase 4 drilling;
- Phase 4 operations; and
- Operations of the Proposed City Maintenance Yard Project.

Emissions are generated related to criteria pollutants for construction and operations, greenhouse gasses, and toxics and odors.

Portions of the Proposed Oil Project, the Pipeline and the Proposed City Maintenance Yard Project would occur simultaneously, particularly during Phase 3. Therefore, all of the components of the Proposed Project are assessed together under the impacts sub-section.

4.2.4.1 Design Features

The Proposed Project would be required to comply with a range of air quality measures and permits, primarily through the SCAQMD, including component monitoring for leaks, combustion equipment emissions limits, measures to reduce fugitive dust, limits on venting, etc. The Applicant has proposed several design features in addition to these permitted requirements that would reduce air quality impacts such as:

- An electric automated drill rig, with an approximately 87-foot rig mast, will be used to drill the wells thereby eliminating diesel emissions from a drilling rig;
- An Air Quality Monitoring Plan that will provide for the monitoring of total hydrocarbon vapors and hydrogen sulfide (H_2S) on the Project Site during drilling and production operations;
- An Odor Minimization Plan that will address the potential sources of odors from all equipment;
- An odor suppressant spray system or vapor capture hood and carbon filter system on the mud shaker tables and carbon capture canisters on all tanks will be installed during Phase 2;
- Use of a closed-loop system venting all pressure relief valves to the vapor recovery unit or an enclosed ground flare, eliminating the release of odors associated with gases; and
- Air monitoring will be performed during the excavation activities in which contaminated or potentially contaminated materials will be disturbed, excavated, or otherwise handled.

4.2.4.2 Conditional Use Permit (CUP) Requirements

The Proposed Project would be required to comply with the conditions of approval in the 1993 Conditional Use Permit. Applicable requirements for Air Quality are listed below.

- The number of truck trips shall be limited to a maximum of 18 rounds trips per day, except in an emergency;
- Grading shall not be performed when wind speeds exceed 20 mph. The contractor shall maintain a wind speed monitoring device on site during grading operations. The contractor shall continually keep the soil moist during grading operations. At no time shall any dust be allowed to leave the work site;
- All trucks arriving or departing the drill site shall be washed to prevent spillage of earth and all routes shall be swept and or washed by the driller as required by the City;
- A vapor recovery system shall be installed to recover 99% of hydrocarbon emissions during storage and transfer of crude oil;
- Raw gas shall not be allowed into the atmosphere;
- Any flame shall be enclosed;
- Tanks shall be designed and located so that no odors or fumes can be detected from the adjacent areas outside the exterior walls of the Project;
- Odorless drilling muds shall be used;
- Well tubing and rods shall not remain out of the well during workover operations less than 8-hours. The tubing will be surface washed with a detergent solution to remove odor bearing residual hydrocarbons if exposed longer than 8-hours;
- The permittee shall monitor drilling mud during drilling on the site for odorous substances and take such measures to eliminate any odor which could be perceptible outside the drill site;
- Well cellars shall be maintained in a clean and efficient manner to prevent waste accumulation and shall be frequently steam cleaned;
- Gas and vapor detection systems shall be installed at appropriate locations;
- The permittee shall monitor drilling mud during drilling on the site for odorous substances and take such measures to eliminate any odor which could be perceptible outside the drill site; and
- The permittee shall undertake no refining process or any process for the extraction of produces from natural gas, except for such minor processing as necessary to make natural gas acceptable to the City gas mains for domestic use.

4.2.4.3 Construction Criteria Pollutant Emissions

Air emissions of criteria pollutants (CO, VOC, NOx, 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). Air pollutants would also be emitted from contaminated soil off-gassing and asphalt paving off-gassing. Soil movement and vehicle movement on exposed soil (via grading activities or travel on dirt roadways) would also generate fugitive dust emissions. Vehicle travel on paved roads would also generate fugitive dust emissions.

Air emissions from construction equipment at the Project Site were estimated using the emission factors from the CalEEMod 2013.2.2 model (CAPCOA 2013) and the assumptions on the horsepower, duration and personnel detailed in Section 2.0, Project Description. The construction emissions were tabulated using spreadsheets instead of the CalEEMod program due to a number of factors, including the difficulty of assessing irregular, non-development type projects using CalEEMod with different sources, such as soil off-gassing. In addition, due to the irregular nature of the vehicular trips (soil hauling, oil and gas equipment delivery, etc), the peak day vehicle trips would be 5-6 times higher than the average day. CalEEMod is not capable of handling large variations in peak day emissions. Therefore, the CalEEMod emissions equations were utilized, but were developed and presented in spreadsheets for estimating the construction emissions from the Project Site. Appendix B includes details on the construction equipment and periods of operation for each equipment piece.

The CalEEMod program with defaults were used to estimate the construction emissions associated with the construction of the Proposed City Maintenance Yard (both temporary and permanent). Construction emissions associated with the permanent Proposed City Maintenance Yard parking option, involving more construction, were used as a worst case. Scheduling of each option construction would be similar, with the parking option taking a bit longer due to the additional construction requirements. Analysis of the temporary Proposed City Maintenance Yard assumed a smaller area and shorter duration of construction and would be constructed prior to the start of the Proposed Oil Project Phase 1. The removal of the temporary yard was included in the permanent yard construction estimates.

The primary source of criteria pollutants (NOx, CO, VOC, SOx and PM) would be the use of internal combustion engines associated with construction equipment, such as cranes and backhoes, as the pollutants are a byproduct of combustion in engines, including on-road vehicles.

A large portion of particulate emissions during construction are produced by pieces of equipment traveling on disturbed soil and unpaved surfaces, and various earth-moving activities, such as trenching, grading, clearing, etc (called fugitive dust). The amount of these emissions mostly depends on the size of the graded area, volume of moved soil, the number of construction machinery and vehicles, and the duration of construction.

Emission factors were used from CalEEMod model for calculation of the fugitive dust emissions. Onsite dirt road travel at the Project Site assumed a distance of 250 feet per truck visit, with a maximum of 18 truck visits per day. Truck loading and soil dumping assumed a total of about 450 cubic yards of material moved for electrical trenching and street work, and about 16,660 cubic yards of soil moved for the pipeline installation. Grading assumed a disturbed area equal to the Project Site area. The detailed calculations are contained in Appendix B.

Site preparation at the Project Site includes excavation of soils contaminated with lead and some hydrocarbons. The Applicant's submittals to the City (see RAP in Appendix A) indicate that some of the hydrocarbon impacted soils would be excavated from shallower soils (less than 25 feet below ground) and the remaining hydrocarbon impacted soils would be "vapor extracted" in place. The vapor extraction would take place after the facility is constructed. As there is some uncertainty associated with the exact amount of soils to be excavated, it was assumed as a worst case that all of the hydrocarbon contaminated soils would be excavated with an additional 25%

contingency factor, totaling 16,875 cubic yards of contaminated soils to be excavated over the 40 day period assigned to that task. Estimates of the VOC emissions from contaminated soils off-gassing utilized EPA estimates for Superfund sites (EPA 1992) assuming nonane (C9) emission rate of 1.48 grams VOC/second. The EPA approach assumes that all of the pore spaces of the excavated soils are saturated with the hydrocarbon and that these vapors are emitted as the soil is excavated. The average excavation rate over the excavation period was utilized as opposed to the EPA value of 0.42 cubic meters per second.

Excavation of contaminated soils at the Proposed City Maintenance Yard would also occur. Emissions were assumed to be similar to the emissions at the Project Site.

The use of nonane molecular weight materials was used in the EPA equations to estimate off-gassing emissions as the material at the site is weathered with the material located less than 10-15 feet deep composed predominately of higher molecular weight hydrocarbons (carbon fraction range C13-C40), with some low concentrations of lighter hydrocarbons (<C13) which would be approximated with the surrogate of nonane (C9). Historical sampling (Brycon 2012) shows that the highest concentrations of VOCs (C4-C12) are located between 10 and 35 feet deep with the highest concentrations of C13+ being located nearer the surface. The highest concentrations of toxic VOCs (benzene, etc) are located between 25 and 40 feet deep, which is below the 15 foot deep area that would be excavated as part of the Applicants Remedial Action Plan (RAP). However, in order to estimate the potential effects of toxic air contaminants associated with the contaminated soil excavations, modeling was conducted assuming that all contaminated soil at all depths contain toxic hydrocarbons as defined by the proposed RAP (see toxics analysis below).

The Project would also involve the laying of asphalt as part of the construction period in Phase 3 and these emissions were calculated using the CalEEMod emission factor of 2.62 lbs VOC/acre of asphalt. Crushed aggregate would be used for the Phase 1 and Phase 2 periods.

Offsite emissions during construction would be produced by vehicles visiting the site. The EMFAC2011 emission factors for vehicles were utilized along with the default commute distances for Los Angeles County in the CalEEMod program (14.7 miles each way).

Table 4.2-7 Construction Criteria Emissions

Activity	Peak Day Emissions (lb/day)					
	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Temporary City Maintenance Yard Construction						
Construction Equipment	28.11	8.30	14.38	0.01	1.00	0.92
Fugitive Dust Emissions	0.00	0.00	0.00	0.00	0.66	0.39
Subtotal: Construction Equipment/Fugitive Dust	28.11	8.30	14.38	0.01	1.66	1.31
Offsite Mobile Emissions	0.12	1.60	0.60	0.00	0.01	0.01
Total	28.23	9.90	14.97	0.01	1.67	1.32
Phase 1 Construction						
Construction Equipment	4.55	28.12	44.29	0.04	2.99	2.75
Fugitive Dust Emissions	0.00	0.00	0.00	0.00	2.26	0.23
Subtotal: Construction Equipment/Fugitive Dust	4.55	28.12	44.29	0.04	5.25	2.98

Table 4.2-7 Construction Criteria Emissions

Activity	Peak Day Emissions (lb/day)					
	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Offsite Mobile Emissions	0.36	4.00	11.38	0.00	0.24	0.22
Total	*4.91*	*32.12*	*55.67*	*0.04*	*5.49*	*3.20*
Phase 2 Construction						
Construction Equipment	1.69	8.25	17.18	0.01	0.89	0.82
Fugitive Dust Emissions	0.00	0.00	0.00	0.00	2.21	0.22
Subtotal: Construction Equipment/Fugitive Dust	1.69	8.25	17.18	0.01	3.10	1.04
Offsite Mobile Emissions	0.35	3.29	11.88	0.00	0.25	0.23
Total	2.04	11.53	29.06	0.01	3.36	1.27
Phase 3 Construction						
Construction Equipment Pipeline Construction	4.58	22.27	45.43	0.05	2.30	2.14
Fugitive Dust Emissions Pipeline Construction	0.00	0.00	0.00	0.00	0.04	0.01
Subtotal: Constr. Eq and Fugitive Dust - Pipeline	4.58	22.27	45.43	0.05	2.34	2.14
Construction Equipment Onsite	7.06	31.07	43.54	0.04	2.93	2.73
Fugitive Dust Emissions Onsite	0.00	0.00	0.00	0.00	0.04	0.01
Subtotal: Constr. Eq and Fugitive Dust - onsite	7.06	31.07	43.54	0.04	2.96	2.73
Offsite Mobile Emissions	0.93	9.09	30.95	0.00	0.66	0.59
Total	12.57	62.44	119.92	0.09	5.96	5.47
Proposed City Maintenance Yard Construction						
Construction Equipment	28.20	19.78	29.22	0.02	1.91	1.80
Fugitive Dust Emissions	0.00	0.00	0.00	0.00	5.55	2.89
Subtotal: Construction Equipment/Fugitive Dust	28.20	19.78	29.22	0.02	7.46	4.68
Offsite Mobile Emissions	0.27	1.35	3.45	0.01	0.37	0.11
Total	28.47	21.13	32.68	0.03	7.83	4.80
Phase 4 Construction						
Construction Equipment	1.41	12.28	16.16	0.19	0.01	0.83
Offsite Mobile Emissions	0.08	1.57	2.73	0.00	0.04	0.04
Total	1.49	13.85	18.89	0.19	0.05	0.87
Peak Day, Onsite	28.2	31.1	45.4	0.2	7.5	4.7
Peak Day, Total	41.0	83.6	152.6	0.1	13.8	10.3
SCAQMD Regional Construction Thresholds (lbs/day)	**75**	**550**	**100**	**150**	**150**	**55**
SCAQMD Localized Construction Thresholds Lookup Tables (lbs/day)	**-**	**755**	**103**	**-**	**5.9**	**3.6**
Significant Impact Regional?	**No**	**No**	**Yes**	**No**	**No**	**No**
Significant Impact Local Lookup Tables?	**-**	**No**	**No**	**-**	**Yes**	**Yes**

Notes: Local significance impacts compared to only onsite emissions. Peak Day=Phase 3 onsite construction, Pipeline and the City Maintenance Yard construction. City Maintenance Yard construction assumes Parking Option. See air quality appendix for detailed calculations

The proposed parking area at 636 Cypress Avenue was included in the emissions estimates for Phase 1 building demolition and asphalt paving, as well as offsite vehicle trips for demolition material hauling using the CalEEMod default values for demolition waste volumes. Construction air emissions are summarized in Table 4.2-7.

