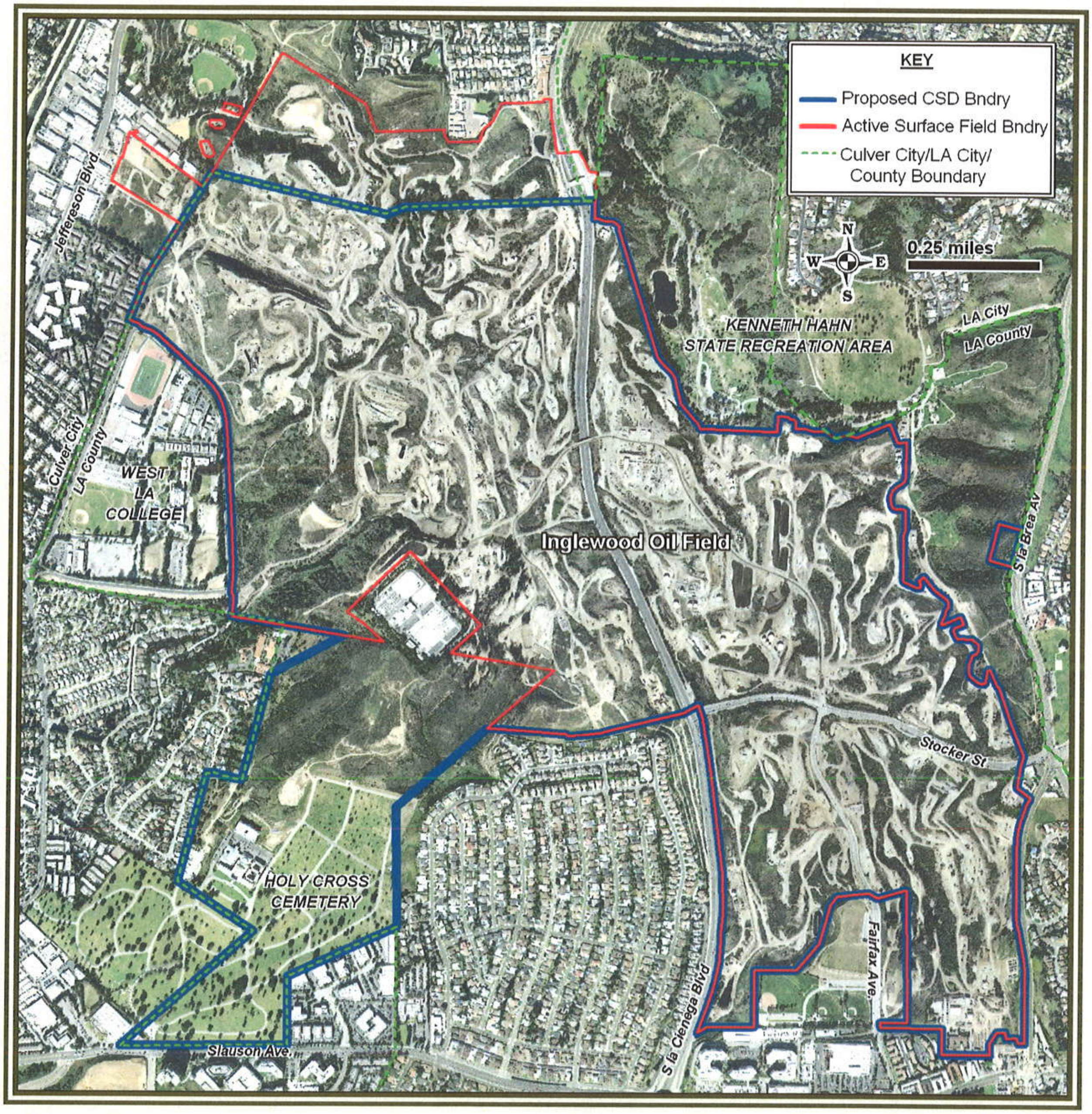
Final Environmental Impact Report

Baldwin Hills Community Standards District



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cleaning plants. These facilities are projected for construction five to ten years out. As such, they would not combine with the potential future construction impacts. The Air Quality Management Plan anticipates growth and associated construction in the region, consistent with the Southern California Association of Governments projections. Each project must be evaluated for the need for consistency and CEQA analysis, and mitigation measures applied to reduce construction impacts, where appropriate. With the implementation of the mitigation measures identified above the for potential future oil development, cumulative construction air quality impacts would be considered less than significant.

Cumulative projects that are included in adopted general and regional plans would be included in the SCAQMD projections for the region. Individual projects (previously planned or not) must be evaluated for the need for CEQA analysis, and mitigation measures applied, where appropriate. Further, the AQMP and continuing updates of that plan are required to include air emission reduction strategies for the basin (such as increased stationary source emissions controls, improved vehicle emission standards, transportation alternatives, etc.). These, in concert with individual project mitigation measures will help reduce impacts. However, until the south coast air basin as a whole attains all federal and state standards, which is not anticipated to occur until 2020, it is likely that the air emissions from the cumulative project would be significant. For the potential future operational emissions at the oil field a mitigation measure has been required that offsets and the RECLAIM program be used, which will assure that potential future operational emissions will not result in a net increase in air emissions within the Los Angeles air basin. In addition, the potential future oil development would not require any General Plan amendment and hence is within the Southern California Association of Governments projection, and therefore would be considered consistent with the Air Quality Management Plan. As such, the potential future oil development's contribution to cumulative air emission would be less than significant with mitigation.

4.2.7 Climate Change (i.e., Greenhouse Gases)

This subsection of the Air Quality section analyzes the potential impacts that the potential development will have on climate change by focusing on greenhouse gas emissions.

According to CEQA Guidelines Section 15002(a)(1), one of the basic purposes of CEQA is to, "inform governmental decision makers and the public about the potential, significant environmental effects of proposed activities." Although a discussion of global warming impacts is not currently required by the CEQA Statutes or Guidelines, it is the view of the California Legislature (as expressed in its adoption of AB 32, the California Global Warming Solutions Act of 2006) that global warming poses significant adverse effects to the environment of the state and the world. In addition, the global scientific community has expressed a high confidence that global warming is anthropogenic, i.e., caused by humans, and that global warming will lead to adverse climate change effects around the globe (IPCC 2007a). Consequently, the potential global warming impacts that may occur during implementation of the potential development are analyzed below.

