4.4 AIR QUALITY

Section 4.4 describes the existing air quality conditions and setting for the Amorco Marine Oil Terminal (Amorco Terminal) Lease Consideration Project (Project), including site-specific factors such as climatology and topography, which influence emissions dispersion. Additionally, the setting section identifies the locations of sensitive receptors that will be impacted by air pollution from the Project. The regulatory background section includes a discussion of the potential human health impacts and effects of pollutants on the surrounding community. Significance criteria are also discussed, and the baseline level of pollutants within the Project area are identified. The Impacts section includes anticipated Project air pollutant and greenhouse gas emissions, and their impacts, on the surrounding environment.

Unlike most projects that are still in the planning stage, the Amorco Terminal has been in operation since 1923. The Amorco Terminal's emissions are a part of the existing ambient air quality in the local and regional area, and have been included in the San Francisco Bay Area regional air emissions inventory and planning process. Therefore, this section includes both a discussion of the existing emissions and an analysis of the impacts associated with continued operations under the proposed 30-year lease period.

4.4.1 ENVIRONMENTAL SETTING

4.4.1.1 Local Climatology

The climate of the San Francisco Bay Area (Bay Area) is considered a Mediterranean-type, characterized by warm, dry summers and mild, wet winters. Extreme variations in ambient temperature are rare. The climate is strongly influenced by the proximity of the Pacific Ocean and irregularities in the inland topography.

During the summer months, the high-pressure system over the Pacific Ocean diverts precipitation and facilitates northwest wind flows over the Bay Area. These northwesterly flows, along with the natural current flowing southward from Alaska, promote the upwelling of cold water near the San Francisco coastline. Cool, moisture-laden air approaching the coast often results in condensation and the formation of fog and clouds in the region. In winter, the high-pressure system over the Pacific Ocean shifts southward, allowing weather systems to move inland across northern California. The formation of high-pressure systems over the mountainous regions of northern California cause winter winds in the Bay Area to come from the east and northeast.

A majority of the Bay Area's precipitation occurs from November to March. Average annual rainfall for the city of Martinez is 19.6 inches. Inversion conditions (characterized by cold air trapped at the surface by warm air), which are common in winter in many

areas, are either nonexistent or very weak in the Bay Area. Stagnant conditions are unusual due to the replacement of air masses with each storm.

Weather patterns influence the dispersion of pollutants. Stagnant periods, which inhibit the dispersion of pollutants in the lower atmosphere, generally result from high temperatures and relatively stable environmental conditions. In the Bay Area, however, the land-sea temperature differential is frequently high on warm days, and turbulence results from the passage of westerly winds over the irregular topography, improving the dispersion of pollutants.

The air pollution potential is lowest for those regions closest to the bay, due largely to instability and strong atmospheric mixing characteristics created by onshore winds. During summer and fall, air emissions generated within the Bay Area, especially inland, can combine with sunshine under the restraining influences of topography to create conditions that are conducive to the buildup of photochemical pollutants, such as ozone, and secondary pollutants, such as sulfates and nitrates. Also, stable conditions characterized by low wind speeds contribute to increased concentrations of air pollutants due to accumulation in the air mass.

4.4.1.2 Atmospheric Air Pollutants

Criteria Air Pollutants

Criteria air pollutants are those pollutants for which the federal and state governments have established air quality standards for outdoor or ambient concentrations to protect public health. The national and state ambient air quality standards have been set at levels to protect human health with a determined margin of safety. For some pollutants, there are also secondary standards to protect the environment.

The U.S. Environmental Protection Agency (USEPA) has established ambient air quality standards for the following air pollutants:

- ozone (O_3)
- carbon monoxide (CO)
- nitrogen dioxide (NO_2)
- sulfur dioxide (SO_2)
- lead
- particulate matter (PM_{10} and $PM_{2.5}$)

The California Air Resources Board (CARB) has also established ambient air quality standards for the six pollutants regulated by the USEPA. Some of the California ambient air quality standards are more stringent than the national ambient air quality standards (NAAQS). In addition, California has established ambient air quality standards for the following pollutants or air quality conditions:

- hydrogen sulfide
- sulfates
- vinyl chloride
- particulates reducing visibility

The following paragraphs provide descriptions of the USEPA-established ambient air pollutants, including potential health effects of each.

Ozone. O_3 is one of a number of substances called photochemical oxidants that are formed when volatile organic compounds (VOCs) and NOx (a mixture of nitric oxide (NO) and NO_2) react in the presence of ultraviolet sunlight. The damaging effects of photochemical smog, which is a popular name for a number of oxidants in combination, are generally related to concentrations of O_3. Individuals exercising outdoors, children, and people with preexisting lung disease, such as asthma and chronic pulmonary lung disease, are considered to be the subgroups most susceptible to O_3 effects. Short-term exposures (lasting for a few hours) to O_3 at elevated levels can result in breathing pattern changes, reduction of breathing capacity, increased susceptibility to infections, inflammation of the lung tissue, and some immunological changes.

Carbon Monoxide. CO is a colorless, odorless gas formed by the incomplete combustion of fuels. Motor vehicles are the main source of this gas. CO competes with oxygen, often replacing it in the blood, thus reducing the blood's ability to transport oxygen to vital organs in the body. The ambient air quality standard for carbon monoxide is intended to protect persons whose medical condition already compromises their circulatory system's ability to deliver oxygen. These medical conditions include certain heart ailments, chronic lung diseases, and anemia. Persons with these conditions have reduced exercise capacity even when exposed to relatively low levels of CO. Smokers are also at risk from ambient CO levels because smoking increases the background level of CO in their blood.