Impact #	Impact Description	Phase	Residual Impact
AQ.1	Construction activities would generate NOx and PM emissions that exceed South Coast Air Quality Management District thresholds.	Construction	Class II Less than Significant with Mitigation

Construction emissions generated during the Proposed Project could exceed the SCAQMD thresholds for NOx, $PM_{2.5}$ and PM_{10}.

Several Proposed Project activities would generate construction emissions; including Phase 1 and some Phase 2 construction (Phase 2 construction includes installing equipment and setting up the drilling rig). Some activities would occur simultaneously, specifically during Phase 3 construction, which would include construction at the Proposed Oil Project Site, pipeline construction, construction of the Proposed City Maintenance Yard and offsite emissions associated with traffic traveling to and from the construction sites. Table 4.1-9 shows each activity and emissions associated with those activities. Appendix B includes the inputs to estimate the emissions levels.

The highest emissions levels would occur during Phase 3 when the Proposed Oil Project construction, pipeline construction, and construction of the Proposed City Maintenance Yard would be occurring simultaneously. Emissions of NOx would exceed the regional significance criteria. All other pollutant emissions would remain below the regional significance thresholds.

Onsite emissions of PM_{10} and $PM_{2.5}$ would exceed the localized significance thresholds (see Table 4.2-7).

Mitigation measures to reduce NOx emissions would include the required use of cleaner engines (called EPA Tier 3). Reductions of PM emissions could be achieved through the use of fugitive dust measures, such as watering, and other measures listed below.

Mitigation Measures

AQ-1a The Applicant shall submit and implement a Fugitive Dust Control Plan that includes SCAQMD mitigations for fugitive dust mitigation, according to Rule 403, and SCAQMD CEQA Guidelines. Fugitive dust mitigation measures in the plan shall include the following (this mitigation is applicable to both the Proposed Oil Project and the Proposed City Maintenance Yard Project):

- Apply water every 3 hours to disturbed areas and unpaved roads within a construction site (61 percent reduction).

- Require minimum soil moisture of 12 percent for earthmoving, by using a moveable sprinkler system or water truck. Moisture content can be verified by lab sample or moisture probe (69 percent reduction).
- Limit onsite vehicle speeds on unpaved roads to 15 mph and posting of speed limits.
- All trucks hauling dirt, sand, soil, or other loose materials are to be tarped with a fabric cover and maintain a freeboard height of 12 inches (91 percent reduction).
- Install gravel bed trackout apron (3 inches deep, 25 feet long, 12 feet wide per lane, and edged by rock berm or row of stakes) to reduce mud and dirt trackout from unpaved truck exit routes (46 to 80 percent reduction).
- Water storage piles by hand or apply cover when wind events are declared, according to SCAQMD Rule 403 when instantaneous wind speeds exceed 25 miles per hour (90 percent reduction).
- Appoint a construction relations officer to act as a community liaison concerning onsite construction issues, such as dust generation.

AQ-1b The Applicant shall implement a NOx reduction program including the following, or equivalent, measures to the satisfaction of the SCAQMD (this mitigation is applicable to both the Proposed Oil Project and the Proposed City Maintenance Yard Project):

- All off-road construction equipment shall be tuned and maintained according to manufacturers' specifications.
- Any temporary electric power shall be obtained from the electrical grid, rather than portable diesel or gasoline generators.
- All off-road diesel construction equipment with greater than 100-horsepower engines shall meet Tier 3 NOx requirements.
- Limit onsite truck idling to less than 5 minutes.
- A copy of the certified tier specification, best available control technology documentation, or the CARB or SCAQMD operating permit for each piece of equipment shall be provided to the City and SCAQMD when each piece of equipment is mobilized.

Residual Impacts

Implementation of Tier 3 engines reduces emissions of NOx and PM. Fugitive dust would be reduced through the implementation of the mitigation measures. Emissions would be reduced to below the regional and localized thresholds for all pollutants. Table 4.2-8 shows the mitigated emissions with revised emission factors for fugitive dust and construction equipment. Therefore, the proposed construction would be considered **less than significant with mitigation (Class II)**.

Table 4.2-8 Construction Criteria Emissions: Mitigated

Activity	Peak Day Emissions (lbs/day)					
	VOC	CO	NO_x	SO_X	PM_{10}	$PM_{2.5}$
Phase 1 Construction						
Construction Equipment	0.93	27.95	18.93	0.04	1.11	1.11
Fugitive Dust Emissions	0.00	0.00	0.00	0.00	1.02	0.10

Table 4.2-8 Construction Criteria Emissions: Mitigated

Activity	Peak Day Emissions (lbs/day)					
	VOC	CO	NO_x	SO_X	PM_{10}	$PM_{2.5}$
Subtotal: Construction Equipment/Fugitive Dust	0.93	27.95	18.93	0.04	2.13	1.22
Offsite Mobile Emissions	0.36	4.00	11.38	0.00	0.24	0.22
Total	1.29	31.95	30.31	0.04	2.37	1.43
Phase 2 Construction						
Construction Equipment	0.33	7.96	6.25	0.01	0.28	0.28
Fugitive Dust Emissions	0.00	0.00	0.00	0.00	0.99	0.10
Subtotal: Construction Equipment/Fugitive Dust	0.33	7.96	6.25	0.01	1.27	0.38
Offsite Mobile Emissions	0.35	3.29	11.88	0.00	0.25	0.23
Total	0.68	11.24	18.13	0.01	1.53	0.61
Phase 3 Construction						
Construction Equipment Pipeline Construction	1.22	27.24	22.28	0.05	0.95	0.95
Fugitive Dust Emissions Pipeline Construction	0.00	0.00	0.00	0.00	0.04	0.01
Subtotal: Constr. Equip and Fugitive Dust -Pipeline	1.22	27.24	22.28	0.05	0.98	0.95
Construction Equipment Onsite	2.54	29.39	21.43	0.04	1.18	1.18
Fugitive Dust Emissions Onsite	0.00	0.00	0.00	0.00	0.04	0.01
Subtotal: Constr. Equip and Fugitive Dust -Onsite	2.54	29.39	21.43	0.04	1.21	1.18
Offsite Mobile Emissions	0.93	9.09	30.95	0.00	0.66	0.59
Total	4.69	65.72	74.66	0.08	2.86	2.73
Proposed City Maintenance Yard Construction						
Construction Equipment	28.20	15.14	16.38	0.02	1.24	1.23
Fugitive Dust Emissions	0.00	0.00	0.00	0.00	2.01	1.08
Subtotal: Construction Equipment/Fugitive Dust	28.20	15.14	16.38	0.02	3.25	2.32
Offsite Mobile Emissions	0.27	1.35	3.45	0.01	0.37	0.11
Total	28.47	16.49	19.84	0.03	3.62	2.43
Phase 4 Construction						
Construction Equipment	0.28	2.00	5.39	0.06	0.00	0.05
Offsite Mobile Emissions	0.08	1.57	2.73	0.00	0.04	0.04
Total	0.36	3.57	8.12	0.06	0.04	0.09
Peak Day, Onsite	28.2	29.4	22.3	0.1	3.3	2.3
Peak Day, Total	33.2	82.2	94.5	0.1	6.5	5.2
SCAQMD Regional Construction Thresholds (lbs/day)	**75**	**550**	**100**	**150**	**150**	**55**
SCAQMD Localized Construction Thresholds (lbs/day)	-	**755**	**103**	-	**5.9**	**3.6**
Significant Impact Regional?	**No**	**No**	**No**	**No**	**No**	**No**
Significant Impact Local Lookup Tables?	-	**No**	**No**	-	**No**	**No**

Impact #	Impact Description	Phase	Residual Impact
AQ.2	Construction activities would generate emissions from contaminated soil excavation.	Construction	Class III Less Than Significant

As discussed above, the Applicant indicates that some of the hydrocarbon impacted soils would be excavated from shallower soils (less than 25 feet below ground) and the remaining hydrocarbon impacted soils would be "vapor extracted" in place. Soil sampling data indicates that most of the toxic and volatile hydrocarbons would be located below the areas that would be excavated. However, as a worst case, it was assumed that all soils excavated would be contaminated with the highest levels of toxic contaminants identified in the Applicant RAP and that the EPA Superfund emission rate (EPA 1992) assuming a surrogate hydrocarbon level of nonane of total hydrocarbons would occur. Modeling was conducted with AERMOD using an area source equal to the area of TPH contamination. The rate of soil excavation conservatively assumed that all hydrocarbon contaminated soils would be excavated with an additional 25% contingency factor to address the uncertainties associated with the contaminated area.

The concentrations of toxic contaminants in the soil range from a high of 1.9 mg/kg of soil for naphthalene to a low of 0.015 mg/kg of soil for benzene. TPH ranges in the soil for the lighter hydrocarbons ranged up to 350 mg/kg soil. It assumed that the toxic hydrocarbon constituent would vaporize with the lighter hydrocarbons to produce the VOC emissions rate discussed above.

The primary constituent of concern related to acute impacts would be benzene. The acute reference exposure level (REL) as defined by the OEHHA (OEHHA 2013) for benzene is 1,300 ug/m3 in the air and the modeled levels at the closest offsite location would be substantially below this level. Therefore, no acute impacts would be anticipated based on the SCAQMD thresholds for acute risks.

The primary constituents of concern related to chronic impacts would be benzene (REL of 60 ug/m3), ethylbenzene (REL of 2,000 ug/m3) and naphthalene (REL of 9 ug/m3). The combined health hazard index (HI, the ratio of the anticipated concentration divided by the REL) at the closest offsite location would be 0.003, primarily due to the presence of naphthalene. This would be considered a less than significant impact.

Cancer screening, using the OEHHA cancer potency factors for benzene, ethylbenzene and naphthalene yield an estimated cancer risk for the peak year (as per the SCAQMD Rule 1401) of 0.13 in a million at the closest offsite location, also primarily due to naphthalene. This also would be considered a less than significant impact.