4.2.7.1 Background

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

These greenhouse gases 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 greenhouse gases in the atmosphere regulates the earth's temperature. Without natural greenhouse gases, the earth's surface would be cooler (CA 2006). Emissions from human activities such as electricity production and vehicles have elevated the concentration of these gases in the atmosphere. Emissions of greenhouse gases in excess of natural ambient concentrations are thought to be responsible for the enhancement of the greenhouse effect and to contribute to what is termed "global warming," a trend of unnatural warming of the earth's natural climate. Unlike criteria air pollutants and toxic air contaminants, which are pollutants of regional and local concern, greenhouse gases are global pollutants and climate change is a global issue.

Global climate change caused by greenhouse gases is currently one of the most important and widely debated scientific, economic, and political issues in the United States. Global climate change is a change in the average weather of the earth, which can be measured by wind patterns, storms, precipitation, and temperature. Historical records have shown that temperature changes have occurred in the past, such as during previous ice ages. Some data indicates that the current temperature record differs from previous climate changes in rate and magnitude (AEP 2007).

These climate changes could lead to various changes in weather and rainfall patterns over time. According to CARB, some of the potential impacts of global warming may include loss in snow pack, sea level rise, more extreme heat days per year, more high ozone days, more large forest fires, and more drought years (CARB 2006c, 2007c). Several recent studies have attempted to explore the possible negative consequences that climate change, left unchecked, could have in California. These reports acknowledge that climate scientists' understanding of the complex global climate system, and the interplay of the various internal and external factors that affect climate change, remains too limited to yield scientifically valid conclusions on such a localized scale. Substantial work has been done at the international and national level to evaluate climatic impacts, but far less information is available on regional and local impacts. In addition, projecting regional impacts of climate change and variability relies on large-scale scenarios of changing climate parameters, using information that is typically at too coarse a scale to make accurate regional assessments (Kiparsky, 2003).

The difficulty of analyzing climate change on a regional or local level is illustrated by the following. Modeling of climate change consistently predicts increasing temperatures; however, the ways in which increasing temperatures will affect precipitation is not well understood.

Studies have found that, "Considerable uncertainty about precise impacts of climate change on California hydrology and water resources will remain until we have more precise and consistent information about how precipitation patterns, timing, and intensity will change." (Kiparsky, 2003).

Even assuming that climate change leads to long-term increases in precipitation, analysis of the impact of climate change is further complicated by the fact that no studies have identified or quantified the runoff impacts such an increase in precipitation would have in particular watersheds (Kiparsky, 2003). Also, little is known about how groundwater recharge and water quality will be affected (*Id.*). Higher rainfall could lead to greater groundwater recharge, although reductions in spring runoff and higher evapotranspiration could reduce the amount of water available for recharge (*Ibid.*). The Department of Water Resources and the California Energy Commission have also noted the uncertain effect of climate change on water supply. In light of this dearth of accurate scientific information, analyzing the potential impacts a project would have on the regional or local environment is inherently complicated.

Types of Greenhouse Gasses

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

Carbon dioxide (CO_2) is an odorless, colorless greenhouse gas. Natural sources include decomposition of dead organic matter; respiration of bacteria, plants, animals, and fungus; evaporation from oceans; and volcanic outgassing. Anthropogenic (human caused) sources of carbon dioxide include burning fuels, such as coal, oil, natural gas, and wood. Concentrations are currently around 379 ppm; some say that concentrations may increase to 1,130 CO_2 equivalent ppm by 2100 as a direct result of anthropogenic sources (IPCC 2007). Some predict that this will result in an average global temperature rise of at least 7.2 ° Fahrenheit (IPCC 2007). The global warming potential of CO_2 is defined as one.

Methane is a gas and is the main component of natural gas used in homes. It has a global warming potential of about 21, meaning that it creates heating effects 21 time greater than CO_2 (see Table 4.2.12). A natural source of methane is from the decay of organic matter. Geological deposits known as natural gas fields contain methane, which is extracted for fuel. Other sources are from decay of organic material in landfills, fermentation of manure and cattle.

Nitrous oxide (N_2O), also known as laughing gas, is a colorless gas. It has a global warming potential of about 310. Nitrous oxide 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 are gases formed synthetically by replacing all hydrogen atoms in methane or ethane with chlorine and/or fluorine atoms. Chlorofluorocarbons are nontoxic, nonflammable, insoluble, and chemically nonreactive in the troposphere (the level of air at the earth's surface). Chlorofluorocarbons were first synthesized in 1928 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 are synthetic man-made chemicals that are used as a substitute for Chlorofluorocarbons for automobile air conditioners and refrigerants. Perfluorocarbons are used in aluminum production and the semiconductor manufacturing industry. Fluorocarbons have a global warming potential of between 140 and 11,700, with the low end being for HFC-152a and the higher end being for HFC-23.

Sulfur hexafluoride (SF_6) is an inorganic, odorless, colorless, nontoxic, nonflammable gas. It has the highest global warming potential of any gas - 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.

Table 4.2.12 shows a range of gasses that contribute to greenhouse gas warming with their associated global warming potential. Also shown are their estimated lifetime in the atmosphere and the range in global warming potential over a 100 year timeframe.

Table 4.2.12 Global Warming Potential of Various Gasses

Gas	Life in the Atmosphere	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
CF4	50,000	6,500
C2F6	10,000	9,200
C4F10	2,600	7,000
C6F14	3,200	7,400
SF6	3,200	23,900

Source: EPA 2007

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) to global warming (CARB 2006c). Therefore, emissions of ozone precursors would not significantly contribute to global climate change.

Calculation of Greenhouse Gas Emissions

The quantification of greenhouse gas emissions associated with a project can be complex. Greenhouse gas emissions are global in that emissions from one location could affect the entire planet and are not limited to local impacts. Therefore a "lifecycle" type analysis must be conducted to fairly evaluate the greenhouse gas emissions associated with the entire "raw material" to "end use" cycle and the project's impact on the cycle.

Greenhouse gas emissions are classified as direct and indirect. Direct emissions are associated with the production of greenhouse gas emissions at the facility site. These would include the combustion of natural gas in heaters or flares, the combustion of diesel fuel in drilling engines or construction vehicles and fugitive emissions from valves and connections, which include methane as a component.

Indirect emissions include the emissions from vehicles (both gasoline and diesel) delivering materials and equipment to the potential development site or the use of electricity. Electricity produces greenhouse gas emissions because of the need to utilize fossil fuel for the generation of electricity.

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 greenhouse gas emissions than electricity generated from natural gas combustion due to the higher carbon content of coal and oil. Electricity generated from wind turbines, hydroelectric dams or nuclear power is assigned zero greenhouse gas emissions. Although these sources have some greenhouse gas emissions associated with the manufacture of the wind generators, 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 they are assumed to be relatively small compared to the electricity generated. For example, estimates of nuclear power greenhouse gas emissions associated with uranium mining and enrichment range up to about 60 lbs/MWh, or about 5% of natural gas turbine greenhouse gas emissions (Canada 1998).