Nitrogen Dioxide. NO_2 is a byproduct of fuel combustion. The principal form of nitrogen oxide produced by combustion is NO, but NO reacts quickly to form NO_2, creating the mixture of NO and NO_2 commonly referred to as NOx. NO_2 acts as an acute irritant and, in equal concentrations, is more injurious than NO. At atmospheric concentrations, however, NO_2 is only potentially irritating. There is some indication of a relationship between NO_2 and chronic pulmonary fibrosis. Some increase in bronchitis in young

children has also been observed at concentrations below 0.3 parts per million. NO_2 absorbs blue light, which results in a brownish red cast to the atmosphere and reduced visibility. NOx emissions are also of concern because of their contribution to the formation of O_3 and particulate matter.

Sulfur Dioxide. SO_2 is a colorless, pungent gas formed primarily by the combustion of sulfur-containing fossil fuels. Health effects include acute respiratory symptoms and difficulty in breathing for children. Individuals with asthma may experience constriction of airways with exposure to SO_2. Though SO_2 concentrations have been reduced to levels well below State and federal standards, further reductions in SO_2 emissions are needed because SO_2 is a precursor to sulfate and PM_{10}.

Lead. Lead concentrations in air in California have historically exceeded the State and federal air quality standards by a wide margin, but have not exceeded State or federal standards at any Bay Area Air Quality Management District (BAAQMD) air quality monitoring station since 1982. Infants and children are more sensitive than others to the adverse effects of lead exposure. Exposure to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence levels. In adults, increased lead levels are associated with increased blood pressure. Lead poisoning can cause anemia, lethargy, seizures, and death. Lead can be stored in the bone from early-age environmental exposure, and elevated blood lead levels can occur due to the breakdown of bone tissue during pregnancy, hyperthyroidism (increased secretion of hormones from the thyroid gland) and osteoporosis (breakdown of bony tissue).

Particulate Matter. Inhalable fine particulate matter (PM_{10}) consists of extremely small suspended particles or droplets 10 microns or smaller in diameter that can lodge in the lungs, contributing to respiratory problems. PM_{10} arises from such sources as re-entrained road dust, diesel soot, combustion products, tire and brake abrasion, construction operations, and fires. It is also formed in the atmosphere from NOx and SO_2 reactions with ammonia. PM_{10} scatters light and significantly reduces visibility. Inhalable particulates pose a serious health hazard, alone or in combination with other pollutants. More than half of the smallest particles inhaled will be deposited in the lungs and can cause permanent lung damage. Inhalable particulates can also have a damaging effect on health by interfering with the body's mechanism for clearing the respiratory tract or by acting as a carrier of an absorbed toxic substance. In 1997, the USEPA established a new particulate matter $PM_{2.5}$ standard, in addition to the PM_{10} standard. $PM_{2.5}$ is defined as particulate matter with a diameter less than 2.5 microns and is a subset of PM_{10}. $PM_{2.5}$ consists mostly of products from the reaction of NOx and SO_2 with ammonia, secondary organics, finer dust particles, and the combustion of fuels, including diesel soot. $PM_{2.5}$ is considered even more dangerous to human health than PM_{10} due to its ability to lodge more deeply into lung tissue.

Volatile Organic Compounds. VOCs are not true criteria pollutants in that there are no State or federal ambient air quality standards established. VOCs are regulated, however, because a reduction in VOC emissions reduces certain chemical reactions that contribute to the formation of ozone. VOCs are also transformed into organic aerosols in the atmosphere, contributing to higher PM_{10} and lower visibility levels. Although health-based standards have not been established for VOCs, health effects can occur from exposures to high concentrations of VOCs. Some hydrocarbon components classified as VOC emissions are hazardous air pollutants. Benzene, for example, is a hydrocarbon component of VOC emissions that is known to be a human carcinogen.

Toxic Air Contaminants

Toxic Air Contaminants (TACs), as classified by the State of California, are often referred to as "non-criteria" air contaminants because ambient air quality standards have not been established for these pollutants. There are hundreds of TACs, and exposure to these pollutants is associated with elevated risk of cancer and non-cancer health effects such as birth defects and genetic damage. The USEPA has a similar list of toxic substances referred to as Hazardous Air Pollutants (HAPs). Effects may be chronic (i.e., of long duration) or acute (i.e., of short duration) on human health. Acute health effects are attributable to short-term exposure to air toxics. These effects include nausea, skin irritation, respiratory illness, and, in extreme cases, death. Chronic health effects result from long-term exposure. The effect of major concern for this type of exposure is cancer, which may develop up to 30 years after exposure.

The USEPA regulates HAPs through technology-based requirements, which are implemented by State and local agencies. California regulates TACs through the Air Toxics Program (Health and Safety Code § 39660 et seq.) and the Air Toxics "Hot Spots" Information and Assessment Act (Health and Safety Code § 44300 et seq.). The CARB, working in conjunction with the Office of Environmental Health Hazard Assessment, identifies TACs. Air Toxic Control Measures (ATCMs) must then be adopted by CARB to implement controls to reduce TACs. Where there are federal HAP standards, the CARB must, at minimum, adopt the standards established by the USEPA. If there is a threshold below which there would be no significant adverse health impacts, the CARB must create an ATCM to reduce emissions so there are no adverse health effects. If there is not a threshold below which there would be no significant adverse health impacts, CARB must create an ATCM that reduces TAC emissions using the best available control technologies.