The SCAQMD Rule 1166 requires measures that would substantially reduce the emissions of VOC from the soil excavation activities. These include:

- Monitoring for VOC contamination at least once every 15 minutes commencing at the beginning of excavation or grading;
- All VOC soils shall be segregated, covered and watered for all periods longer than 1 hour to reduce VOC emissions;

- All contaminated soils shall be removed from the site at least every 30 days;
- If soils contain VOC greater than 1,000 ppm, they shall be, as soon as possible, but not more than 15 minutes, loaded into trucks, moistened with additional water, covered and transported off site.

Implementation of the monitoring and VOC reduction measures required by Rule 1166 would substantially reduce the emissions of toxic vapors. Therefore, the proposed construction contaminated soils excavation activity would be **less than significant (Class III)**.

Contaminated soils at the Proposed City Maintenance Yard Site are classified as containing semi-volatile hydrocarbons and lead. Neither of these contaminants would produce impacts greater than those identified at the Project Site as the volatility of the materials are lower (i.e. less would go into the air). SCAQMD Rule 1166 would apply to activities at the Proposed City Maintenance Yard Site. Therefore, the proposed construction at the Proposed City Maintenance Yard Site would be **less than significant (Class III)**.

4.2.4.4 Operational Criteria Pollutant Emissions

Air emissions of criteria pollutants (NOx, CO, VOC, SO_2 and PM) during operations would result from equipment associated with combustion (e.g., microturbines and the flare), fugitive emissions of VOCs from components and from offsite vehicles (e.g., employee commuter vehicles and trucks delivering supplies, trucks hauling crude oil, etc.).

Combustion emissions were estimated utilizing the proposed equipment heat/fuel ratings along with emission factors. During Phase 1, the flare would be used to combust the produced gas because none of the gas would be used onsite or transported offsite.

During Phase 4, the microturbines would be used to generate onsite electricity by burning some of the produced gas from the Project wells. The flare would be utilized during emergency situations or to allow for maintenance of the gas processing equipment and burn all of the produced gas so that the wells would not need to be shut-in if the gas plant equipment malfunctions or needs to be repaired. Shut-in of wells involves stopping the pumps and closing the main valves on each well to prevent flow from the wells. Emission factors for the microturbines and flares (flare for Phase 2 and Phase 4, microturbine for Phase 4 only) are based on Applicant submitted manufacturers information for NOx, CO and VOC. PM emission factors are based on EPA AP-42.

Fugitive emissions are associated with gas leaks from fittings, valves, and tanks. The amount of gas that leaks from tanks is a function of the amount of crude oil throughput as the level of crude oil in the tank is raised and lowered, leaving a film of crude oil on the sides of the tank. The proposed tanks would have fixed roofs. The Applicant has proposed a vapor recovery system that was included in the air emissions calculations. Calculations utilized the EPA Tanks version 409d emissions model. Crude throughput was assumed to be the maximum throughput identified in Section 2.0, Project Description for Phase 2 and Phase 4. There would also be fugitive emissions from valves, compressors, pumps and connections. These emissions are a function of

the number of components and the levels of maintenance. Component counts were estimated based on the Applicant-supplied information.

Emission factors for fugitive components are based on the SCAQMD Guidelines for Fugitive Emissions Calculations (SCAQMD 2003) default emission factors for oil and gas production facilities (Form P1 or P1U). Because these emission factors do not include the use of an inspection and maintenance program, as prescribed and required by SCAQMD Rule 1173, a reduction level of 80 percent was applied to these emissions to account for the quarterly Leak Detection and Reporting (LDAR) protocol as required by Rule 1173 (SBCAPCD 1998). Note that, using a correlation equation to estimate emissions (the procedure used in the air emissions study provided by the Applicant), where the number of "leakers" and "non-leakers", and the level of "leakers", for a facility is known based on historical monitoring data, would not be applicable in this case as the facility has not been built yet. The SCAQMD default fugitive emission rate correlates to about a 1.5 percent leaker rate (a leaker being defined as a hydrocarbon value of greater than 10,000 ppm detected at the valve location) based on the CAPCOA correlation equations (CAPCOA 1999). EPA estimates a similar leaker rate in industry studies (USEPA 1994).

Emissions associated with drilling have been included in the operational emissions estimates because drilling could occur over an extended period of time during Phase 4 (2.5 years) and could continue intermittently for the life of the Project. In addition, because drilling would be occurring at the same time as facility operations (crude processing and shipping during Phase 2) and crude processing, shipping and gas processing (during Phase 4), the SCAQMD requires that these emissions be calculated and compared to the operational emissions thresholds.

Because drilling would be performed using an electric drilling rig, drilling emissions at the Project Site would be limited to emissions from support equipment used to handle piping and equipment (a forklift) as well as potential emissions from muds handling. Muds that originate from areas of the borehole that contain hydrocarbons could come to the surface and release hydrocarbon vapors ("mud off-gassing"). Emissions estimates for muds off-gassing have not been well documented in the industry. EPA AP-42 does not address muds off-gassing, for example. The SCAQMD has begun exploring a potential rule adoption and protocols for estimating muds off-gassing emissions (SCAQMD 2012). Drillers often monitor the hydrocarbon levels in the vapors immediately coming off of the muds as they leave the wellhead in order to assess the potential for increased well pressures and to ensure they have proper well control.

Due to the large amount of drilling activity in Texas, the Texas Commission on Environmental Quality Air Quality Division has published some emission inventories which estimate muds off-gassing at about 75 pounds of VOC per day (ERGI 2007). For this Project, this was estimated to occur only during the last 500 feet of well drilling as the wells begin to encounter zones with hydrocarbons. Well workovers are maintenance activities performed on a well that use a rig similar to a drilling rig, but are less equipment intensive as an actual hole is not drilled (no muds used, etc). Workovers would occur for periods of up to 90 days per year for the life of the Project; this limitation is imposed by the 1993 CUP conditions. Well workovers would utilize a truck mounted drilling rig that would require a diesel generator and a diesel truck engine to be operating during the workover operations.

Operational emissions are shown in Table 4.2-9 for Phase 2 with drilling, Phase 2 with testing only, Phase 4 with drilling and Phase 4 without drilling. The Proposed City Maintenance Yard operational emissions would not change from the current City Maintenance Yard operational emissions and are therefore not shown. The Proposed City Maintenance Yard would not involve combustion sources (beyond vehicle use) and would therefore not produce any localized impacts. Odors from the site would be associated with normal vehicle maintenance activities and would not exceed the current operations.

Table 4.2-9 Operational Criteria Emissions

Activity	Peak Day Emissions (lb/day)					
	VOC	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Phase 2 Test Drilling and Testing						
Testing Equipment & fugitives	23.2	3.9	6.0	0.2	1.9	1.9
Drilling Equipment & fugitives	76.1	0.9	1.6	0.0	0.3	0.2
Subtotal: Constr. Equip and Fugitive Dust	99.3	4.8	7.6	0.2	2.2	2.1
Offsite Mobile Emissions	0.4	3.5	14.0	0.0	0.3	0.3
Total	99.7	8.3	21.6	0.2	2.5	2.4
Phase 2 Testing Only						
Combustion Equip and Fugitives	23.2	3.9	6.0	0.2	1.9	1.9
Offsite Mobile Emissions	0.1	1.3	5.1	0.0	0.1	0.1
Total	23.3	5.2	11.1	0.2	2.1	2.0
Phase 4 Operations and Drilling						
Processing Equipment and Fugitives	32.6	278.0	151.6	1.5	18.8	18.4
Drilling Emissions and Fugitives	76.1	0.9	1.6	0.0	0.3	0.2
Subtotal: Stationary Equip, Workovers and Drilling	108.7	278.9	153.2	1.5	19.1	18.7
Offsite Mobile Emissions	0.2	2.6	7.5	0.0	0.1	0.1
Total	108.8	281.5	160.8	1.5	19.2	18.8
Phase 4 Operations Only						
Processing Equipment and Fugitives	32.6	278.0	151.6	1.5	18.8	18.4
Workover Emissions	2.1	11.0	21.7	0.0	1.0	0.9
Subtotal: Stationary Equip, Workovers and Drilling	34.7	289.0	173.4	1.5	19.8	19.4
Offsite Mobile Emissions	0.1	2.3	4.1	0.0	0.1	0.1
Total	34.8	291.3	177.4	1.5	19.9	19.4
SCAQMD Regional Operations Thresholds (lbs/day)	**55**	**550**	**55**	**150**	**150**	**55**
SCAQMD Localized Operations Thresholds (lbs/day)	**-**	**755**	**103**		**1.3**	**1**
Significant Impact Regional?	**Yes**	**No**	**Yes**	**No**	**No**	**No**
Significant Impact Local Lookup Tables?		**No**	**Yes**		**Yes**	**Yes**

Note: Numbers may not add due to rounding.

Some potential impacts would be classified as Class III, or less than significant. These include impacts related to localized exceedances of CO standards "hot spots" and impacts related to truck traffic and health risk. CO hot spots are created when a substantial amount of traffic is generated by a project that causes congestion at an intersection. The vehicle emissions of CO can produce localized exceedances of the CO standards. Generally, the number of vehicle trips needed to generate enough traffic to contribute to CO hot spots would be more than a few thousand per day The Proposed Project would not generate enough traffic to generate CO hot spots.

Truck traffic generating above about 100-200 vehicles per day over a long operational period can produce localized cancer-related impacts due to diesel emissions. Because cancer risks are based on lifetime exposure, the truck trips would need to be associated with the long term operational characteristics of a Project instead of just the relatively short-duration construction activities. The Proposed Project (Proposed Oil Project and the Proposed City Maintenance Yard Project) would not generate enough operational truck trips to cause health risk impacts from diesel particulate emissions. Note that SCAQMD significance criteria for cancer risk are based on the incremental increase in cancer risk levels.

Impact #	Impact Description	Phase	Residual Impact
AQ.3	Regional Impacts: Operational activities would generate emissions that exceed South Coast Air Quality Management District VOC and NOx regional thresholds.	Operations Phase 2 and Phase 4.	Class II Less Than Significant with Mitigation

During routine maintenance or emergency scenarios, the produced gas would be routed to the flare instead of to the gas processing equipment. The flare operations are limited by the SCAQMD to 200 hours per year. During a peak day, the flare could operate for 24 hours. If this were to occur, the operational emissions generated would exceed the SCAQMD regional thresholds for NOx and would be considered significant.

Emissions of VOC would also exceed the SCAQMD regional thresholds due primarily to the fugitive emissions from tanks, valves and components and muds off-gassing during drilling and would be considered significant.

During a normal operational day, with just the microturbines operating, the SCAQMD regional thresholds for NOx would not be exceeded but emissions of VOC would continue to be exceeded.

Mitigation would include limiting the operating hours of the flare on the peak day, installing muds VOC capturing devices and reducing VOC fugitive emissions.

Mitigation Measures

AQ-3a The Applicant shall limit flaring to a total of 5 hours per day at the full flaring capacity (or equivalent) during all emergency or routine flaring events in order to ensure that NOx emissions are reduced below the thresholds. Lower NOx emission combustors or other equivalent measures can also be used to satisfy the requirement.

AQ-3b The Applicant shall implement methods to reduce the off-gassing of muds by at least 90 percent through the installation of fully enclosed mud pit areas with vapor control (either through carbon canisters or vapor recovery) and/or the use of mud degassing units routed to vapor control systems. The Applicant shall monitor the muds vapor immediately above the muds exit point from the wellbore and at other areas above the mud pits where muds may be exposed to the atmosphere in order to ensure that hydrocarbon vapors are captured at the minimum rate of 90 percent.