Detailed information on the 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). The most recent version of eGRID (eGRID2006), released in April 2007, was used in this analysis. 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. EPA, Energy Information Administration and Federal Energy Regulatory Commission.

eGRID includes electricity generated from coal, gas, oil, biomass (including wood, paper, agricultural byproducts, landfill gas, digester gas, etc.), nuclear, hydroelectric, geothermal, solar, wind and other fossil fuels (solid waste, tire derived fuel, hydrogen, methanol, coke gas, etc). Each of these is assigned criteria as well as greenhouse gas emission levels based on plant specifics. Nuclear, hydroelectric, wind, geothermal, biomass and solar are assigned zero greenhouse gas emissions. eGRID assigns zero CO_2 emissions to generation from the combustion of all biomass because these organic materials would otherwise release CO_2 (or other greenhouse gases) to the atmosphere through natural decomposition. The other fuels are assigned greenhouse gas emissions levels based on the fuel carbon content.

An analysis of the database was conducted for this report in order to assign a greenhouse gas emissions level to electricity generated for the current and potential development operations. The resource mix and estimated greenhouse gas emissions for a range of areas is shown in the Table 4.2.13. Note that about half of the electricity in the United States is generated from coal, producing a U.S. greenhouse gas emissions level of about 1,363 lbs/MWh (pounds per mega-watt hour). The greenhouse gas emissions rate is lower for western states, primarily due to the increased use of hydroelectric and gas. The California Independent Service Operator (CalISO) area (which includes some generation outside of California) has a low greenhouse gas emission rate of about 687 lbs/MWh due to the use of hydroelectric, nuclear and renewable energy sources (see Table 4.2.13).

The Southern California Edison greenhouse gas emission rate is lower than the California ISO average due to the reliance on the San Onofre Nuclear Generating Station. The SCE service area includes partial use of electricity from San Onofre, the use of hydroelectric in San Bernardino and the Sierra Nevada, and the use of geothermal plants located in Nevada but providing electricity to the SCE service area. As the Mojave Coal power station was shut down in 2005 and is not in operation, it was removed from the eGRID database and calculations.

The greenhouse gas emission rate from electricity from CalISO is about 45% less than the rate associated with direct natural gas combustion due to the electricity resource mix including non-greenhouse gas emission creating resources (hydroelectric, nuclear, renewables).

Table 4.2.13 Electricity Generation Resource Mix and Greenhouse Gas Emissions

Area	United States	Western States (WECC)	California ISO	So Cal Edison Service Area*
Resource Mix, %				
Coal	50.2	34.2	1.2	1.7
Oil	3.0	0.5	1.2	0.9
Gas	17.4	26.3	51.1	41.9
Nuclear	20.0	9.9	16.8	38.0
Hydro	6.6	24.3	17.3	4.7
Biomass	1.4	1.3	3.2	2.9
Wind	0.3	0.9	2.4	3.8
Solar	0.0	0.1	0.3	0.8
Geo	0.3	2.0	5.5	4.1
Other Fossil	0.5	0.3	0.9	1.2
Other	0.1	0.0	0.0	0.0
Non-renewables	91.3	71.3	71.3	83.7
Renewables	8.7	28.7	28.7	16.3
Non-hydro Renewables	2.1	4.3	11.4	11.6
CO2 Rate, lb/MWh	1363	1107	687	613

Notes: Source is eGRID database with modifications and updates. *SCE Service area includes 75% of San Onofre, Geothermal in Nevada and hydro in Sierra Nevada, San Bernardino & LA. Mojave Coal Fired Power Plant not included in CalISO or So Cal Edison service area as it was shut down in 2005. Resource mix is the percentage of total mega-watt hours. Renewables are defined as hydro, biomass, wind, solar, geo and other.

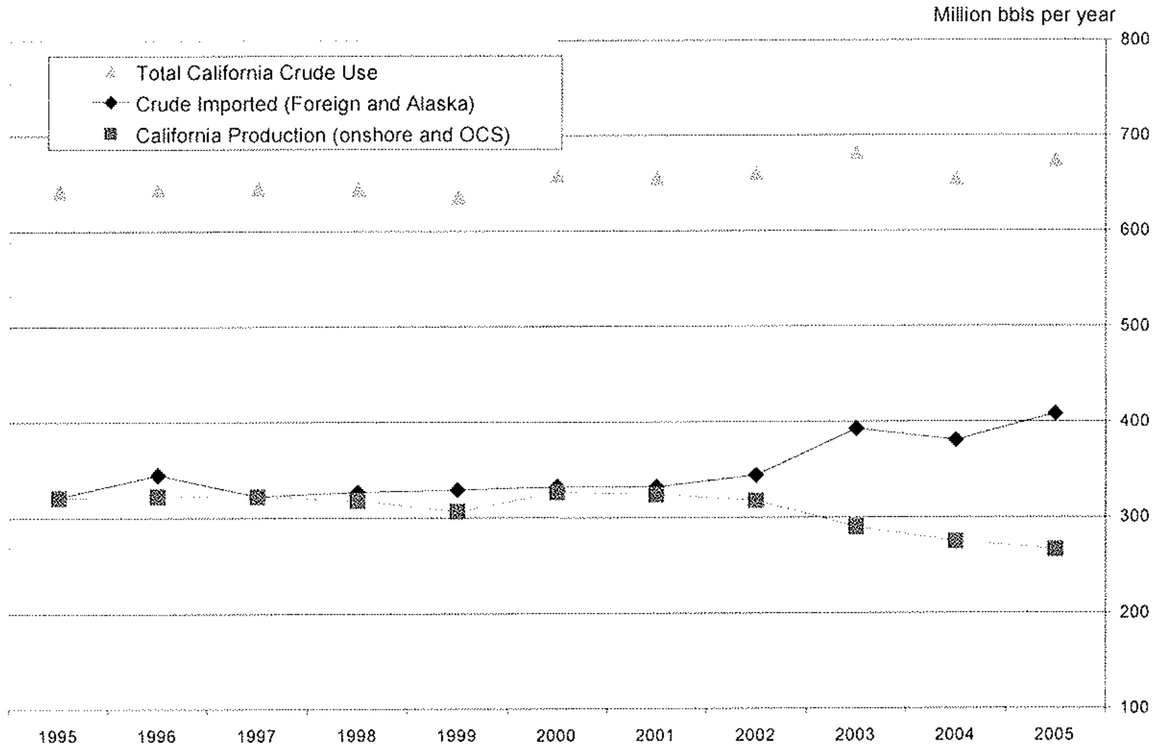
Crude Oil Transportation/Refining Lifecycle and Greenhouse Gas Emissions

One aspect of the "lifecycle" analysis of greenhouse gas emissions associated with the baseline and potential development is the dynamics of the crude oil markets in California. The supply of crude oil is driven by the demand for refined products (gasoline, diesel and jet fuel). Currently, the demand for refined products is met through supply to California refineries of crude oil from California domestic production, foreign imports of crude oil, imports of crude oil from Alaska, and imports of refined products. There are no crude oil pipelines which bring crude oil into California.