Diesel exhaust is the predominant contributor to human health risk from TACs statewide, and is estimated to represent approximately about 84 percent of the total risk (SCAQMD 2008). Diesel exhaust is a complex mixture of gases, vapors, and fine particles, and the evaluation of health effects of diesel exhaust is a complex scientific issue. Some of the chemicals in diesel exhaust, such as benzene and formaldehyde,

have been previously identified as TACs by the CARB. California has adopted a comprehensive diesel risk-reduction program. The USEPA has adopted low-sulfur diesel fuel standards that will facilitate substantial reductions in diesel particulate matter through exhaust treatment. These low-sulfur standards went into effect in June 2006.

Global Warming and Ozone-depleting Gases

"Stratospheric ozone depletion" refers to the slow destruction of naturally occurring ozone, which lies in the upper atmosphere (called the stratosphere) and which protects the Earth from the damaging effects of solar ultraviolet radiation. Certain compounds, including chlorofluorocarbons (CFCs), halons, carbon tetrachloride, methyl chloroform, and other halogenated compounds, accumulate in the lower atmosphere and then gradually migrate into the stratosphere. In the stratosphere, these compounds participate in complex chemical reactions to destroy the upper ozone layer. Destruction of the ozone layer increases the penetration of ultraviolet radiation to the Earth's surface, a known risk factor that can increase the incidence of skin cancers and cataracts, contribute to crop and fish damage, and further degrade air quality.

Some gases in the atmosphere affect the Earth's heat balance by trapping infrared radiation. This layer of gases in the atmosphere functions much the same as glass in a greenhouse (i.e., both prevent the escape of heat). This is why global warming is also known as the "greenhouse effect." Gases responsible for global warming and their relative contribution to the overall warming effect are carbon dioxide (55 percent), CFCs (24 percent), methane (15 percent), and nitrous oxide (6 percent). It is widely accepted that continued increases in greenhouse gases will contribute to global warming, although there is uncertainty concerning the magnitude and timing of the warming trend. Global warming gases emitted as part of the Project include carbon dioxide and methane. Most carbon dioxide emissions are a result of fossil fuel combustion in stationary and mobile sources. They contribute to the greenhouse effect, but not to stratospheric ozone depletion. Methane is emitted from biogenic sources, incomplete combustion in forest fires, landfills, and leaks in natural gas pipelines. It is a greenhouse gas and traps heat 40 to 70 times more effectively than carbon dioxide. Methane emissions also come from petroleum sources, such as fugitive emissions from petroleum production, refining, and distribution.

4.4.1.3 Site Setting and Sensitive Receptors

The Project site is located on the Carquinez Strait, approximately 0.25 mile west of the Benicia-Martinez Bridge in an industrial area of the city of Martinez. The Carquinez Strait is the only sea-level gap between the San Francisco Bay and the Central Valley. Elevations in excess of 900 feet are reached in the surrounding hills of the Franklin Ridge, located west of Martinez. Topography to the north, across the Carquinez Strait, is also hilly. These topographical features create a high-pressure gradient causing high wind flows through the Carquinez Strait. Mount Diablo is also a major topographical

feature with an elevation of over 3,800 feet, located approximately 15 miles to the southeast in Mount Diablo State Park.

For the purposes of air quality, sensitive receptors are generally defined as land uses with population concentrations that would be particularly susceptible to disturbance from dust or air pollution associated with the operation of the Amorco Terminal. These receptors generally include schools, day care centers, hospitals, residential care centers, parks, and churches. No sensitive land uses such as hospitals, schools, or convalescent homes are located near the Amorco Terminal. The nearest residential area is approximately 2,400 feet from the Amorco Tank Farm boundary and 4,900 feet from the berthing area.

4.4.1.4 Air Monitoring Data near the Amorco Terminal

The BAAQMD operates a regional air quality network for monitoring compliance ("attainment") with ambient air quality standards. The network consists of a series of monitoring stations used to measure ambient air concentrations of pollutants for which air quality standards have been established. Each station monitors a combination of gaseous and/or particulate pollutants. The data are used to describe the air quality within the surrounding community and to determine the attainment status of the air basin.

The air monitoring station closest to the site that monitors ozone, carbon monoxide, nitrogen dioxide, and $PM_{2.5}$ is located in Vallejo on Tuolumne Street in Solano County, approximately 8 miles northwest of the Amorco Terminal. The Crockett air monitoring station is located approximately 6 miles west of the Amorco Terminal, and presently only records sulfur dioxide concentrations. The Concord air monitoring station, located approximately 5.5 miles southeast of the Amorco Terminal, is the closest station that records PM_{10} data. A three-year summary of data collected at these stations is presented in Table 4.4-1.

As indicated in Table 4.4-1, monitoring stations in the vicinity of the Amorco Terminal did not record violations of carbon monoxide, nitrogen dioxide, or sulfur dioxide in the last three years. There were no recorded violations of the NAAQS for PM_{10} during the three-year period, but the State standard was exceeded once in 2011. The federal $PM_{2.5}$ standard was exceeded six times in 2011 and once in 2012. The State ozone standard was exceeded twice, and the federal ozone standard was exceeded once, in 2010.