Residual Impacts

Implementation of reduced flare daily hours and reductions in the vapor from muds degassing would reduce the emissions of NOx and VOC from the operations and drilling to less than the thresholds. Emissions levels are shown in Table 4.2-10. Therefore, the proposed operational emissions would be considered **less than significant with mitigation (Class II)**.

Table 4.2-10 Operational Criteria Emissions: Mitigated

Activity	Peak Day Emissions (lb/day)					
	VOC	CO	NO_x	SO_X	PM_{10}	$PM_{2.5}$
Phase 2 Test Drilling and Testing						
Testing Equipment & fugitives	23.2	3.9	6.0	0.2	1.9	1.9
Drilling Equipment & fugitives	7.6	1.0	0.6	0.0	0.2	0.2
Subtotal: Constr. Eq and Fugitive Dust	30.8	4.9	6.6	0.2	2.1	2.1
Offsite Mobile Emissions	0.4	3.5	14.0	0.0	0.3	0.3
Total	31.2	8.4	20.6	0.2	2.4	2.3
Phase 2 Testing Only						
Combustion Equipment and Fugitives	23.2	3.9	6.0	0.2	1.9	1.9
Offsite Mobile Emissions	0.1	1.3	5.1	0.0	0.1	0.1
Total	23.3	5.2	11.1	0.2	2.1	2.0
Phase 4 Operations and Drilling						
Processing Equipment and Fugitives	12.7	43.6	23.8	0.2	3.0	2.9
Drilling Emissions and Fugitives	7.6	1.0	0.6	0.0	0.2	0.2
Subtotal: Stationary Eq, Workovers and Drilling	20.4	44.6	24.4	0.2	3.2	3.1
Offsite Mobile Emissions	0.2	2.6	7.5	0.0	0.1	0.1
Total	20.5	47.2	31.9	0.2	3.3	3.2
Phase 4 Operations Only						
Processing Equipment and Fugitives	12.7	43.6	23.8	0.2	3.0	2.9
Workover Emissions	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal: Stationary Eq, Workovers and Drilling	12.7	43.6	23.8	0.2	3.0	2.9
Offsite Mobile Emissions	0.1	2.3	4.1	0.0	0.1	0.1
Total	12.8	45.9	27.9	0.2	3.0	2.9
SCAQMD Regional Operations Thresholds (lbs/day)	**55**	**550**	**55**	**150**	**150**	**55**
SCAQMD Localized Operations Thresholds (lbs/day)	**-**	**755**	**103**		**1.3**	**1**
Significant Impact Regional?	**No**	**No**	**No**	**No**	**No**	**No**
Significant Impact Local Lookup Tables?		**No**	**No**		**Yes**	**Yes**

Impact #	Impact Description	Phase	Residual Impact
AQ.4	Local Impacts: Operational activities would generate PM emissions that exceed South Coast Air Quality Management District local thresholds.	Operations Phase 2 and Phase 4.	Class II Less Than Significant with Mitigation

Emissions from the microturbines or from the flare would cause the localized thresholds from the SCAQMD lookup tables to be exceeded for the PM_{10} and $PM_{2.5}$ emissions even after the mitigation for the regional thresholds. Therefore, modeling using the AERMOD program was utilized to estimate the localized impacts following the guidance from the SCAQMD website (http://www.aqmd.gov/smog/metdata/AERMOD_ModelingGuidance.html).

Modeling parameters are listed below based on Applicant and manufacturers' information.

- For the Phase 1 flare, the exhaust stack diameter: 3.5 feet, the exhaust gas exit temperature: 2000 deg F and the exhaust gas exit velocity: 15.3 feet/second;
- For the Phase 2 flare, the exhaust stack diameter: 10 feet, the exhaust gas exit temperature: 2000 deg F and the exhaust gas exit velocity: 15.3 feet/second;
- For the Phase 2 microturbines, there would be 5 separate stacks, one associated with each microturbine, with the following characteristics each: exhaust stack diameter: 1 foot, exhaust gas exit temperature: 325 deg F, exhaust gas exit velocity: 10.6 feet/second.
- All stacks would be 16 feet high.

For Phase 4, as the microturbine and flare stacks would be located within an area that has a 16 foot wall (when there is no drilling) or a 32 foot sound wall (when there is drilling), building downwash effects need to be included. Aerodynamic building downwash is a phenomenon caused by eddies created by air movement around building obstacles. Wind-tunnel and field studies have demonstrated that incorporating estimates of wind speed, streamline deflection, and turbulence intensities in the wake of wind flow over nearby buildings, as related to the location of the source, are crucial to accurately modeling ground level concentrations of pollutants. For a given source-building configuration, the dominant effect depends on the wind direction relative to the building face (affecting the amount of streamline descent) and the wind speed (controlling the rate of rise of the plume).

Studies by Schulman (Schulman 2000) indicate that, for the parameters of the wall proposed by the Applicant, the wind "cavity", meaning the area downwind most influenced by the building downwash effect, would extend from 40 to 70 meters (for the 16 foot and 32 foot walls, respectively, using the equations from Schulman). The microturbine and flare stacks would be located within these cavities and, even though shorter than the 32 foot wall, would be substantially influenced by the downwash effect. Peak offsite pollutant concentrations increase by 2-3 times with the inclusion of building downwash effects.

The building downwash parameters were estimated using the BPIPPRM program (EPRI 1997) assuming a 18 inch thick wall surrounding the site at 16 feet high or 32 feet high for the sound wall. Stack locations were placed based on the plot plans supplied as part of the Application.

For Phase 2, there would not be a 16 foot wall around the site so the building downwash corrections were not used unless drilling is taking place. Then the 32 foot sound wall was included with the corresponding downwash effects.

The soundwall would be twice the height of the flare or microturbine stacks and could substantially influence the flow of wind around and near the site and influence the plume behavior and the ground level concentrations of pollutants. The AERMOD model building downwash algorithms was also run assuming a 32 foot wall around the site for Phase 2 and Phase 4 drilling periods to ensure that the modeling results are accurate.

Modeling was run using terrain data generated from AERMAP and digital elevation files. The model was also run with the FLAT option (no terrain effects) to ensure that the maximum impacts were assessed (as per SCAQMD modeling guidance). The urban dispersion modeling setting was utilized with an urban population of 9,862,049 (as per SCAQMD Guidance).

A near field receptor grid with receptors every 10 meters was used extending 250 meters from the site, with a grid of every 50 meters used beyond that for a distance of about 1 km. The site boundary was set with receptors approximately every 8 meters.

Modeling results are shown below in Table 4.2-11. Levels are shown for the peak concentration at a sensitive (residential) receptor, as per SCAQMD Guidance for localized impacts.

Table 4.2-11 Localized Modeling Results for Combustion Source Particulate Matter

Pollutant	Background, ug/m3	Project Contribution, ug/m3	Project + Background	Threshold	Significant?
Phase 2 Flaring					
PM 24 hr	31	1.37	32.37	2.5 change	No
PM Annual	19.8	0.34	20.14	1.0 change	No
Phase 4 Flaring					
PM 24 hr	31	3.85	34.85	2.5 change	Yes
PM Annual	19.8	0.003	19.80	1.0 change	No
Phase 4 Microturbines					
PM 24 hr	31	4.87	35.87	2.5 change	Yes
PM Annual	19.8	1.37	21.17	1.0 change	Yes

Note: The flare and the microturbine would not operate at the same time.
Source: AERMOD modeling, see Appendix B

Localized impacts associated with the Phase 4 operations would exceed the thresholds for PM and would be considered significant.

Localized impacts associated with Phase 2 flaring would be below the thresholds.

Mitigation measures discussed above, including limits on the daily flaring, would reduce PM emissions associated with the flare. Mitigation requiring microturbines that produce less PM

emissions, or the installation of fewer microturbines, thereby purchasing more electricity from the grid, would reduce localized impacts.

Mitigation Measures

AQ-4 The Applicant shall limit the microturbine PM emissions to 0.0035 lbs/mmbtu, or an equivalent reduction in the number and/or size of the microturbines, in order to reduce emissions to below the localized thresholds.

Residual Impacts

Implementation of reduced flare daily hours and reductions in the microturbine PM emissions would reduce the localized impacts from the operations and drilling to less than the localized thresholds (see Table 4.2-12). As the microturbines are not critical to the functioning of the facility (additional electrical power could be purchased from the grid with substantially smaller turbines or heaters to satisfy the minimal heat demands), this mitigation would be feasible. Therefore, the proposed operational emissions would be considered **less than significant with mitigation (Class II)**.

Table 4.2-12 Localized Modeling Results for Combustion Source Particulate Matter: Mitigated

Pollutant	Background, ug/m3	Project Contribution, ug/m3	Project + Background	Threshold	Significant?
Phase 2 Flaring					
PM 24 hr	31	1.37	32.37	2.5 change	No
PM Annual	19.8	0.34	20.14	1.0 change	No
Phase 4 Flaring					
PM 24 hr	31	0.60	31.60	2.5 change	No
PM Annual	19.8	0.003	19.80	1.0 change	No
Phase 4 Microturbines					
PM 24 hr	31	2.29	33.29	2.5 change	No
PM Annual	19.8	0.64	20.44	1.0 change	No

Source: AERMOD modeling, see Air Quality Appendix

Impact #	Impact Description	Phase	Residual Impact
AQ.5	Operational activities would generate emissions that produce offsite odor impacts.	Operations Phase 2 and Phase 4.	Class I Significant and Unavoidable

An odor is produced by the release of material that contains even small amounts of sulfur compounds or hydrocarbons. 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 (hydrogen sulfide) can be detected by humans at concentrations from 0.5 parts per billion (ppb, or 0.0005 ppm) (detected by 2 percent of the population) to 40 ppb,

qualified as annoying by 50 percent of the population. Above these levels, it would be detected by most people. The OSHA allowable limit for occupational exposure to H_2S is 20 ppm with a 50 ppm peak over 10 minutes (29 CFR 1910.1000 Z-2 Table). Inhaling 100 ppm of H_2S can be lethal according to the Emergency Response Planning Guideline (AIHA 2008). The H_2S levels in the gas are estimated to be less than 6 ppm. However, it is possible that it could range up to 100 ppm because the gas plant would be designed to process gas with up to 100 ppm H_2S. As a worst case, gas H_2S levels of 100 ppm have been assumed.

Many volatile compounds found in oil and gas (pentane, n-pentane, hexane, ethane and longer chain hydrocarbons) also typically have a petroleum or gasoline odor 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, with an odor threshold of 2 ppm (New Jersey 2007).

Natural gas contains mostly methane, which is odorless so it is odorized as dictated by law before entering a distribution pipeline. The various odorizing compounds contain sulfur compounds and have very low odor thresholds and can produce odors if released into the atmosphere.

During Phase 2 and 4, the facility would inspect components for fugitive emissions as required by SCAQMD rule 1173 “Control of Volatile Organic Compound Leaks and Releases from Components at Petroleum Facilities and Chemical Plants.” Rule 1173 prohibits: (1) leaks of light liquids greater than three drops per minute; (2) leaks from gas components greater than 10,000 ppm; (3) leaks from heavy liquid components greater than 100 to 500 ppm; and (4) leaks from a pressure relief valve greater than 200 ppm. Rule 1173 also requires daily inspection of compressors, pumps, and pressure relief devices and inspection of all other components at least quarterly. Any leaks identified greater than 10,000 ppm are required to be repaired within 2 days and any leaks greater than 25,000 ppm are required to be repaired in 1 day.