This means that the only sources of crude oil to meet refinery crude oil demand are from California production, Alaska production, or from foreign sources brought into ports by tanker ships.

California production of crude oil per year has been in decline since 1986, when production peaked at slightly over 400 million barrels. The decline has averaged about 1.7% per year since 1995. More recently, the decline has averaged over 3% annually since the year 2000. Figure 4.2-6 shows the total California crude oil use, California production, and the associated imports through California ports.

Figure 4.2-6 California Crude Oil Use, Production and Imports



Source: CEC and DOGGR databases online

The production of Alaska North Slope crude oil has experienced decline due to the age of the reservoirs. Alaska North Slope production has declined since its peak in 1989 of about 328 million barrels annually. The average rate of decline since 1995 has been above 4%.

At the same time that there has been declining California production and declining Alaska North Slope production, demand for crude oil in California has remained relatively flat, with an annual average increase since 1995 of only about 0.5%.

The combination of declining California and Alaska North Slope production along with a relatively constant, flat demand for crude oil in California equates to an increase in foreign crude oil imports. Foreign crude oil imports since 1995 have increased by an average of almost 38%. As seen in Figure 4.2-6, the increase in imports closely mirrors the decline in California production since about 2000.

The California Energy Commission (CEC) has produced a number of reports on the state of the California crude oil markets. They conclude the following:

- "Declining California production will be replaced with crude oil delivered by marine vessel" (CEC 2003);

- A "reduction in [gasoline] use with alternative fuels and efficiency improvements will reduce imports of [refined] products, not imports of crude oil" (CEC 2007);
- "Without increasing the fuel supply by importing additional crude oil and transportation fuels, California will not only continue to experience supply disruptions and price spikes, but also supply shortages and prolonged and elevated prices, for gasoline fuels"; (CEC 2003b); and
- "Supplies of crude oil from within California and from Alaska have been declining, requiring California to import an increasing proportion of its crude oil from foreign sources" (CEC 2003b).
- The CEC estimates that increases in imports of crude oil to California translates into "an additional 150 shipments of crude oil [into ports] received per year [by] 2015" (CEC 2005).

A component of the crude oil markets involve Los Angeles area refineries and their associated ability to process a range of different crude types, from the relatively sweet/light Alaska North Slope crude to the heavy San Joaquin Valley crudes. Increased installation of cracking units at refineries, which allow for the refining of heavier crude oils into gasoline and lighter products, in the last 5-10 years has increased the ability of refineries to process heavier crude oils as the supply of ANS crude and San Joaquin Valley light crude has diminished (SCAQMD CEQA Documents).

The three major regions of California crude oil production are Kern County, the Los Angeles Basin, and the Outer Continental Shelf. Oil from Kern County accounts for two-thirds of California's total crude oil production. Approximately 58 percent of the Kern County crude oil has an API of 18 degrees or less (heavy crude). The Los Angeles Basin's largest fields are the Wilmington and the Huntington Beach fields with average APIs of 17 to 19 degrees, respectively (heavy crude). The Outer Continental Shelf accounts for about 10 percent of the total California production. The quality of Outer Continental Shelf crude oil varies by field with API gravities ranging from 14 to 38 degrees (heavy to light crude). (CEC 2006). Alaska North Slope crude oil ranges from an API gravity of 22 to 40 degrees (light crude).

Oil imports delivered to California from foreign sources by ocean going tankers come from Saudi Arabia (35%), Ecuador (25%), Iraq (12%), Mexico (7%) and others. The Saudi crude oil API gravity ranges from 28 to 34 degrees (light crude) (CEC 2006).

The use of foreign crude oil is associated with substantial emissions associated with transportation as foreign crude oil needs to be transported from between 4,000 miles (Ecuador) and 13,000 miles (Saudi Arabia) one-way to get to California. Alaska North Slope crude travels about 2,500 miles from Alaska. This causes the greenhouse gas lifecycle emissions associated with foreign crude oil to be substantially higher than California crude oil.

Transportation of the majority of California crude oil is via pipeline, which requires energy to pump the crude oil to the refineries. This energy is generally a function of the type of crude oil, if heating is required, and the distance and terrain between the wells and the refinery.

Very little, if any, crude oil is exported from California. Since the beginning of 2001 through the end of November 2007, 1,367,000 barrels of crude has been exported from PADD 5 (California, Arizona, Nevada, Oregon, Washington, Alaska, and Hawaii). The majority of the exports were a shipment to China of 805,000 barrels in April 2004, 401,000 barrels to Canada in January 2006, and 57,000 barrels to Canada in October 2004 (EIA 2008). The remaining exports from PADD 5 (17 shipments) were to Canada and Mexico, and averaged approximately 6,000 barrels per shipment. Given the small size of most of these shipments, it is likely they were via truck and not marine tanker.

Therefore, if one assumes that all of the PADD 5 exports originated from California, which is highly unlikely, but the most conservative assumption, then at best there would have been two to four marine tanker trips for exporting crude over a seven year period. This compares with over 1,000 tanker trips that imported crude oil into California over the same seven year period.

Refining of crude oil into end-use products such as gasoline, diesel and jet fuel requires energy. Refinery energy requirements are a function of the refinery arrangements, the type of crude oil, the type of gasoline being produced (winter or summer blends), the level of sulfur removal required, etc. Efficiencies of refineries have been shown to range from 83 to 87% (GM, 2001), meaning that 13 to 17% of the product energy content is required to refine the product.