Table 4.4-1: Summary of Air Quality Monitoring at the Vallejo, Concord, and Crockett Monitoring Stations

Pollutant/Standard	Number of Days Thresholds Were Exceeded, and Maximum Levels		
	2010	2011	2012
Ozone			
State 1 Hr > 0.09 ppm	0	0	0
State 8 Hr > 0.70 ppm	2	0	0
Federal 8 Hr > 0.075 ppm	1	0	0
Max 1 Hr Conc (ppm)	0.091	0.090	0.085
Max 8 Hr Conc (ppm)	0.080	0.069	0.062
Carbon Monoxide			
State 1 Hr > 20 ppm	0	0	0
Federal 1 Hr > 35 ppm	0	0	0
State 8 Hr > 9 ppm	0	0	0
Federal 8 Hr > 9 ppm	0	0	0
Max 1 Hr Conc (ppm)	2.9	3.0	2.8
Max 8 Hr Conc (ppm)	1.9	2.4	2.2
Nitrogen Dioxide			
State 1 Hr >0.18 ppm	0	0	0
Federal 1 Hr > 0.10 ppm	0	0	0
Federal Ann > 0.03 ppm	0	0	0
Max 1 Hr Conc (ppm)	0.056	0.047	0.052
Max Ann Conc (ppm)	0.009	0.010	0.009

Pollutant/Standard	Number of Days Thresholds Were Exceeded, and Maximum Levels		
	2010	2011	2012
Sulfur Dioxide			
State 1 Hr > 0.25 ppm	0	0	0
Federal 1 Hr >0.075 ppm	0	0	0
State 24 Hr > 0.04 ppm	0	0	0
Federal 24 Hr > 0.14 ppm	0	0	0
Federal Ann > 0.030 ppm	0	0	0
Max 1 Hr Conc (ppm)	0.011	0.007	0.014
Max 24 Hr Conc (ppm)	0.002	0.002	0.002
Max Ann Conc (ppm)	0.001	0.001	0.001
Particulate Matter ($PM_{2.5}$)			
Federal 24 Hr > 35 µ/m^3	0	6	1
State Ann > 12 µ/m^3	0	0	0
Federal Ann > 15 µ/m^3	0	0	0
Max 24 Hr Conc (µ/m^3)	29.5	54.2	36.8
Max Ann Hr Conc (µ/m^3)	9	10	9
Particulate Matter (PM_{10})			
Federal 24 Hr > 150 µ/m^3	0	0	0
State 24 Hr > 50 µ/m^3	0	1	0
State Ann > 20 µ/m^3	0	0	0
Max 24 Hr Conc (µ/m^3)	41	59	35
Max Ann Hr Conc (µ/m^3)	13.7	15.7	12.6

Source: BAAQMD 2013
Units/Acronyms: ppm – parts per million, µ/m^3 - micrograms per cubic meter, Hr – hour, Ann – annual, Conc – concentration

4.4.2 REGULATORY SETTING

Federal and State laws that may be relevant to the Project are identified in Table 4-1. Regional and local laws, regulations, and policies are discussed below.

Bay Area Air Quality Management District

The BAAQMD implements federal and state air quality programs and regulations, and maintains a comprehensive program of planning, enforcement, technical innovation, and promotion of the understanding of air quality issues. The clean air strategy of the BAAQMD includes the preparation of plans for the attainment of ambient air quality standards, adoption and enforcement of rules and regulations concerning sources of air pollution, and issuance of permits for stationary sources of air pollution. .

In 2009, the BAAQMD released an update to its California Environmental Quality Act (CEQA) Guidelines. This is an advisory document that provides the lead agency, consultants, and project applicants with uniform procedures for addressing air quality in environmental documents. The handbook contains the following applicable components: criteria and thresholds for determining whether a project may have a significant adverse air quality impact; specific procedures and modeling protocols for quantifying and analyzing air quality impacts; methods available to mitigate air quality impacts; and information for use in air quality assessments and environmental documents that will be updated more frequently such as air quality data, regulatory setting, climate, and topography.

The BAAQMD has also established a climate protection program to reduce pollutants that contribute to global climate change and affect air quality. The climate protection program includes measures that promote energy efficiency, reduce vehicle miles traveled, and develop alternative sources of energy. In May 2012, the BAAQMD released updated CEQA Guidelines, requiring that the effects of climate change be addressed in CEQA documents. The CEQA Guidelines: (1) specify a threshold of significance for operations-related GHG emissions of 10,000 MT of CO_2e per year, (2) discuss how the BAAQMD established the thresholds of significance, (3) recommend that CEQA documents include a discussion of a project's GHG emissions from construction and operation, and (4) discuss GHG impact assessment and mitigation measures available. On March 5, 2012, the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the new thresholds, and the BAAQMD appealed. On August 14, 2013, the court reinstated the guidelines; however, additional appeals may ensue.

Contra Costa County

The Contra Costa County General Plan includes goals to improve air quality, including meeting federal air quality standards, supporting efforts to reduce air pollution, restoring

air quality to a more healthful level, and reducing the percentage of traffic trips at peak hours.

4.4.3 EMISSIONS INVENTORY

4.4.3.1 Baseline Condition Annual Emissions

Emissions Sources

The leased portion of the Amorco Terminal has the following emissions sources: (1) engines on ocean-going vessels (OGV); (2) displacement of VOCs during ballasting; (3) fugitive emissions from components such as pumps, valves, flanges, and pressure relief devices; and (4) diesel generators for fire pumps, when operational. The Amorco Terminal is an unloading-only facility; therefore it does not have a vapor control system, which would be required for the control of emissions from loading crude or other high-vapor-pressure products into OGV. The Amorco Terminal operates under a BAAQMD Title V Operating Permit, which includes the Golden Eagle Refinery (Refinery) (BAAQMD Facility #B2758) and the Amorco Terminal (BAAQMD Facility #B2759). Condition #22455, Part 11 of the Permit prohibits the shipment of crude oil from the Amorco Terminal.