Odor events could occur due to many different situations associated with equipment or drilling upset conditions. The equipment components could also leak and cause odors. Tanks are equipped with hatches to protect them from overpressure. If these hatches lift, due to a failure of the vapor recovery compressor, for example, odor events could occur. During drilling, drilling muds, well kicks, and releases from increased pressure up the wellbore could cause odor events. During drilling, pockets of gas can be encountered, which can be picked up by the circulating muds, brought to the surface, and released through the muds processing system (muds off-gassing, discussed above). These types of releases have caused notices of violation (NOV) at other oilfields in the past, such as the Baldwin Hills Oilfield. Any of these scenarios would be considered a significant impact.

Due to the close proximity of the site to neighbors, businesses and the public (within 100 feet of businesses, 160 feet of residences, 55 feet of the Greenbelt and 20 feet of the public sidewalks), numerous other scenarios could cause odors offsite. These could include various maintenance activities, small spills and "leaker" components. A single component defined as a "leaker" by Rule 1173 (>10,000 ppm) from a compressor or pump seal, for example, could produce odor impacts 100 feet downwind and would produce odor impacts offsite (as per AERMOD modeling assuming a point source, leaking at the SCAQMD pegged emission rate).

Modeling was conducted to predict the potential extent of odor impacts from normal operations fugitive component leaks and muds off-gassing. The modeling utilized the same meteorological parameters and air dispersion models as the health risk analysis using the HARP Model and was conducted using the AERMOD modeling program assuming area sources for gas component fugitive leaks, muds off-gassing and oil component fugitive leaks. The H_2S concentration was assumed to be 100 ppm as a worst case, and H_2S in crude oil vapors was assumed to be 10 times higher as a worst case because vapors above crude oil containing even small amounts of H_2S can have a substantially higher H_2S content than the gas. The odor threshold was conservatively set at 2 parts per billion (ppb) for H_2S. The modeling was based on the SCAQMD AERMOD meteorological files for LAX which cover 5 years of data.

The results of the modeling indicate that fugitive emissions from normal operations could produce concentrations greater than the odor threshold from the Project equipment, which would reach nearby residences and businesses and public areas offsite. Concentrations of odiferous materials could be as high as 6 times the odor threshold, primarily driven by H_2S levels. Odor impacts from normal operations would therefore be considered potentially significant.

Because the odor thresholds for materials are very low, in the parts per billion, releases of odor causing materials creates impacts at considerable distances. Therefore, odor impacts associated with accidental releases, such as tank pressure relief device releases, or minor releases from the oil or gas equipment, due to the close proximity of neighbors, could impact surrounding areas and would also be a potentially significant impact.

The frequency of odor events can be reduced with systems that direct odor-causing releases to flare-type systems, the use of odor masking materials, and implementing systems to notify operators when releases could or do occur. Increased vigilance associated with Rule 1173 also can reduce emissions from fugitive components. These mitigation measures are frequently utilized in oil fields in urban areas.

Mitigation Measure

AQ-5a The Applicant shall at all times have a gas buster and SCAQMD-approved portable flare at the site and connected for immediate use to circulate out and combust any gas encountered during drilling. The flare shall be capable of recording the volume of gas that is flared. The operator shall report any flared gas from drilling to the Hermosa Beach Fire Chief and the SCAQMD.

AQ-5b The Applicant shall install a detection system that will monitor vapor space on all crude oil tanks. The detection system shall be capable of monitoring pressure in the vapor space of the tanks and notifying the Operator via an alarm when the pressure in the tanks gets within 10 percent of the tank relief pressure. If the tank pressure exceeds the relief pressure, the Operator shall report the incident to the SCAQMD as a breakdown pursuant to Rule 430, and submit a report of the breakdown to the Hermosa Beach Fire Chief and the SCAQMD, which shall detail the corrective actions the Operator shall take to avoid exceeding the tank relief pressure.

AQ-5c The Applicant shall develop and implement an Odor Minimization Plan, submitted to and approved by the City and the SCAQMD. The Odor Minimization Plan shall

address potential sources of odors from all site equipment, including wells and drilling operations, temporary operations such as truck loading, and measures to reduce or eliminate these odors (e.g., containment, design modifications, carbon canisters). The Plan shall address issues such as facility information, buffer zones, signs with contact information, logs of odor complaints, the protocol for handling odor complaints and odor event investigations and methods instituted to prevent a re-occurrence.

AQ-5d The Applicant shall develop and implement an Air Monitoring Plan. The Plan shall provide for the monitoring of total hydrocarbon vapors and hydrogen sulfide and total hydrocarbon vapors at all perimeter locations of the facility. At all times during operations, drilling, redrilling and workover operations, the Operator shall maintain monitoring equipment that shall monitor and digitally record the levels of hydrogen sulfide and total hydrocarbon vapors. Such monitors shall provide automatic alarms that are audible or visible to the Operator of the drilling equipment, and gas plant, and shall be triggered by the detection of hydrogen sulfide or total hydrocarbon vapors. Alarm points shall be set at a maximum of 5 and 10 ppm H_2S and 500 and 1,000 ppm hydrocarbons, with the higher level requiring shut-down of drilling or plant operations and notification to appropriate agencies, including the Hermosa Beach Fire Department and SCAQMD. A meteorological station to monitor wind speed and direction under the guidance and specification of the SCAQMD shall be installed at the site.

AQ-5e The Applicant shall use an odor suppressant spray system on the mud shaker tables, and shall install carbon capture canisters on all tanks (permanent and portable) that are not equipped with vapor recovery, containing potentially odiferous materials (for example; the mud baker-type tanks) for all drilling operations so that no odor can be detected at the closest receptor.

AQ-5f The fugitive component leak detection program under Rule 1173 shall utilize a Leak Detection and Reporting (LDAR) level of monthly detections with an action level of 100ppm and the installation of bellows valves where applicable (valves 2 inches or smaller) to ensure that leaking components are minimized at the facility.

Residual Impacts

Implementing these mitigation measures would substantially reduce the frequency of odor events that have resulted in odor complaints and NOV at other oilfields in urban settings in the past, as well as other suspected sources of odors associated with the site operations. Although odor events could still occur, with mitigation the number of odor events would most likely be reduced. In addition, normal operations leaking components and muds off-gassing impacts would produce offsite odor concentrations that would be below the odor thresholds. While the Applicant has proposed the development of air monitoring and odor minimization plans, the mitigation measures provide a degree of specificity, addressing issues that are important to include in each plan, and are therefore included as mitigation.

However, due to the close proximity of residences, business and public and recreational areas, reducing the number of odor events to less than six per year, (which is the SCAQMD definition

of a "nuisance,") would be difficult because the close proximity means that even small upset releases could generate odor events. Impacts would therefore remain significant.

Using portable flares and odor suppressants during drilling would reduce the odor events associated with mud vapors and drilling gasses. Technology to separate the muds from entrained gasses and utilize flares, or equivalent devices, to combust the gasses would help reduce the impacts of events similar to the January 2006 event at the Baldwin Hill Oilfield, where gasses entrained in the muds were released and detected by oilfield neighbors. However, note that in the case of the Baldwin Hills Oilfield, neighbors were more than 1,000 feet from the drilling activities. At this site, drilling activities would occur within 20 feet of the public sidewalks, 55 feet from recreational facilities and 100 feet of businesses.

The flare systems would be required to utilize a de-gassing vessel (i.e., gas buster). When high gas levels or pressures are detected, the muds would be re-directed to pass through this vessel to release entrained gasses. These gasses would be combusted in a flare while the liquid muds would flow to muds processing. The dedicated flare pilot or igniter would automatically and immediately ignite the flare gasses. The flare would essentially eliminate all of the hydrocarbons in the gas, and the combustion of gasses would create substantial heat, providing the combusted products with sufficient buoyancy to rise quickly into the air without producing odors. This type of flare technology for drilling operations is well developed in the oil and gas industry.

Note that mitigation measures identified for impact AQ.3 would reduce muds off-gassing by 90 percent, which would also reduce potential sources of odor impacts.

Engineering analysis of the operations identified tank hatches as a potential odor source. The tanks have a relief system that relieves the pressure to the atmosphere instead of to the vapor recovery system if the pressure gets too high inside of the tank. This could occur if the vapor recovery system fails or if surges in fluid flow cause short-term increases in pressure that exceed the capacity of the vapor recovery system compressor. Ensuring appropriate monitoring of the tank relief systems would increase the understanding associated with intermittent tank releases and allow for minimizing these potential odor events by increasing compressor capacity if necessary.

By implementing these mitigation measures, the oil operations would substantially reduce the frequency of odor events and impacts to neighbors. However, due to the close proximity of neighbors, and the potential at oil fields to produce relatively localized odors, impacts would be **significant and unavoidable (Class I).**

4.2.4.5 Potential Operations Greenhouse Gas Emissions

With the addition of combustion and gas processing equipment at the field, and the drilling operations, emissions of GHG would occur.

Impact #	Impact Description	Phase	Residual Impact
AQ.6	Potential operations and drilling at the Project Site would increase greenhouse gas emissions.	Phase 1 - 4	Class II Less Than Significant with Mitigation

GHG emissions were estimated utilizing the same equipment size and fuel use data that were used to estimate criteria emissions, along with emission factors as defined by the CARB and the EPA (see Appendix B for the detailed calculations). GHG associated with operations include emissions from combustion sources (e.g., flare, microturbines), offsite vehicles (including crude oil trucking during Phase 2), electrical generation, and fugitive emissions that contain CO_2 and methane. The largest sources of GHG emissions would be the microturbines, the flare, and offsite electrical generation.

GHG emissions are shown in Table 4.2-13. Emissions associated with stationary equipment, offsite vehicles and electrical generation would exceed the SCAQMD threshold of 10,000 MTCO2e per year during Phase 4, both during drilling and during operations without drilling; therefore, the impact would be significant. Phase 2 GHG emissions would not exceed the thresholds. Construction emissions have been amortized over 25 years and added to the Phase 4 GHG emissions.

Mitigation measures could include a wide variety of measures, detailed in a plan and annual reports from the Applicant, from onsite increased efficiency to offsite programs implemented in the community, which would reduce GHG emissions. Onsite measures could include: reduced facility water consumption (by reducing pumping electrical consumption and water treatment emissions), waste generation, and material use; recycling to the maximum extent feasible; or equipment changes such as elimination or a reduction in the use of the microturbines. Offsite measures could include sponsoring solar installation, or methane-capture technology projects, including methane capture from dairy and agricultural operations, as well as purchasing offsets from approved sources. All of these activities would reduce emission of GHG.

Mitigation Measure

AQ-6 The Applicant shall provide credits for all GHG emissions generated above the threshold of 10,000 MTCO2e per year. A GHG Reporting and Reduction Plan shall be submitted to the SCAQMD and the City detailing the measures to be implemented to achieve the required reductions, updated annually, and shall include specifications on the protocol, vintage, and registry for any offsite mitigation. The following mitigation credits shall not require prior City or SCAQMD approval:

1. Credits generated within Los Angeles County per an approved SCAQMD protocol;
2. Credits generated within the State of California per an approved SCAQMD protocol;

3. Credits that are generated and verified under the CAPCOA GHG Rx program;
4. Credits that are generated and verified under the voluntary SCAQMD Regulation XXVII;
5. Verified credits registered with the Climate Action Reserve or the American Carbon Registry.