4.2.7.2 Affected Environment

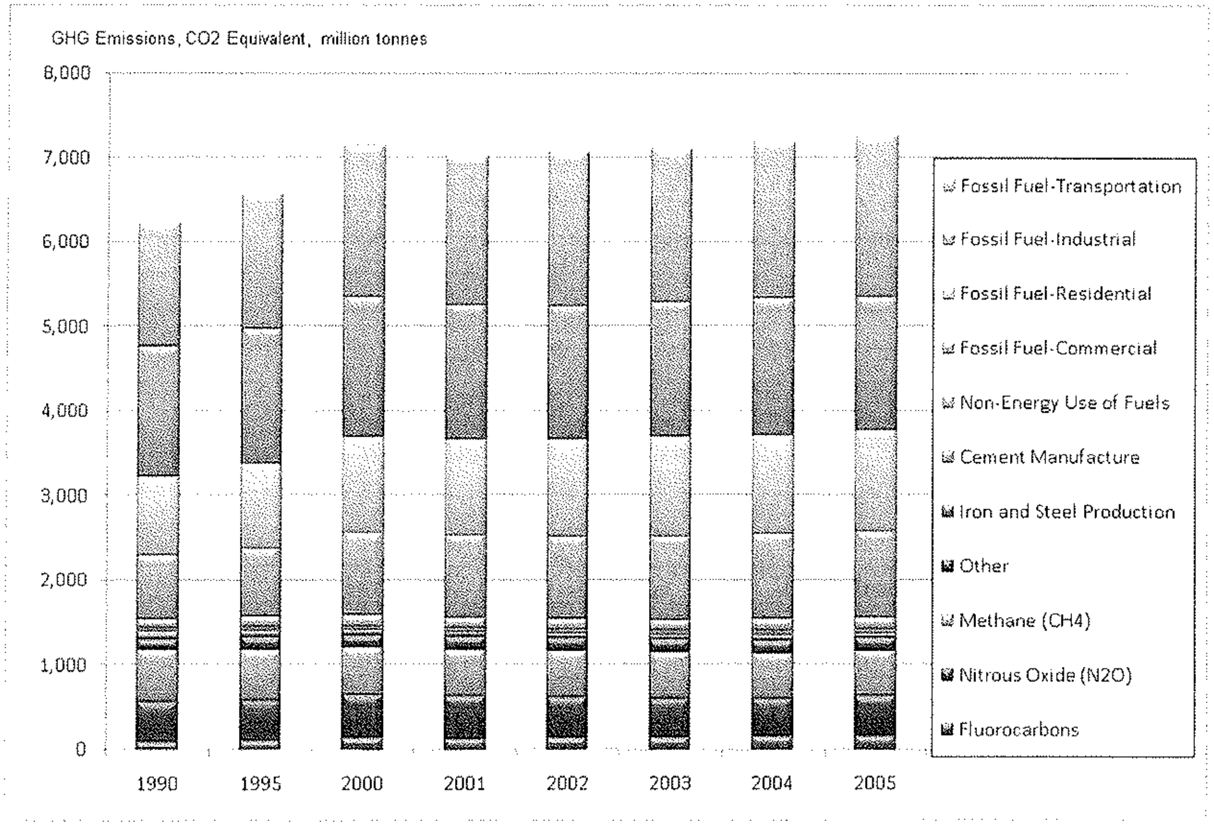
National Greenhouse Gas Emissions

Fossil fuel combustion represents the vast majority of the nation's greenhouse gas emissions, with CO_2 being the primary greenhouse gas. The total U.S. greenhouse gas emissions were 7,260 million metric tons of carbon equivalents (MMTCE) in 2005, of which 84% was CO_2 emissions (EPA 2007). Figure 4.2-7 shows the breakdown of U.S. greenhouse gas emissions since 1990. Approximately 33% of greenhouse gas emissions were associated with transportation in 2005 and about 41% was associated with electricity generation.

Statewide Greenhouse Gas Emissions

California's greenhouse gas emissions are large in a world-scale context and growing over time. If California were considered an independent country, its emissions would rank at least 16th largest. In 2004, California produced 492 million metric tons of CO2 equivalent greenhouse gas emissions (CEC 2006). The transportation sector is the single largest category of California's greenhouse gas emissions, producing 41% of the state's total greenhouse gas emissions in 2004. Electrical generation produced 22% of greenhouse gas emissions. Most of California's emissions, 81%, are carbon dioxide produced from fossil fuel combustion (CEC 2006).

Figure 4.2-7 U.S. Greenhouse Gas Emissions



Notes: Fossil fuel use includes electrical generation. Source: EPA 2007.

Local Greenhouse Gas Emissions Related to Current Site Uses

Existing greenhouse gas emissions related to the current facilities use include both direct and indirect emissions. Direct emissions, meaning those produced at the facility site, include the emissions from the combustion of natural gas or diesel fuel and fugitive emissions from valves and connections, which include methane as a component. Indirect emissions include the emissions from vehicles (both gasoline and diesel) delivering materials and equipment to the site and emissions related to the use of electricity which is generated at some other location.

An estimate of greenhouse gas emissions related to the current site use was prepared and is summarized in Table 4.2.14. Emissions estimates are based on fuel use for engines, flares, boiler and vehicles, and from the methane fractions of the gas contributing to the fugitive emissions.

Greenhouse gas emissions rates from electrical generation, due to the wide variability in electricity sources and between seasons and times of day, used the California ISO rate discussed above. The greenhouse gas emissions on a CO_2 equivalent basis, including the GWR factors for methane, are shown in Table 4.2.14 below.

Table 4.2.14 Current Greenhouse Gases Emissions Summary

Emission Source	Annual Emissions (tons/yr)		
	CH_4	CO_2	Percent of Greenhouse Gas
Operational Direct Emissions			
Internal Combustion	0.50	10,052	12.4
Tank Fugitive Emissions	0.00	0.00	0.0
Other Fugitive Emissions	35.5	5.51	0.0
Well Heads Fugitive Emissions	0.09	0.04	0.0
Miscellaneous Sources	0.00	0.00	0.0
Well Workover Emissions	0.00	157	0.2
Drilling Emissions (including offsite)	0.00	4,184	5.1
Total Operational Direct Emissions	36.0	14,398	17.7
Operational Indirect Emissions	=	=	
Workers and Trucks	0.00	3,676	4.5
Electrical Generation	0.00	63,190	77.8
Total Operational Indirect Emissions	0.00	66,866	82.3
Total Operational Baseline Greenhouse Gases Emissions	**36.0**	**81,264**	
Total Operational Baseline GHG CO2 equivalent, tons	**82,021**		

Notes: Electrical generation assumes Cal ISO weighted average GHG emission rate. To convert to metric tonnes of GHG, multiply by 0.90.

4.2.7.3 GHG Regulatory Setting

International Regulations

Kyoto Protocol

The United States participates in the United Nations Framework Convention on Climate Change (UNFCCC) (signed on March 21, 1994). The Kyoto Protocol is a treaty made under the UNFCCC and 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 could be reduced by an estimated 5% from 1990 levels during the first commitment period of 2008–2012. Notably, while the United States is a signatory to the Kyoto Protocol, Congress has not ratified the Protocol and the United States is not bound by the Protocol's commitments.