Crude oil unloaded from OGV is piped into one of the five crude oil storage tanks at the Amorco Tank Farm. Each storage tank is designed with an external floating roof to minimize atmospheric emissions. The tanks are located onshore and are not part of the Project; therefore, such emissions are not considered in the baseline or life-of-lease assessments. Emissions from these tanks are primarily driven by atmospheric pressure conditions (weather) and are not expected to change over the life of the lease.

Because the facility is already operational, emissions such as worker commutes are already part of baseline/existing conditions, and, because these emissions are not expected to change, they were not considered in the baseline or life-of-lease analyses.

Vessels

OGV (Including tankers and barges) that call on the Amorco Terminal contribute indirectly to emissions associated with Amorco Terminal operations. These emissions are generated from the combustion of fuel oil by the vessel engines and generators as they travel, as well as emissions from auxiliary engines and boilers used to provide the necessary electrical and accessory power while the OGV are “hoteling” at the wharf.

Crude Oil Ballasting

Ballasting is the practice of loading one or more cargo tank compartments with seawater after the cargo has been offloaded. Ballast water intake allows an OGV to adjust the depth below surface of the ship hull, thus increasing stability and making the OGV less vulnerable to waves and winds. During a ballasting operation, VOCs are

emitted into the atmosphere as the vapors from nonsegregated tanks are displaced with ballast water. BAAQMD Regulation 8 Rule 44, Marine Tank Vessel Operations, specifies the following requirements for ballasting operations:

- limit VOC emissions to less than 5.7 g/m^3 (2 pounds per 1,000 barrels) loaded;
- reduce VOC emissions by 95 percent by weight; and
- control ballasting emissions with segregated ballast tanks, dedicated clean ballast tanks, internal vapor balancing, and compression ballasting.

These requirements are specifically referenced in the Permit on Table VII–D.1, Applicable Limits and Compliance Monitoring Requirements.

Fugitives (Pumps, Valves, Flanges)

There are numerous pipelines associated with the Amorco Terminal that transport crude oil from the OGV to on-site storage tanks. The pumps, valves, flanges, and connectors along the pipelines are potential sources of fugitive emissions of VOC and methane. The leakage from these components is a function of the liquid being transported; condition of the components; and other variables such as pressure, vibration, heat, friction, and corrosion. Fugitive VOC emissions are estimated using the Correlation Equation Method from the *California Implementation Guidelines for Estimating Mass Emissions of Fugitive Hydrocarbon Leaks at Petroleum Facilities* issued by the California Air Pollution Control Officers Association and CARB. Fugitives are tracked in a Leak Detection and Repair (LDAR) database as part of the Amorco Terminal's compliance obligations under BAAQMD Regulation 8 Rule 18. The 2013 VOC emissions from fugitive components at the Amorco Terminal were 15.069 pounds per year.

4.4.3.2 Baseline Emissions

Maximum throughput for both the Refinery and Amorco Terminal are limited by the BAAQMD Title V Operating Permit. The Refinery is permitted for a maximum annual throughput of 63,875,000 barrels, and the Terminal is limited to 70,080,000 barrels on a rolling 12-month basis. The level of actual throughput received at the Amorco Terminal over the period from 2008 through 2012 has ranged between a low of 16,900,791 barrels and 53 vessel calls in 2010 to a high of 26,859,593 barrels and 85 vessel calls in 2008. The 2008 maximum of 85 annual vessel calls was assumed for the baseline of this assessment. This is well below the permitted throughput, which would correspond to approximately 194 vessels (with an individual cargo of 360,000 barrels each).

The 2008 vessel call quantity was conservatively chosen as a representative baseline because the intervening years may have been impacted by the decline in the overall economy and gasoline usage. As noted in Section 2.4.7, marine shipments of crude oil and demands for refinery products are expected to continue at a similar or slightly

increased rate as seen in previous years, and the level of shipping activity to the Amorco Terminal is not expected to change substantially during the proposed 30-year lease agreement period, with an expected range of 60 to 90 vessels per year.

The Amorco Terminal emissions are regulated as part of the BAAQMD Title V Operating Permit for the Refinery. The Amorco Terminal emissions are included in the Refinery Emissions Clean Air Plan (CAP)~~, as specified in Permit Condition Number 8077~~. Pollutants regulated include carbon monoxide, nitrous oxides, hydrocarbons, sulfur dioxide, and particulate matter. The CAP is based on both annual and monthly maximum emissions from all Refinery operations. As long as Tesoro Refining and Marketing Company, LLC (Tesoro) complies with the CAP in total, even if emissions from the Amorco Terminal increase, the permit will not be considered to be violated.

In addition to regulating emissions, the Permit prescribes the calculation methodology to be used to quantify emissions from OGV. The methodology is contained in Condition 878 of the Permit as well as in Appendix B. The analysis presented herein conforms to the methods prescribed in the Permit. The calculation methodology in the Permit was reviewed as part of the recent renewal of the Permit and is current as of June 2011.

Table 4.4-2 presents the ship emissions for a single OGV call, based on the methodology prescribed in the Permit, for the 2008 baseline year.