In addition, independently verified GHG credits available through other carbon registries that follow specific protocols may be eligible for offsite mitigation, subject to review and prior approval by the City and the SCAQMD. The general criteria for acceptable credits include:

- Real: emission reduction must have actually occurred, as the result of a project yielding quantifiable and verifiable reductions or removals.
- Additional/Surplus: an emission reduction cannot be required by a law, rule, or other requirement.
- Quantifiable: reductions must be quantifiable through tools or tests that are reliable, based on applicable methodologies, and recorded with adequate documentation.
- Verifiable: The action taken to produce credits can be audited and there is sufficient evidence to show that the reduction occurred and was quantified correctly.
- Enforceable: An enforcement mechanism must exist to ensure that the reduction project is implemented correctly.
- Permanent: Emission reductions or removals must continue to occur for the expected life of the reduction project.

Operational/drilling GHG emissions from stationary and mobile sources shall be quantified and reported to the City and to the SCAQMD annually. Emissions reporting will follow the same reporting format and procedures as required by the Mandatory Reporting Rule.

Residual Impacts

Mitigation measure AQ-6 requires annual quantification and reporting of GHG emissions. Mitigation measures associated with criteria pollutants would also reduce GHG emissions by an estimated 80 MTCO2e per year during Phase 4. The GHG Reporting and Reduction Plan allows the Applicant to choose the most effective means of providing the necessary reductions or offsets. Several measures could be implemented to reduce GHG emissions to below the SCAQMD thresholds, thereby demonstrating the feasibility of the mitigation, including the following for onsite emissions:

- Reducing energy use, including natural gas and electricity, from existing and proposed direct sources, which would reduce GHG emissions from fuel combustion and electrical generation. Reducing water use, raw material use, and waste generation and increasing recycling would also reduce GHG emissions by reducing the energy used to transport and pump water, produce goods, and for truck trips.

None of these GHG emission levels would be above the 25,000 MTCO2e per year level that would require the facility be a part of the California Cap-and-Trade program.

Sources of GHG in the community that could be assisted by the Applicant, thereby achieving reductions, could include the following:

- Planting trees removes CO_2 from the atmosphere as the tree grows. Trees remove CO_2 from the atmosphere through photosynthesis and store, or sequester, the carbon in the tree trunk, branches, and leaves. Tree carbon calculators indicate that a sycamore, 20 inches in diameter (at 4.5 feet height) and 50 feet tall, stores approximately 2.2 $MTCO_2e$ and grows at a rate that sequesters approximately 0.1 $MTCO_2$ per year. Protocols for forest carbon sequestration would be utilized to ensure reductions are legitimate, such as those developed by the Climate Action Reserve.
- Installation of solar panels at parking lots, for example, or on City buildings or structures, would reduce the need to generate electricity by area utilities and would therefore reduce emissions of GHG. The City indicates that it currently has the capacity on its buildings for about 300 kW of solar panels. The installation of approximately 300 solar panels could reduce annual emissions of GHG by approximately 100 MTCO2e.
- Sponsoring a solar installation program assisting other entities (such as Hermosa Beach School District) and/or new or retrofitted private development.
- Obtaining offset credit through the Climate Action Reserve or through the voluntary SCAQMD Regulation XXVII, would decrease GHG emissions impacts. This offset program establishes standards for the development, quantification, and verification of GHG emissions reduction projects; issues carbon offset credits known as Climate Reserve Tonnes generated from such projects; and tracks the transaction of credits. The CARB participates in the program. The Climate Action Reserve has issued more than 10 million Climate Reserve Tonnes.

A combination of these measures would reduce the GHG emissions to below the SCAQMD threshold of 10,000 MTCO2e per year. Impacts would therefore be **less than significant with mitigation (Class II).**

As a note, elimination of the microturbines and utilizing entirely grid power could reduce GHG emissions at the site. This is because electricity generated by SCE relies in part on hydroelectric and low-GHG sources, thereby producing fewer GHG emissions per MWh than what the microturbines generate. However, as the site has a need for heat, which would be recovered from the waste heat from the microturbines under the Proposed Project, this approach would add emission sources including the heater treater, glycol regenerator and the DEA reboiler. Therefore, no GHG gains would be realized from this approach.

Carbon Neutral

In order to achieve a carbon-neutral approach to the Proposed Oil Project, as is defined in the City of Hermosa Beach strategic plan for at least municipal operations, the mitigation measure AQ-6 would need to require that the Applicant shall provide credits for all GHG emissions generated above the threshold of zero MTCO2e per year.

End Use

End use is the combustion of the crude oil products (after refining into gasoline, diesel, jet fuel and other products) and natural gas by automobiles, trucks, airplanes, residential end users, etc.

End use of the crude oil produced as a part of this Project has not been included in the GHG emissions. Crude oil is supplied to the region from a number of different sources, both local, from California, by train from other parts of the U.S and Canada, and by tanker from Alaska and foreign countries. The demand for crude oil in the region is not a function of supply; if this crude oil is not produced, it will be supplied by another source, as crude oil prices are set largely on the global market. CARB and SCAQMD specifications for the calculation of GHG emissions from a project do not include the end use estimates. Current policies, such as Cap-and-Trade and automobile efficiency standards and the Low Carbon Fuel Standard, address GHG emissions from transportation fuels. The end use of fossil fuels will be encompassed by the Cap-and-Trade program in 2015. However, for informational purposes, the Project would generate, over its life, an average amount of crude oil that would generate 535,000 MTCO2e per year, from the combustion of natural gas, and crude oil products.

Toxic Air Contaminants

With the addition of equipment at the field and drilling operations, emissions of toxic air contaminants would occur. Toxic air contaminant emissions associated with operations would include the emissions from combustion sources (e.g., flare, microturbines) and fugitive emissions. Emissions were quantified using toxic air contaminant factors defined by CARB speciation profiles and the SCAQMD. Appendix B lists emissions quantified by toxic material for the drilling period and the following period when the only drilling would be re-drills or workovers.

Impact #	Impact Description	Phase	Residual Impact
AQ.7	Potential operations and drilling at the Project Site would emit toxic air contaminants.	Phase 4	Class II Less Than Significant With Mitigation

According to AB 2588, health risk assessments (HRA) are required for facilities that emit toxic pollutants above a threshold criteria level. Based on SCAQMD annual emission reporting requirements, future operations at the site could exceed the thresholds for equipment that is covered by the SCAQMD Rule 301 reporting requirements. Although the SCAQMD Rule 301 reporting requirement does not include mobile sources and temporary equipment (e.g., drill rigs and construction equipment), they have been included to provide a comparison of these emissions to the reporting thresholds. Table 4.2-14 lists the toxic air contaminants from the Project Site equipment.

Table 4.2-13 GHG Emissions

Activity	N_2O, tons	CH_4, tons	CO_2, tons	$MTCO_2e$
Construction (Phase 1 and 3)				
Phase 1 Construction	0.00	0.03	93	84
Phase 2 Construction	0.00	0.01	17	16
Phase 3 Construction	0.01	0.19	675	613
City Maintenance Yard Construction	0.00	0.06	273	275
Phase 4 Construction	0.00	0.00	14	13
Offsite	0.00	0.00	62	56
Construction Total				*1,057*
Operations - one time (Phase 2)				
Drilling Emissions - Testing	0.00	0.00	8.0	7
Testing Emissions	0.01	12.86	5,605	5,290
Offsite Mobile (all Phase 2)	0.00	0.00	87	79
Indirect Electrical Generation	0.04	0.19	4,107	3,711
Operations - one time total, tons				*9,087*
Operations while Drilling (Phase 4)				
Stationary Equipment	0.01	7.31	7,174	6,598
Drilling Emissions	0.00	0.01	24	22
Offsite Mobile Emissions	0.01	0.01	220	200
Water, solid waste, waste water	0.00	0.00	0.77	0.69
Amortized construction				42
Offsite Electrical Generation	0.16	0.76	16,580	14,981
Total				*21,845*
Operations no Drilling (Phase 4)				
Stationary Equipment	0.01	7.31	7,174	6,598
Workover Emissions	0.00	0.03	112.5	102
Offsite Mobile Emissions	0.00	0.01	127	115
Water, solid waste, waste water	0.00	0.00	0.77	0.69
Amortized construction	-	-	-	42
Offsite Electrical Generation	0.05	0.25	5,527	4,994
Total				*11,852*

As part of this analysis, a health risk assessment was conducted using the CARB Hotspots Analysis and Reporting Program (HARP) model version 1.4f. HARP is a computer software package that combines the tools of emission inventory database, facility prioritization, air dispersion modeling, and risk assessment analysis. All of these tools are tied to a single database allowing sharing and utilization of information. HARP inputs are included in Appendix B.

The State Office of Environmental Health Hazard Assessment's (OEHHA) Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments outlines the risk assessment methods and procedures (OEHHA 2013). The following paragraphs discuss the inputs associated with the model.

Receptor locations were established based on the Project Site boundary, a regional receptor grid, and the closest residences. The main receptor grid covered a 1.5- by 1.5 miles grid with spacing every 160 feet. Receptors closer to the facility were spaced about every 30 feet.

Impacts related to pipeline operations would not produce cancer, acute or chronic impacts as the pipeline related emissions would be nominal. Emissions from the Proposed City Maintenance Yard Site would also be nominal and would not increase over the current City Maintenance Yard location and would therefore not generate any incremental risk.

The health risk assessment utilized local meteorological data for worst-case health risk estimates: SCAQMD meteorological data from the LAX monitoring station was utilized as provided by the SCAQMD.

Pursuant to SCAQMD Guidelines, terrain elevation heights were included in the modeling analysis. Digital Elevation Mapping data in the AEMOD AERMAP modeling software were used to input elevations for all sources and receptors. Digital Elevation Mapping data from four U.S. Geological Survey quadrangles were required, which included Inglewood, Redondo, Torrance and Venice. See Appendix B.

The analysis was conducted for cancer, acute and chronic impacts. Acute and chronic impacts are assessed through a comparison to the OEHHA approved reference exposure levels, which are the levels at which symptoms would likely occur. This comparison for chronic and acute exposures is termed the health index, or the HI. An HI greater than 1.0 is considered a significant impact.

Cancer impacts are assessed relative to the expected number of additional cancer cases per 1 million persons exposed. It was assumed that all offsite individuals would experience a lifetime exposure (i.e., 70 years under the SCAQMD and OEHHA risk assessment guidelines, which is the exposure timeframe to be used for long term projects, even if the project life is less than 70 years) for operations and drilling (including re-drilling and workovers). Two emission scenarios were evaluated in the analysis: a 70-year average emissions profile to estimate lifetime cancer risk, and a peak emissions year that was assumed to persist for 70 years to evaluate the SCAQMD's criteria limiting the risk per year to 1/70 of the maximum allowable risk. Since drilling would only occur over a 2.5 year period, the maximum emissions scenario represents a very conservative estimate of potential health risk.

Offsite worker risk (workers at facilities different than the Proposed Project) was also examined for cancer based on a reduced exposure timeframe and breathing rate, as per OEHHA guidelines (OEHHA 2013).

Table 4.2-15 shows the results of the HARP modeling for the facility fenceline (for Point of Maximum Impact, PMI) and for the closest receptor (residence) for the peak year cancer risk. Based on the health risk assessment modeling results, potential health risks would be considered

significant. Sources that would make the greatest contribution to the increased health risk levels were emissions from the diesel equipment used throughout the life of the Project, including the diesel forklift during drilling and redrilling and the diesel equipment used for workovers, as well as emissions from the crude oil tanks. Due to the close proximity of the facility boundary to industrial receptors/workers and residences, risks would be above the thresholds for the unmitigated scenario.