Climate Change Technology Program

The United States has opted for a voluntary and incentive-based approach toward emissions reductions in lieu of the Kyoto Protocol's mandatory framework. The Climate Change Technology Program is a multi-agency research and development coordination effort (which is led by the Secretaries of Energy and Commerce) that is charged with carrying out the President's National Climate Change Technology Initiative.

Federal Regulations

Clean Air Act

In the past, the US EPA has not regulated greenhouse gases under the Clean Air Act. This was based on the EPA's assertion that the Clean Air Act does not authorize it to issue mandatory regulations to address global climate change and that such regulation would be unwise without an unequivocally established causal link between GHGs and the increase in global surface air temperatures. However, the U.S. Supreme Court recently held that the EPA can, and should, consider regulating motor-vehicle greenhouse gas emissions. In *Massachusetts vs. Environmental Protection Agency et al.*, twelve states and cities, including California, in conjunction with several environmental organizations sued to force the EPA to regulate greenhouse gases as a pollutant pursuant to the Clean Air Act. (U.S. Supreme Court No. 05-1120; 127 S. Ct. 1438 (2007). The Court ruled that greenhouse gases fit within the Clean Air Act's definition of a pollutant and that the EPA's reason for not regulating greenhouse gases were insufficiently grounded. Despite the Supreme Court ruling, to date the EPA has not promulgated federal regulations limiting greenhouse gas emissions.

State Regulations

Executive Order S-3-05

California Executive Order S-3-05 established the following greenhouse gas emission reduction targets for California:

- by 2010, reduce greenhouse gas emissions to 2000 levels;
- by 2020, reduce greenhouse gas emissions to 1990 levels; and
- by 2050, reduce greenhouse gas emissions to 80% 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. Several of the programs developed by the Climate Action Team to meet the emission targets are relevant to industrial construction and are outlined in a March 2006 report (CalEPA 2006a).

Assembly Bill 1493

The legislature declared in AB 1493 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 greenhouse gas emissions would stimulate California's economy and provide jobs. Accordingly, AB 1493 required CARB to develop and adopt the nation's first greenhouse gas emission standards for automobiles. CARB responded by adopting "CO2-equivalent fleet average emission" standards. The standards will be phased in from 2009 to 2016, reducing emissions by 22% in the "near term" (2009–2012) and 30% in the "mid-term" (2013–2016), as compared to 2002 fleets.

Assembly Bill 32

AB 32 codifies the State's greenhouse gas emissions target by requiring the State's global warming emissions be reduced to 1990 levels by 2020 and directs 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 AB 32 milestones are as follows:

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

Since the passage of AB 32, CARB published *Proposed Early Actions to Mitigate Climate Change in California* (CalEPA 2007). There are no early action measures specific to industrial development included in the list of 36 measures identified for CARB to pursue during calendar years 2007, 2008 and 2009. Also, this publication indicated that the issue of greenhouse gas 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. To date, there has been no guidance from CARB or other agencies on the relation between AB 32 and CEQA, or on whether or how greenhouse gas emissions should be evaluated in environmental impact reports.

California Senate Bill 1368 (SB 1368)

In 2006, the California Legislature passed SB 1368 which requires the Public Utilities Commission (PUC) to develop and adopt a "greenhouse gases emission performance standard" by February 1, 2007, for the private electric utilities under its regulation. The PUC adopted an interim standard on January 25, 2007, of 1,100 lbs CO_2/MWh. These standards apply to all long-term financial commitments entered into by electric utilities (California SB 2006).

Renewables Portfolio Standard

Established in 2002 under Senate Bill 1078 and accelerated in 2006 under Senate Bill 107, California's Renewables Portfolio Standard (RPS) requires electric corporations to increase procurement from eligible renewable energy resources by at least 1% of their retail sales annually, until they reach 20% by 2010.

Local Regulations

The County of Los Angeles and the SCAQMD presently have no guidance concerning CEQA evaluation of greenhouse gas emissions and no regulatory requirements.

4.2.7.4 Potential Future Development Contribution to Greenhouse Gas Emissions

Ultimately, determining whether the proposed potential future development's contribution of greenhouse gases is significant or not significant requires a knowledge of incremental effects that is not currently available. Thus, determining whether the potential future development greenhouse gas emissions would contribute to a significant impact associated with global climate change, considering that no quantifiable numeric threshold exists for such an impact, would be speculative.

Construction greenhouse gas emissions would come mostly from truck trips bringing materials to the site, commuter and construction support vehicles, construction machinery, associated with well pad grading activities.

With respect to the proposed potential future development's operations, due to the drilling and new equipment and the increase in operations of the existing equipment, direct emissions of greenhouse gases would likely increase. The direct greenhouse gases emissions would come from combustion of natural gas and diesel fuel (producing greenhouse gas emissions of CO_2 and CH_4), as well as from fugitive emissions (a component of fugitive emissions is methane, CH_4). Indirect emissions associated with electrical generation and with worker and truck transportation offsite would also likely increase over current levels. Electrical greenhouse gas emissions are based on the California ISO weighted average values obtained from the EPA eGRID database (excluding the Mojave Coal power plant).

Table 4.2.15 below summarizes the greenhouse gas emissions due to the potential oil and gas development at the field.

Crude Oil and Natural Gas End-Use

The crude oil produced from the potential development would be delivered to Los Angeles area refineries and refined into gasoline, diesel, jet fuel and a range of end products. Greenhouse gas emissions would be associated with the transportation, refining and end-use of the refined products, including natural gas, propane and crude oil after it has been processed and distributed. Natural gas would be burned in homes, businesses and burned to produce electricity. Propane would be used for residential (barbeques, etc), transportation and industrial fuel. However, the potential future development would not increase the consumption of these refined products as the consumption of natural gas, propane and crude oil products is not a function of the source of the gas or crude oil supply. Therefore, there would be no net increase in greenhouse gas emissions associated with the potential development end-use products over current production related end-use greenhouse gas emissions. The information is presented below for informational purposes only.