Table 4.4-2: Emissions per OGV (pounds unless indicated)

Activity	VOC	SO_2	NOx	CO	PM_{10}	$PM_{2.5}$
Transit	157.87	1,012.22	1766.44	273.87	96.26	39.23
Maneuvering	105.25	674.81	1,177.63	182.58	64.18	26.16
Hoteling	90.47	1,324.51	977.51	149.99	98.28	20.54
Boiler	50.78	5,164.61	789.52	49.92	311.22	133.52
Tugs (2)	26.20	141.32	1,151.54	114.72	50.40	16.44
Total	**430.58**	**8,317.47**	**5,862.64**	**764.07**	**620.34**	**235.89**
Total (tons)	**0.22**	**4.16**	**2.93**	**0.38**	**0.31**	**0.12**

To conservatively estimate emissions, the following assumptions were used:

- large OGV (>180,000 deadweight tons) were assumed to call;
- a total travel distance of 31 miles, beginning 11 miles west of the Golden Gate Bridge, was assumed for the transit distance, and a total transit time of 3 hours was assumed for each direction;
- two hours of maneuvering time were included for incoming and outgoing OGV and added to the total transit time;

- each OGV was assumed to require two tugs for a total of 4 hours per tug for each direction; and
- each tanker was assumed to hotel at the Amorco Terminal for 20 hours.

4.4.3.3 Lease Period Emissions

Table 4.4-3 presents the emissions from the baseline year (85 OGV) as compared with the annual level expected during the 30-year lease agreement period (90 OGV, the maximum expected annually; refer to Section 2.4.7). The BAAQMD established significance thresholds for VOC, NOx, and PM_{10} in its 1999 Guidance Document for CEQA. The significance threshold for each of these criteria pollutants is an incremental increase of 15 tons/year and 88 pounds/day. As shown on Table 4.4-3, the annual significance thresholds are not expected to be exceeded.

Table 4.4-3: 2008 Baseline Year Compared with Anticipated Lease-Period Annual Emissions (tons)

Source	VOC		SO_2		NO_x		CO		PM_{10}		$PM_{2.5}$	
	2008	Lease Period	2008	Lease Period	2008	Lease Period	2008	Lease Period	2008	Lease Period	2008	Lease Period
OGV	18.30	19.38	353.49	374.29	249.16	263.82	32.47	34.38	26.36	27.92	10.03	10.61

Maximum daily emissions from the Amorco Terminal will not increase because the Amorco Terminal can only handle one OGV at a time, and typically, OGV are docked at the Amorco Terminal between 20 and 30 hours. On June 2, 2010, the BAAQMD adopted new thresholds of significance to assist in the review of projects under CEQA. On March 5, 2012 the Alameda County Superior Court issued a judgment finding that the BAAQMD had failed to comply with CEQA when it adopted the new thresholds, and the BAAAQMD appealed. Until the appeal is resolved, agencies will continue to rely upon the 1999 thresholds.

4.4.3.4 Baseline GHG Emissions

The baseline GHG impact of the Amorco Terminal was established, in part, in the 2010 BAAQMD GHG Emitting Facilities Report. The BAAQMD report contains all CO_2e emissions by facility within the BAAQMD's jurisdiction. This report identifies the GHG emissions from the Amorco Terminal separately from the Refinery. The Refinery GHG emissions were reported as 3,056,697 metric tons/year, and the Amorco Terminal is listed as 8 metric tons/year. The relatively low Amorco Terminal GHG emissions indicate that the indirect OGV emissions were not included in the calculation. The

baseline emissions presented here will, therefore, comprise the sum of the non-OGV emissions presented in the 2010 BAAQMD GHG Report and OGV GHG emissions calculated herein, based upon baseline 2008 figures. (The difference in non-OGV emissions between the 2008 and 2010 throughput is assumed to be negligible.)

OGV operations at the Amorco Terminal would generate quantifiable emissions of carbon dioxide, methane, and nitrous oxides. Other recognized GHG emission sources, such as refrigerants, are not relevant to the Amorco Terminal. GHG emissions from OGV were calculated using the quantity of fuel specified in the BAAQMD Permit. CO_2e emissions were calculated using fuel usage data for engine types and emission factors for CH_4 and N_2O on a gram/kilowatt-hour basis as developed by the CARB and the Port of Long Beach. These were converted to CO_2e emissions per unit of fuel burned by applying the Global Warming Potentials factors of 21 for CH_4 and 310 for N_2O. The assumptions used for OGV calls regarding distances and time in each activity were the same as for the air pollutants presented above. Table 4.4-4 contains the estimated GHG emissions for the baseline and anticipated future OGV call cases.

Table 4.4-4: Inventory Summary of GHG Emissions

Source	CO_2e MT/Year[1]	
	Baseline (2008)	**Anticipated Future Annual**
Ballast emissions	0	0
Amorco Terminal operations other than OGV calls[2]	8.02	8.49
Vessel transit to Amorco Terminal vicinity	4,313.80	4,567.56
Maneuvering	2,965.23	3,139.65
Hoteling—main diesel engine	2,228.83	2,359.94
Hoteling—fuel oil	2,229.67	2,360.83
Boiler—unloading	14,638.29	15,499.37
Tug boats (2)	2,053.00	2,053.00
Total Emissions:	**28,428.82**	**30,101.10**

[1]CO_2-equivalent metric tons/year

[2]Other operations include fugitive emissions, tank emissions, fire pump testing. Emissions were scaled up by ratio of 90/85 vessel calls to account for potential increases in tank emissions based on throughput.

4.4.4 IMPACT ANALYSIS

4.4.4.1 Significance Criteria

For the purposes of this analysis, an impact was considered to be significant and to require mitigation if it would result in any of the following:

- Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation
- Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors
- Expose sensitive receptors to substantial pollutant concentrations
- Create objectionable odors affecting a substantial number of people
- Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction

4.4.4.2 Assessment Methodology

Impacts of the proposed project on air quality and GHG emissions were assessed by comparing baseline conditions to anticipated changes from future Project operation during the proposed 30-year lease period. Impacts were quantified to the extent feasible, using the methods and data presented in Section 4.4.3.