Table 4.2-14 Phase 4 Equipment Toxic Air Contaminants

Compound	CAS	Peak Year, lbs	Average Year lbs
Acetaldehyde	75070	7.3E+0	1.5E+1
Acrolein	107028	2.3E-1	2.3E-1
Arsenic and Compounds (inorganic)	7440382	6.5E-3	6.3E-3
Benzene	71432	1.6E+2	1.1E+2
Butadiene [1,3]	106990	1.8E-1	3.7E-1
Cadmium	7440439	2.6E-3	2.6E-3
Chlorine	7782505	2.8E-3	2.8E-3
Copper	7440508	5.8E-3	5.7E-3
Diesel exhaust particulates	9901	9.4E+1	9.2E+1
Ethyl benzene	100414	1.0E+0	1.3E+0
Formaldehyde	50000	1.5E+1	3.0E+1
Hexane	110543	6.3E+2	4.4E+2
Hydrogen sulfide	647783	0.0E+0	0.0E+0
Lead compounds (inorganic)	7439921	9.1E-4	8.9E-4
Manganese	7439965	5.1E-3	5.0E-3
Mercury	7439976	6.4E-4	6.3E-4
Methanol	67561	2.9E-2	5.8E-2
Methyl ethyl ketone {2-Butanone}	78933	1.4E+0	2.9E+0
Naphthalene [PAH, POM]	91203	1.1E-1	2.0E-1
Nickel	7440020	8.2E-4	8.0E-4
Polycyclic aromatic hydrocarbons, total, w/o individual components reported [PAH, POM]	1151	1.4E-1	2.5E-1
Propylene	115071	2.5E+0	5.1E+0
Selenium	7782492	7.3E-4	7.1E-4
Styrene	100425	5.7E-2	1.2E-1
Toluene	108883	9.4E+1	6.9E+1
Xylenes	1330207	2.8E+0	3.5E+0
Zinc	7440666	2.0E-1	2.0E-1

Note: CAS stands for the Chemical Abstract Number

The cancer burden is defined as the estimated increase in the occurrence of cancer cases in a population subject to a cancer risk of greater than or equal to one in 1,000,000 (1 x 10-6) resulting from exposure to toxic air contaminants.

The cancer risk contours are shown in Figures 4.2-5, 4.2-6 and 4.2-7 for acute and chronic impacts health index and cancer cases per one million persons. The results of the HARP modeling (summarized in Table 4.2-15) show that both acute and chronic impacts are below the applicable thresholds under the Proposed Oil Project. The cancer risk would be significant and are driven by diesel particulate matter (96 percent of the risk) from diesel engines (primarily workover rig engines) followed by benzene from crude oil fugitive emissions. The point of maximum impact (PMI) is defined as the offsite point of maximum impact which, for this Project, would occur along the western property boundary (see Figures 4.2-5, 4.2-6 and 4.2-7).

Table 4.2-15 Health Risk Assessment Results: Unmitigated

Criteria Description	HRA Result	Threshold Value	Significant?
Cancer risk, per million, Point of Maximum Impact (PMI)	689	10	Yes
Cancer risk, per million, peak residential risk	46	10	Yes
Cancer risk, per million, peak worker risk	105	10	Yes
Peak Annual Equivalent Cancer peak residential risk	53	10	Yes
Cancer Burden	0.12	0.5	No
Chronic risk, health index	0.39	1	No
Acute risk, health index	0.38	1	No

Notes: Cancer thresholds are cancer cases per one million persons. Chronic and acute thresholds are the health index (HI). PMI based on fence line, worker based on closest business, peak annual based on closest residence (as per SCAQMD HRA Guidance).
Source: HARP model. The PMI occurs at the western property boundary 30 feet from drilling activities.

Mitigation Measures

Several mitigation measures have been identified as part of the air quality analysis. Implementing these mitigation measures, including the mitigation measures identified in the discussions of impacts AQ.3, AQ.4 and AQ.5, would reduce emissions of toxic air contaminants. In addition:

AQ-7a All diesel equipment used at the site shall meet EPA Tier 3 emission requirements and be equipped with a CARB Level 3 diesel particulate catalyst to reduce Diesel PM emissions. All workover rigs shall utilize electric drive/sources and shall not utilize diesel generators or engines.

AQ-7b Vapor recovery on crude oil tanks shall achieve a minimum of 99 percent recovery of fugitive emissions.

Residual Impacts

To evaluate the effectiveness of the proposed mitigation measures, the HARP model was rerun using the same approach as was used to evaluate the potential future site development. Table 4.1-16 presents the results of the revised health risk assessment modeling. Worst-case health risks associated with mitigated Project operations would be below all applicable health risk criteria.

Mitigation would essentially eliminate most diesel PM emissions at the site. Remaining health impacts would be primarily associated with emissions from the crude oil tanks and, to a lesser extent, the fugitive emissions from the facility and the use of the mitigated forklift during drilling.

With implementation of these mitigation measures, which would meet the SCAQMD Best Available Control Technology for Toxics requirements, impacts would be **less than significant with mitigation (Class II).**

Table 4.2-16 Health Risk Assessment Results: Mitigated

Criteria Description	HRA Result	Threshold Value	Significant?
Cancer risk, per million, Point of Maximum Impact (PMI)	6.2	10	No
Cancer risk, per million, peak residential risk	1.3	10	No
Cancer risk, per million, peak worker risk	0.9	10	No
Peak Annual Equivalent Cancer peak residential risk	2.6	10	No
Cancer Burden	<0.01	0.5	No
Chronic risk, health index	0.004	1	No
Acute risk, health index	0.01	1	No

Source: HARP model. Cancer risk at the PMI would occur within the industrial zoned area.

4.2.4.6 Compliance with Area Air Quality Management Plans

The SCAQMD Air Quality Management Plan (AQMP) includes implementing control measures and strategies to attain state and federal ambient air quality standards in the Basin. The SCAQMD then implements these control measures as regulations to control or reduce criteria pollutant emissions from stationary sources or equipment. A project would be inconsistent with the AQMP if it results in population or employment growth that exceeds growth estimates in that AQMP. Projects that do not involve growth-inducing impacts or exceed local or regional population or growth projections are generally considered consistent with the AQMP. The Proposed Project would comply with all SCAQMD regulations and is not expected to result in population growth, and it would therefore comply with the goals of the AQMP.

Figure 4.2-5 Acute Impacts Health Index

Notes: HI=Health Impacts, PMI = Point of Maximum Impact

Figure 4.2-6 Chronic Impacts Health Impacts

Notes: HI=Health Impacts, PMI = Point of Maximum Impact

Figure 4.2-7 Cancer Impacts Cancer Cases: Unmitigated

Notes: HI=Health Impacts, PMI = Point of Maximum Impact

Figure 4.2-8 Cancer Impacts Cancer Cases: Mitigated

Notes: HI=Health Impacts, PMI = Point of Maximum Impact

4.2.4.7 Valve Box Options

The Proposed Project includes a number of different options for the location of the valve box for the tie-in to the crude oil system. Air quality impacts could be realized if leaks occurred from components, causing localized odors. Therefore, the greater separation distance the better from populated areas. The valve box options 2 and 4 provide the best separation distance, with the Proposed Project location and option 3 being closer to receptors (a recreation/softball field and apartments and commercial areas, respectively).

4.2.4.8 Pipeline Route Options

The Proposed Project includes a number of different options for the pipeline route for tie-in to the crude oil system. Scenario 1 and Scenario 2 involve construction in the roadway, which would require additional construction activities, including asphalt laying, which would generate more emissions than Scenario 3, which would be installed within the mostly dirt SCE right-of-way. Scenario 3 would therefore be preferable. However, none of the scenarios produce significant impacts.

4.2.4.9 Proposed City Maintenance Yard Parking Options

The Proposed City Maintenance Yard Project has two options for parking: a No Added Parking option that would retain the same number of parking spaces as are currently available at Hermosa Self-Storage; and a Parking Option, that would add 97 parking spaces. Under the Parking Option, additional construction would be required to construct the lower parking levels, thereby increasing construction emissions over the No Added Parking option. During operations, the Parking Option would introduce vehicle emissions into an area that does not currently have vehicles. However, as no diesel trucks would be used or distribution-type activities would be taking place, and traffic volumes would be below the levels that could produce CO Hot Spots, impacts would be less than significant. Otherwise, for operations, the two options would generate the same air quality impacts.

4.2.5 Comparison to Applicant Studies

The Applicant provided an air quality analysis associated with their Application materials. The EIR analysis provides general agreement with the criteria pollutant emissions levels as provided by the Applicant as the same emission factors were used for the combustion equipment. The EIR analysis was more conservative (higher emissions estimates) on the fugitive emissions as the SCAQMD default values were used instead of estimating the number of leaking components that would occur during inspections.

For the modeling and estimates of localized impacts, this EIR produced more conservative values for ground level concentrations of pollutants as substantial building downwash was included in the analysis. The Applicant did not perform a health risk analysis, examining cancer risks, for example.

The GHG emissions estimates in this EIR are in general agreement for onsite emissions from combustion equipment, with this EIR producing a slightly higher emissions estimate as the AP-42 GHG emission factor was used for gas combustion, and flaring to the full extent allowed by SCAQMD (200 hours per year) was assumed. The GHG emissions during operations (not the 2.5 years of drilling on Phase 4) were in general agreement with the Applicant. However, the EIR also calculated GHG emissions during the 2.5 years of drilling, when substantially more electricity would be used (for operating the electric drilling rig) and during this period of Phase 4, GHG estimates are substantially higher in this EIR. The Applicant studies did not calculated GHG emissions for the Phase 4 drilling period.

4.2.6 Other Issue Area Mitigation Measure Impacts

Some mitigation measures could increase construction requirements associated with the Project such as the permanent wall (AE-1b) which could increase construction-related emissions. However, none of these mitigation measures would increase the peak day emissions or operational health risk emissions. Therefore, the other issue area mitigation measures would not result in additional impacts, and additional analysis or mitigation is not required.

4.2.7 Cumulative Impacts and Mitigation Measures

Localized air quality impacts are generally restricted to an area within a few blocks from a project site. The localized impacts of the unmitigated Proposed Project would extend about 500 feet. None of the cumulative projects would be constructed near enough to the Proposed Project area for localized impacts to overlap, so there would be no operational localized impacts associated with cumulative projects.

The AES project in the City of Redondo Beach, approximately 0.5 miles south of the Project Site, and the Proposed Project would not overlap localized criteria pollutant impacts since they are too far from one another to produce cumulative impacts.

Operational regional impacts could be produced, however, as multiple projects would emit into the same air basin at the same time. However, as the SCAQMD has established thresholds for individual projects that would protect the air quality and achieve the long term goals of the Air Quality Management Plan, the mitigated Proposed Project would not produce cumulative significant impacts.

Since none of the cumulative projects would be constructed near the Proposed Project sites, there would be no cumulative impacts associated with odors or toxic air contaminants.

Emissions of GHG would contribute to global GHG emissions. Since the Proposed Project GHG emissions would be mitigated to less than significant and, as per CEQA Guidelines section 15130, the Proposed Project would be making a fair share contribution to solving global GHG impacts, cumulative GHG emissions would be less than significant.