Table 4.2.15 Potential Future Development Greenhouse Gases Emissions Summary

Emission Source	Annual Emissions (tons/yr)		
	CH_4	CO_2	Percent of GHG
Construction Emissions			
Steam Drive Plant Construction	0.00	42	9
WTP/Oil Plant Construction	0.00	21	5
Construction Offsite	0.00	386	86
Total Construction		***448***	
Direct Operational Emissions			
Internal Combustion	0.53	11,776	5.0
Tank Fugitive Emissions	0.00	0.00	0.0
Other Fugitive Emissions	39.7	6.51	0.0
Well Heads Fugitive Emissions	0.09	0.04	0.0
Miscellaneous Sources	0.00	0.00	0.0
Operational Emissions- New Equipment			
Oil Cleaning Plant	3.31	1	0.0
Water Treating Plant	1.20	0.27	0.0
Steam Drive Plant	4.20	77,996	33
Additional Well Heads	0.09	0.05	0.0
Well Workover Emissions	0.00	426	0.2
Drilling Emissions (including offsite)	0.00	6,152	2.6
Total Operational Direct Emissions	49.1	96,357	41
Operational Indirect Emissions			
Workers and Trucks	0.00	4,516	1.9
Electrical Generation	0.00	135,408	57
Total Operational Indirect Emissions	*0.00*	*139,923*	*59.2*
Total Potential Development GHGs Emissions, tons/yr	**49.09**	**236,280**	
Total Potential Development GHG CO2 equivalent, tons/yr	**237,311**		
Total Baseline CO2 equivalent, tons/yr	**74,564**		
Increase In GHG emissions, tons/yr	**162,747**		

Notes: Electrical generation assumes Cal ISO weighted average GHG emission rate. To convert to metric tonnes of GHG, multiply by 0.90. Numbers may not add due to rounding.

Greenhouse gas emissions associated with the consumption of natural gas produced by the proposed potential future development, including residential cooking and heating, business and industrial use and electricity generation, would be an estimated 301,000 tons per year. This is above the current natural gas production end-use amount of 114,000 tons per year. Note that the natural gas is processed and introduced into the end-use pipelines at the field.

Greenhouse gas emissions associated with the end-use of propane produced at the field and trucked to end users would total about 31,000 tons/year. This is above the current production end-use amount of 14,000 tons per year.

Greenhouse gas emissions associated with the end-use of crude oil produced at the field, including gasoline, diesel fuel, jet fuel, residual oils, etc, would total about 7.6 million tons/year (API 2004). This is above the current production end-use amount of 3.2 million tons per year.

Greenhouse gas emissions associated with refining would increase these emissions amounts by an estimated 13-17% (GM 2001).

Crude Oil Transportation Lifecycle and Greenhouse Gas Emissions Impacts

Based on analysis conducted by the CEC and others, and information presented above, the production of crude oil from the potential development could displace crude oil from foreign sources. The data presented above shows that very little crude oil has been exported from PADD 5 over the past seven years. This trend is expected to continue into the future due to a Federal ban on the export of crude in the lower forty-eight states. The Federal ban on crude oil exports does provide a process for obtaining permission to export shipment of crude, but the process requires extensive review and a lengthy approval process before any crude is allowed to be exported from the lower 48 states. These requirements are set forth in statutes, including the Minerals Leasing Act, the Outer Continental Shelf Lands Act, the National Petroleum Reserves Production Act, and the Energy Policy and Conservation Act, among others.

From California in particular, there is a demonstrated progressive reduction of crude produced in the state and a progressive increase in consumption, which point to a continued need for tankered crudes from foreign countries to satisfy demands. The potential displacement of those tankered crudes from foreign sources by the potential development could cause a reduction in greenhouse gas emissions as less crude oil would need to be transported from as far away as Saudi Arabia, at 13,000 miles. The information on potential greenhouse gas emission reductions due to reduced marine tankering is provided below for reference only.

The proposed potential future development crude oil would constitute about 1.1 percent of the crude oil refined in California (from all sources, including Alaska, California production and foreign).

Greenhouse gas emissions from foreign crude oil transportation were calculated by assuming an average trip by a tanker to deliver oil to the Los Angeles area would be 13,000 miles (from the Persian Gulf). Tankers vary in size and include Aframax class (about 725,000 bbls), Suezmax size (about 1 million barrels) or VLCC class (2 million barrels). About 40 percent of tanker calls into the Los Angeles ports are Aframax, 40 percent are Suezmax and 20 percent are VLCC (PEP 2005).

Note, that for the VLCC, offloading of the tanker would be required outside the port as the Port of Los Angeles and the Port of Long Beach cannot take a tanker of the size of a VLCC fully loaded.

Emissions from marine operations have been estimated by CARB (CARB 2005) and the Ports of Los Angeles (POLA 2007). Emissions associated with tankering were estimated using these studies. With these assumptions, the Potential future development could potentially reduce deliveries of up to six Aframax sized tankers or up to two VLCC sized tankers per year. The

CO_2 emissions produced by these tankers would be between 73,000 and 54,000 tons per year, respectively (CARB 2005).

The tankering emissions quantified above are associated with transportation of the crude oil from oil fields in the Persian Gulf to the Los Angeles refineries. Transportation of the crude oil from the Inglewood Oil Field to the refineries would be conducted using pipeline transportation. Greenhouse gas emissions are associated with pipeline transportation due to pumping the crude oil through the pipelines and are estimated to be less than 1,000 tons per year for the electricity to pump the crude oil. This assumes both a pump efficiency of 0.075 kWh/bbl per mile and the electrical generation greenhouse gas emissions rate from the CALISO area.

Note that the savings in transportation related greenhouse gas emissions cannot be directly compared to potential development greenhouse gas emissions because the potential development emissions include crude oil and gas extraction operations (drilling, pumping and combustion emissions related to gas processing, etc). These emissions have not been quantified for crude oil and gas extraction in the Persian Gulf, but most likely would be similar to those estimated for the potential development scenario.

Contributions to Cumulative Greenhouse Gas Emissions

It is possible that greenhouse gas emissions associated with the potential future development (from construction or operations), when combined with emissions throughout the area, California and the world, might contribute to climate change. While globally climate change is, by definition, a significant cumulative environmental impact and the impacts of climate change on California human and natural systems would also be significant, there currently is no agreed-upon methodology to adequately identify, under CEQA, when project-level greenhouse gas emissions contribute considerably to this significant cumulative impact. Thus, at this time, it would be speculative to determine if the potential greenhouse gas emissions associated with the potential development would or would not contribute considerably to this significant cumulative impact.

Potential Greenhouse Gas Emissions Mitigation Measures

While it would be too speculative to identify any significant impacts and no mitigation is required, methods to reduce or offset GHG emissions are numerous. The field currently implements a number of measures that reduce greenhouse gas emissions, including vapor recovery on all tanks and operation of all pumping units and compressor on electricity. Some potential mitigation measures the Operator could additionally undertake include, but are not limited to, the following:

The reduction in energy use at the field, including natural gas and electricity, from existing and proposed sources, would reduce greenhouse gas emissions. This would reduce greenhouse gas emissions from fuel combustion and electrical generation. The most significant reduction could be achieved through the use of cogeneration for production of both steam for the steam drive plant and electricity to satisfy part of the large electrical demand of the field. The California Energy Commission Integrated Energy Policy report (CEC 2007) specifically directs that "*The state adopt greenhouse gas reduction measures and regulations that fully reflect the benefits of combined heat and power.*" Replacement of existing pumping units with newer, more efficient electric motors and increasing the efficiency of field-wide operations, particularly in regards to flaring of gasses and use of the normally flared gasses, would further reduce greenhouse gas emissions through a reduction in gas and electrical consumption.