4.4.4.3 Impacts Analysis and Mitigation Measures

The following subsections describe the Project's potential impacts on air quality and GHG emissions. Where impacts are determined to be significant, feasible mitigation measures are described that would reduce or avoid the impact.

Proposed Project

Impact Air Quality (AQ)-1: Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation. (Less than significant.)

Measured and calculated criteria pollutant emissions are limited by the CAP included in the BAAQMD-issued Title V Operating Permit encompassing the Refinery and the Amorco Terminal. By virtue of the Permit, continued operation of the Amorco Terminal up to the permitted throughput levels would not result in significant air quality emission impacts, because the limits set by the BAAQMD were determined to be sufficient to render these emissions less than significant. As discussed in Section 4.3.3, recent years indicate that the Amorco Terminal use is well below its BAAQMD-permitted limit, and is expected to be so over the proposed lease period.

Indirect contributions to Amorco Terminal emissions include OGV transit, hoteling, pumping, and tugboat operations that are not subject to explicit Permit conditions; however, they are calculated as prescribed by BAAQMD and are considered part of the

overall emissions of the facility. As presented in Section 4.3.3, the BAAQMD significance thresholds established in its 1999 Guidance Document for CEQA for VOCs, NOx, and PM_{10} are not expected to be exceeded; thus, the impact of continued Amorco Terminal operations would be less than significant.

Mitigation Measure: No mitigation required.

Impact AQ-2: Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors. (Less than significant.)

As discussed in Section 4.4.1.4, the Project region is currently in non-attainment for ozone, PM_{10}, and $PM_{2.5}$. Table 4.4-3 shows the calculated anticipated annual increase in emissions for PM_{10} and VOCs (which are a precursor to ozone) under the proposed Project lease. The BAAQMD significance thresholds established in its 1999 Guidance Document for CEQA for VOCs and PM_{10} ($PM_{2.5}$ is not currently subject to a CEQA threshold) are not expected to be exceeded; thus, the net increase in emissions from these criteria pollutants is not considered to be significant.

Mitigation Measure: No mitigation required.

Impact AQ-3: Expose sensitive receptors to substantial pollutant concentrations. (Less than significant.)

The Amorco Terminal is located in an industrialized area. The nearest residence is located to the southwest of the Amorco Terminal and is greater than 4,000 feet from the wharf. Because the Amorco Terminal and its operations have been permitted through the BAAQMD, the requirements for potential exposure for sensitive receptors have already been satisfied; necessary hazardous and toxic air modeling to evaluate impacts to sensitive receptors, as well as necessary contingency measures, are part of the BAAQMD permitting process. The impact of ongoing Project operations is, therefore, less than significant.

Mitigation Measure: No mitigation required.

Impact AQ-4: Create objectionable odors affecting a substantial number of people. (Less than significant.)

The primary sources of odors at the Amorco Terminal would be fugitive VOC emissions from wharf components and from crude oil in aboveground storage tanks. As discussed in Section 4.3.3.1, the tanks are located onshore and are not part of the proposed lease extension Project, but in any case, emissions from these tanks are primarily driven by atmospheric pressure conditions (weather) and are not expected to change over the life

of the lease. No sensitive receptors are located in the immediate area, and odors have not been historically reported. Therefore, the impact is less than significant.

Mitigation Measure: No mitigation required.

Impact GHG-1: Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction. (Less than significant.)

The inventory of annual GHG emissions, currently and under the proposed lease, is presented in Table 4.4-4. GHG emissions from the Amorco Terminal during the lease period will not increase by greater than 10,000 MT annually, as proposed in the updated 2012 BAAQMD CEQA guidelines; therefore, the impact is less than significant.

Mitigation Measure: No mitigation required.

Alternative 1: No Project

Impact AQ-5: Create air quality impacts during decommissioning of the Amorco Terminal or by the transfer of operations to other Bay Area terminals. (Less than significant.)

Under the No Project Alternative, the Amorco Terminal lease would not be renewed, and the existing Amorco Terminal would be subsequently decommissioned with its components abandoned in place, removed, or a combination thereof.

Decommissioning would likely be accomplished primarily via the water, with materials, other than those that can be used at the Refinery, taken away via barge. The activity would require heavy equipment to be used in the demolition of the wharf and related structures. Emissions from demolition activities would be less than significant provided all feasible dust implementation measures and emissions controls in regulations and guidance are followed.

After decommissioning, Amorco Terminal operations would cease and emission sources at the Project site would be eliminated. However, for the air basin as a whole, operations would be transferred to other Bay Area marine terminals. Increases to meet regional demand would be subject to review by the BAAQMD to determine whether the increase in operations would be in compliance with permitting.

Mitigation Measure: No mitigation required.

Impact AQ-6: Impact air quality during construction or operation of rail facilities or additional trucking. (Less than significant.)

Non-marine supplies of crude oil would likely come from re-purposing existing terminal operations in the Bay Area or by constructing additional facilities to handle crude oil by railcar or by truck. The Refinery has existing rail facilities that would need to be expanded to receive a large quantity of crude oil by rail. Expansion of the existing rail capability and a proposal to increase crude by rail deliveries would be subject to BAAQMD permitting and CEQA review. Deliveries would occur via unit trains of approximately 105 railcars capable of delivering approximately 73,500 barrels per unit train. It is anticipated that up to one unit train per day could be unloaded with an expanded railcar handling facility. This would equate to approximately 26.8 million barrels of crude per year, which is less than the amount of crude that would be received under the annual average case for the Amorco Terminal. Therefore, additional sources of crude oil would be required either from other Bay Area terminals or additional non-marine sources such as trucks.