4.2.8 Mitigation Monitoring Plan

Proposed Oil Project and Pipeline Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
AQ-1a	The Applicant shall submit and implement a Fugitive Dust Control Plan that includes SCAQMD mitigations for fugitive dust mitigation, according to Rule 403, and SCAQMD CEQA Guidelines. Fugitive dust mitigation measures in the plan shall include the following (this mitigation is applicable to both the Proposed Oil Project and the Proposed City Maintenance Yard Project): - Apply water every 3 hours to disturbed areas and unpaved roads within a construction site (61 percent reduction). - Require minimum soil moisture of 12 percent for earthmoving, by using a moveable sprinkler system or water truck. Moisture content can be verified by lab sample or moisture probe (69 percent reduction). - Limit onsite vehicle speeds on unpaved roads to 15 mph and posting of speed limits. - All trucks hauling dirt, sand, soil, or other loose materials are to be tarped with a fabric cover and maintain a freeboard height of 12 inches (91 percent reduction). - Install gravel bed trackout apron (3 inches deep, 25 feet long, 12 feet wide per lane, and edged by rock berm or row of stakes) to reduce mud and dirt trackout from unpaved truck exit routes (46 to 80 percent reduction). - Water storage piles by hand or apply cover when wind events are declared, according to SCAQMD Rule 403 when instantaneous wind speeds exceed 25 miles per hour (90 percent reduction). - Appoint a construction relations officer to act as a community liaison concerning onsite construction issues, such as dust generation.	Plan review, site inspections	Before and during construction Both Oil Project and City Yard	SCAQMD City of Hermosa Beach
AQ-1b	The Applicant shall implement a NOx reduction program including the following, or equivalent, measures to the satisfaction of the SCAQMD (this mitigation is applicable to both the Proposed Oil Project	Plan review, site inspections	Before and during construction	SCAQMD City of Hermosa Beach

Proposed Oil Project and Pipeline Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	and the Proposed City Maintenance Yard Project): - All off-road construction equipment shall be tuned and maintained according to manufacturers' specifications. - Any temporary electric power shall be obtained from the electrical grid, rather than portable diesel or gasoline generators. - All off-road diesel construction equipment with greater than 100-horsepower engines shall meet Tier 3 NOx requirements. - Limit onsite truck idling to less than 5 minutes. - A copy of the certified tier specification, best available control technology documentation, or the CARB or SCAQMD operating permit for each piece of equipment shall be provided to the City and SCAQMD when each piece of equipment is mobilized.			
AQ-3a	The Applicant shall limit flaring to a total of 5 hours per day at the full flaring capacity (or equivalent) during all emergency or routine flaring events in order to ensure that NOx emissions are reduced below the thresholds. Lower NOx emission combustors or other equivalent measures can also be used to satisfy the requirement.	Plan review, site inspections	Before Phase 4 operations	SCAQMD City of Hermosa Beach
AQ-3b	The Applicant shall implement methods to reduce the off-gassing of muds by at least 90 percent through the installation of fully enclosed mud pit areas with vapor control (either through carbon canisters or vapor recovery) and/or the use of mud degassing units routed to vapor control systems. The Applicant shall monitor the muds vapor immediately above the muds exit point from the wellbore and at other areas above the mud pits where muds may be exposed to the atmosphere in order to ensure that hydrocarbon vapors are captured at the minimum rate of 90 percent.	Plan review, site inspections	Before Phase 2 drilling	SCAQMD City of Hermosa Beach
AQ-4	The Applicant shall limit the microturbine PM emissions to 0.0035 lbs/mmbtu, or an equivalent reduction in the number and/or size of the microturbines, in order to reduce emissions to below the localized thresholds.	Plan review, site inspections	Before Phase 4 operations	SCAQMD City of Hermosa Beach

Proposed Oil Project and Pipeline Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
AQ-5a	The Applicant shall at all times have a gas buster and SCAQMD-approved portable flare at the site and connected for immediate use to circulate out and combust any gas encountered during drilling. The flare shall be capable of recording the volume of gas that is flared. The operator shall report any flared gas from drilling to the Hermosa Beach Fire Chief and the SCAQMD.	Plan review, site inspections	Before Phase 2 drilling	SCAQMD City of Hermosa Beach
AQ-5b	The Applicant shall install a detection system that will monitor vapor space on all crude oil tanks. The detection system shall be capable of monitoring pressure in the vapor space of the tanks and notifying the Operator via an alarm when the pressure in the tanks gets within 10 percent of the tank relief pressure. If the tank pressure exceeds the relief pressure, the Operator shall report the incident to the SCAQMD as a breakdown pursuant to Rule 430, and submit a report of the breakdown to the Hermosa Beach Fire Chief and the SCAQMD, which shall detail the corrective actions the Operator shall take to avoid exceeding the tank relief pressure	Plan review, site inspections	Before Phase 4 operations	SCAQMD City of Hermosa Beach
AQ-5c	The Applicant shall develop and implement an Odor Minimization Plan, submitted to and approved by the City and the SCAQMD. The Odor Minimization Plan shall address potential sources of odors from all site equipment, including wells and drilling operations, temporary operations such as truck loading, and measures to reduce or eliminate these odors (e.g., containment, design modifications, carbon canisters). The Plan shall address issues such as facility information, buffer zones, signs with contact information, logs of odor complaints, the protocol for handling odor complaints and odor event investigations and methods instituted to prevent a re-occurrence.	Plan review, site inspections	Before Phase 2 operations	SCAQMD City of Hermosa Beach
AQ-5d	The Applicant shall develop and implement an Air Monitoring Plan. The Plan shall provide for the monitoring of total hydrocarbon vapors and hydrogen sulfide and total hydrocarbon vapors at all perimeter locations of the facility. At all times during operations, drilling, redrilling	Plan review, site inspections	Before Phase 2 operations	SCAQMD City of Hermosa Beach

Proposed Oil Project and Pipeline Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	and workover operations, the Operator shall maintain monitoring equipment that shall monitor and digitally record the levels of hydrogen sulfide and total hydrocarbon vapors. Such monitors shall provide automatic alarms that are audible or visible to the Operator of the drilling equipment, and gas plant, and shall be triggered by the detection of hydrogen sulfide or total hydrocarbon vapors. Alarm points shall be set at a maximum of 5 and 10 ppm H_2S and 500 and 1,000 ppm hydrocarbons, with the higher level requiring shut-down of drilling or plant operations and notification to appropriate agencies, including the Hermosa Beach Fire Department and SCAQMD. A meteorological station to monitor wind speed and direction under the guidance and specification of the SCAQMD shall be installed at the site.			
AQ-5e	The Applicant shall use an odor suppressant spray system on the mud shaker tables, and shall install carbon capture canisters on all tanks (permanent and portable) that are not equipped with vapor recovery, containing potentially odiferous materials (for example; the mud baker-type tanks) for all drilling operations so that no odor can be detected at the closest receptor.	Plan review, site inspections	Before Phase 2 operations	SCAQMD City of Hermosa Beach
AQ-5f	The fugitive component leak detection program under Rule 1173 shall utilize a Leak Detection and Reporting (LDAR) level of monthly detections with an action level of 100ppm and the installation of bellows valves where applicable (valves 2 inches or smaller) to ensure that leaking components are minimized at the facility.	Plan review, site inspections	Before Phase 2 operations	SCAQMD City of Hermosa Beach
AQ-6	The Applicant shall provide credits for all GHG emissions generated above the threshold of 10,000 MTCO2e per year. A GHG Reporting and Reduction Plan shall be submitted to the SCAQMD and the City detailing the measures to be implemented to achieve the required reductions, updated annually, and shall include specifications on the protocol, vintage, and registry for any offsite mitigation. The following mitigation credits shall not require prior City or SCAQMD approval:	Plan review, site inspections	Before Phase 4 operations	SCAQMD City of Hermosa Beach

Proposed Oil Project and Pipeline Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	1. Credits generated within Los Angeles County per an approved SCAQMD protocol; 2. Credits generated within the State of California per an approved SCAQMD protocol; 3. Credits that are generated and verified under the CAPCOA GHG Rx program; 4. Credits that are generated and verified under the voluntary SCAQMD Regulation XXVII; 5. Verified credits registered with the Climate Action Reserve or the American Carbon Registry. In addition, independently verified GHG credits available through other carbon registries that follow specific protocols may be eligible for offsite mitigation, subject to review and prior approval by the City and the SCAQMD. The general criteria for acceptable credits include: • Real: emission reduction must have actually occurred, as the result of a project yielding quantifiable and verifiable reductions or removals. • Additional/Surplus: an emission reduction cannot be required by a law, rule, or other requirement. • Quantifiable: reductions must be quantifiable through tools or tests that are reliable, based on applicable methodologies, and recorded with adequate documentation. • Verifiable: The action taken to produce credits can be audited and there is sufficient evidence to show that the reduction occurred and was quantified correctly. • Enforceable: An enforcement mechanism must exist to ensure that the reduction project is implemented correctly. • Permanent: Emission reductions or removals must continue to occur for the expected life of the reduction project. Operational/drilling GHG emissions from stationary and mobile sources shall be quantified and reported to the City and to the SCAQMD annually. Emissions reporting will follow the same reporting format and procedures as required by the			

Proposed Oil Project and Pipeline Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	Mandatory Reporting Rule.			
AQ-7a	All diesel equipment used at the site shall meet EPA Tier 3 emission requirements and be equipped with a CARB Level 3 diesel particulate catalyst to reduce Diesel PM emissions. All workover rigs shall utilize electric drive/sources and shall not utilize diesel generators or engines.	Plan review, site inspections	Before Phase 4 operations	SCAQMD City of Hermosa Beach
AQ-7b	Vapor recovery on crude oil tanks shall achieve a minimum of 99 percent recovery of fugitive emissions.	Plan review, site inspections	Before Phase 4 operations	SCAQMD City of Hermosa Beach

Proposed City Maintenance Yard Project Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
AQ-1a	The Applicant shall submit and implement a Fugitive Dust Control Plan that includes SCAQMD mitigations for fugitive dust mitigation, according to Rule 403, and SCAQMD CEQA Guidelines. Fugitive dust mitigation measures in the plan shall include the following: • Apply water every 3 hours to disturbed areas and unpaved roads within a construction site (61 percent reduction). • Require minimum soil moisture of 12 percent for earthmoving, by using a moveable sprinkler system or water truck. Moisture content can be verified by lab sample or moisture probe (69 percent reduction). • Limit onsite vehicle speeds on unpaved roads to 15 mph and posting of speed limits. • All trucks hauling dirt, sand, soil, or other loose materials are to be tarped with a fabric cover and maintain a freeboard height of 12 inches (91 percent reduction). • Install gravel bed trackout apron (3	Plan review, site inspections	Before and during construction Both Oil Project and City Yard	SCAQMD City of Hermosa Beach

Proposed City Maintenance Yard Project Mitigation Measures				
Mitigation Measure	**Requirements**	**Compliance Verification**		
		Method	**Timing**	**Responsible Party**
	inches deep, 25 feet long, 12 feet wide per lane, and edged by rock berm or row of stakes) to reduce mud and dirt trackout from unpaved truck exit routes (46 to 80 percent reduction). • Water storage piles by hand or apply cover when wind events are declared, according to SCAQMD Rule 403 when instantaneous wind speeds exceed 25 miles per hour (90 percent reduction). • Appoint a construction relations officer to act as a community liaison concerning onsite construction issues, such as dust generation.			
AQ-1b	The Applicant shall implement a NOx reduction program including the following, or equivalent, measures to the satisfaction of the SCAQMD: • All off-road construction equipment shall be tuned and maintained according to manufacturers' specifications. • Any temporary electric power shall be obtained from the electrical grid, rather than portable diesel or gasoline generators. • All off-road diesel construction equipment with greater than 100-horsepower engines shall meet Tier 3 NOx requirements. • Limit onsite truck idling to less than 5 minutes. • A copy of the certified tier specification, best available control technology documentation, or the CARB or SCAQMD operating permit for each piece of equipment shall be provided when each piece of equipment is mobilized.	Plan review, site inspections	Before and during construction	SCAQMD City of Hermosa Beach

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