Reducing water and raw material use and waste generation and increasing recycling would reduce greenhouse gas emissions by reducing the energy used to transport/pump water and to produce goods and truck trips, with their associated diesel fuel combustion, to produce and transport waste and materials.

Biodiesel (fatty acid methyl ester, or FAME) is produced from plant crops, such as soybeans. Because it is made from plant sources, the carbon in the biodiesel has been recently removed from the atmosphere and therefore does not contribute to greenhouse gas emissions. It can be used by diesel vehicles (UC 2007). The American Society of Testing and Materials has approved a standard for FAME at blend levels up to 20 percent by volume but some engine manufacturers caution about blends over 10 percent. Replacement of 10-20% of the diesel fuel with biodiesel would reduce greenhouse gas emissions by a similar amount. Biodiesel could be used in drilling engines or could be used in other area engines, such as school busses, to offset direct emissions from the potential future development.

Some projects could be undertaken offsite to offset the emissions from site operations. These might include:

Planting of 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. Trees serve as effective carbon sinks since about one-half of the dry weight of the wood is carbon. Forests store more carbon dioxide than the entire atmosphere (IPCC 2007). CO_2 sequestration rates vary by tree type and by land type/quality up to about 10 tons per acre. Tree planting for GHG emission reductions is somewhat controversial as the trees only store/sequester the carbon until they are fully grown. When they die and decay or are used for fuel, they release the carbon they have absorbed while growing. Tree forests for greenhouse gas emission reductions must be managed and maintained and new trees grown to replace trees that have died in order to maintain the sequestration of the carbon. According to the Intergovernmental Panel on Climate Change, on the global level, 12-15% of total global carbon emissions per year could be managed through forestry activities.

Methane capture is currently a promising technology that would enable the conversion of methane emissions from cow manure into fuel. This would reduce greenhouse gas emissions by taking advantage of the global warming potential difference between CH_4 and CO_2 (as use of the methane as a fuel would produce CO2).

Retrofitting diesel busses with more efficient, hybrid-diesel engines would decrease greenhouse gas emissions through an increase in the fuel economy and efficiency and an associated decrease in fuel combustion. This would be true with the use of electric shuttles due to the advantages in electrical generation over fuel combustion (discussed above).

With the application of the recommended mitigation measures, the net direct greenhouse gas emissions could be reduced. Greenhouse gas emissions from indirect sources (electricity generation) are currently addressed through CPUC Emission Performance Standard policies (Commission's Rulemaking on greenhouse gas policies R.06-04-009) and Senate Bill 1368 requiring that electricity generators produce power more efficiently, with an efficiency equal to or below a combined cycle gas turbine (1,100 lbs CO2/MWh). This would lower the greenhouse gas emissions from the electric resource mix, as greenhouse gas emissions associated with electrical generation from coal and gas would be lowered (currently 2,100 and 1,235 lbs/MWH, respectively, for the CALISO area), and would address the reduction in greenhouse gasses from indirect electrical generation.

4.2.8 Mitigation Monitoring Plan

Mitigation Measure	Requirements	Compliance Verification		
		Method	Timing	Responsible Party
AQ.1-1	Construction of the steam drive plant and the water treatment/oil cleaning plant cannot occur at the same time	Review of Construction Schedule Approval of construction	Before construction of either facility	Los Angeles County Department of Regional Planning
AQ.1-2	Prepare a Fugitive Dust Control Plan	Review of Plan	Within six months of adoption of the CSD	SCAQMD Los Angeles County Department of Regional Planning
AQ.1-3	Use of Tier III diesel engines on off-road construction equipment	Review of CARB Certifications for Engines	Prior to Construction	Los Angeles County Department of Regional Planning
AQ.2-1	Use of emission offsets or RECLAIM credits for new fixed facilities	Issuance of ATC/PTO	Before operation of new facility	SCAQMD Los Angeles County Department of Regional Planning
AQ.2-2	Use of combined heat and power systems or equivalent for steam drive plant	Review of Applications to Los Angeles County and SCAQMD for Steam Drive Plant	Prior to issuance of permits for construction of steam drive plant	SCAQMD Los Angeles County Department of Regional Planning
AQ.2-3	Connection of steam drive gas plant with oil field gas plant to eliminate new gas plant and flare.	Review of Applications to Los Angeles County and SCAQMD for Steam Drive Plant	Prior to issuance of permits for construction	SCAQMD Los Angeles County Department of Regional Planning
AQ.2-4	All drilling rig engines shall be Tier II or better certified engines.	Review of CARB Certifications for Engines	Prior to Prior to use drill rig at the oil field	SCAQMD Los Angeles County Department of Regional Planning
AQ.3-1	Use of a portable flare during drilling activities	Review of SCAQMD Permit for Flare On-Site Inspection	Prior to drilling operations	Los Angeles County Department of Regional Planning
AQ.3-2	Installation of tank pressure monitoring devices on crude oil tanks	Inspection of Tanks	Within six months of adoption of the CSD	Los Angeles County Department of Regional Planning

Mitigation Measure	Requirements	Compliance Verification		
		Method	Timing	Responsible Party
AQ.3-3	Odor Minimization Plan	Review of Plan and facility inspections	Prior to resumption of drilling	Los Angeles County Department of Regional Planning, SCAQMD
AQ.3-4	Closed systems for produced water and crude oil	Review of Updated Fixed Facility Drawing Inspection of Fixed Facilities	Within one year of adoption of the CSD	Los Angeles County Department of Regional Planning
AQ.3-5	Installation of a Meteorological Station	Review of Design Specifications for the Station Inspection of the Installed Station	Within 18 months of adoption of the CSD	SCAQMD Los Angeles County Department of Regional Planning
AQ.3-6	Air Monitoring Plan: drill site air sampling	Review of Plan and facility inspections	Prior to resumption of drilling	SCAQMD Los Angeles County Department of Regional Planning
AQ.3-7	Odor Minimization Plan: odor suppressant at bio-farms	Review of Plan and facility inspections	Prior to resumption of drilling	SCAQMD Los Angeles County Department of Regional Planning
AQ.3-8	Odor Minimization Plan: odor suppressant for drilling muds	Review of Plan and facility inspections	Prior to resumption of drilling	SCAQMD Los Angeles County Department of Regional Planning

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