Air quality emissions from delivery by railcar are lower than air quality emissions from OGV on a pounds/barrel crude delivered basis. However, railcar emissions are land-based, and locomotives may emit criteria and toxic pollutants, including diesel particulate emissions, in closer proximity to populations and sensitive receptors than do OGV. In addition, there may be other direct and indirect air quality impacts associated with increased railcar deliveries, such as energy generation to meet the power requirements to unload and transfer crude oil and additional vehicle-idling emissions from transportation delays caused by the frequent unit trains impacting rail crossings.

Receipt of crude oil via tanker truck would have the adverse air quality impact of emissions from the tanker trucks, each of which can only deliver approximately 200 barrels of crude oil. This would require placing 350 tanker trucks on the road for every unit train delivery of crude oil that is received at locations outside the Refinery. However, air quality emissions from delivery by tanker trucks would be lower than air quality emissions from OGV.

Construction of new pipelines to transfer crude oil to the Refinery from existing terminals would also be subject to CEQA review and BAAQMD permitting to ensure the terminals would be operating in accordance with existing BAAQMD permits and regulations. Any new pipeline construction would result in short-term air quality impacts associated with construction equipment.

Any beneficial impact from non-marine supplies of crude oil would primarily be associated with the OGV emissions and would not result in a significant local benefit beyond the vicinity of the wharf and along the OGV route to the Amorco Terminal. Localized benefits would be offset by potential increases in exposures to sensitive receptors along rail and truck routes and increased impacts at other Bay Area marine or rail terminals.

Mitigation Measure: No mitigation required.

Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport

Impact AQ-7: Create air quality impacts by the transfer of operations to other Bay Area terminals. (Less than significant.)

With a restricted lease, the operations associated with the Amorco Terminal would cease, resulting in elimination of all emission sources at the Project site. However, for the air basin as a whole, operations would be transferred to other Bay Area marine terminals. Increases to meet regional demand would be subject to review by the BAAQMD to determine whether the increase in operations would be in compliance with permitting.

Mitigation Measure: No mitigation required.

Impact AQ-8: Impact air quality during construction or operation of rail facilities or additional trucking. (Less than significant.)

See Impact AQ-6.

Mitigation Measure: No mitigation required.

Cumulative Impact Analysis

The 1999 BAAQMD CEQA Guidelines state that:

> *"Any proposed project that would individually have a significant air quality impact … would also be considered to have a significant cumulative air quality impact. For any project that does not individually have significant operational air quality impacts, the determination of significant cumulative impact should be based on an evaluation of the consistency of the project with the local general plan and of the general plan with the regional air quality plan.*
>
> *When a project is proposed in a city or county with a general plan that is consistent with the CAP and the project is consistent with that general plan (i.e., it does not require a general plan amendment), then the project will not have a significant cumulative impact (provided, of course, the project does not individually have any significant impacts). No further analysis regarding cumulative impacts is necessary."*

The proposed Project does not have an individually significant air quality impact. Section 21.51 of the City of Martinez General Plan adopted in 1973 states: "Expansion of the petroleum refining and related industries must proceed in an orderly fashion and

be consistent with protection of the community's air, water, scenic and fiscal resources." The lease period does not involve the expansion of the existing Amorco Terminal and no construction is associated with the Project; therefore, the Project is consistent with the general plan and would not be considered to have a cumulative significant impact.

The city of Martinez is currently updating its general plan. The new general plan will cover the following elements (or topics): Land use, circulation, housing, conservation, open space, noise, and safety. In addition, the new general plan will be fully integrated and in conformance with the State's climate action planning requirements.

From the standpoint of GHG emissions, as discussed in Impact GHG-1, the incremental increase in emissions under the proposed lease falls below the BAAQMD's significant threshold. Therefore, although the Project contributes to overall GHG emissions in the environment, its cumulative effect is less than significant.

4.4.5 SUMMARY OF FINDINGS

Table 4.4-5 includes a summary of anticipated impacts to air quality and associated mitigation measures.

Table 4.4-5: Summary of Air Quality Impacts and Mitigation Measures

Impact	Mitigation Measure(s)
Proposed Project	
AQ-1: Conflict with or obstruct implementation of an applicable air quality plan, permit, or standard, or create an air quality violation.	No mitigation required.
AQ-2: Result in a considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or State ambient air quality standard, including releasing emissions that exceed quantitative thresholds for ozone precursors.	No mitigation required.
AQ-3: Expose sensitive receptors to substantial pollutant concentrations.	No mitigation required.
AQ-4: Create objectionable odors affecting a substantial number of people.	No mitigation required.
GHG-1: Generate GHG emissions, either directly or indirectly, that conflict with an applicable plan, policy, or regulation adopted for the purposes of GHG reduction.	No mitigation required.

Impact	Mitigation Measure(s)
Alternative 1: No Project	
AQ-5: Create air quality impacts during decommissioning of the Amorco Terminal or by the transfer of operations to other Bay Area terminals.	No mitigation required.
AQ-6: Impact air quality during construction or operation of rail facilities or additional trucking.	No mitigation required.
Alternative 2: Restricted Lease Taking Amorco Out of Service for Oil Transport	
AQ-7: Create air quality impacts by the transfer of operations to other Bay Area terminals.	No mitigation required.
AQ-8: Impact air quality during construction or operation of rail facilities or additional trucking.	No mitigation required.

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