3.2 AIR POLLUTANT EMISSIONS

3.2.1 Regional Overview

The proposed Project is located within the South Coast Air Basin (SCAB) offshore from southern Los Angeles County, and falls under the jurisdiction of the South Coast Air Quality Management District (SCAQMD) as the Corresponding Onshore Area (COA) pursuant to Section 328(a)(3) of the Clean Air Act and 40 CFR 55 Outer Continental Shelf Air Regulations. Since the Project area lies outside the 3-nautical mile (3.45 statute mile) State Waters Boundary, state-only air quality regulations do not apply to the proposed Project.

The Project area has a Mediterranean climate that is characterized by mild winters and warm, dry summers. The influence of the Pacific Ocean causes mild temperatures year-round along the coast, while inland areas experience a wider range of temperatures. Precipitation is confined primarily to winter months. Rainfall records for the region reveal that more than 92 percent of the average monthly precipitation falls during the six-month period of November through April. As shown in Table 3.2-1, the average annual precipitation in Long Beach for the period of 1949 to 2016 was 12.01 inches. Table 3.2-2 provides a summary of weather conditions onshore within the vicinity of the Project area in Long Beach.

Table 3.2-1. Average Monthly Precipitation Recorded at Long Beach Daugherty Field (January 1949 to June 2016)

Precipitation	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec	Total
Inches	2.63	2.90	1.83	0.70	0.20	0.06	0.02	0.06	0.19	0.42	1.21	1.80	12.01

Source: Western Regional Climate Center (WRCC), 2017

Table 3.2-2. Average Onshore Weather Temperatures at Long Beach WSCMO - Station 045085 (1958 to 2012)

Parameter	Value (Average) °F
Monthly Average Maximum Temperature	67.0 - 83.9
Monthly Average Minimum Temperature	45.3 - 64.9
Monthly Average	56.1 - 74.4

Source: Western Regional Climate Center (WRCC), 2017

The regional climate within the Project vicinity is dominated by a strong and persistent high-pressure system, the Pacific High, which frequently lies off the Pacific Coast. The Pacific High shifts northward or southward in response to seasonal changes or the presence of cyclonic storms. In its usual position to the west, the Pacific High contributes to an elevated temperature inversion.

An inversion is characterized by a layer of warmer air above cooler air near the ground surface. Normally, air temperatures decrease with altitude, however in an inversion the

temperature of the air increases with altitude. The inversion acts like a lid on the cooler air mass near the ground, preventing pollutants in the lower air mass from dispersing upward beyond the inversion "lid." This phenomenon results in higher concentrations of pollutants trapped below the inversion. This weather pattern is intensified by mountain ranges that surround the SCAB which constrain the horizontal movement of air and inhibit the dispersion of air pollutants out of the region.

Airflow plays a significant role in the dispersal of pollutants. Local winds are normally controlled by the location of the Pacific High. Typical wind speeds in the area are generally light, which is another factor that contributes to higher concentrations of pollutants because low wind speeds minimize dispersion of pollutants. The sea breeze comes from the west and southwest, which blows air from the coastline eastward and inland, i.e., onshore flow. This weather pattern tends to blow pollution from the coastline inland, which then becomes trapped in the inversion discussed above, contributing to the poor air quality in the SCAB. When the Pacific High weakens, a Santa Ana condition can develop with air traveling westward toward the coast from the warmer desert regions eastward, i.e., offshore flow. Santa Ana winds can flush the basin and inversion of pollution, however stagnant air often occurs following a Santa Ana condition, causing a buildup of pollutants offshore that are transported back into the basin when the normal onshore flow returns.

3.2.2 Affected Environment

Air quality in Southern California has improved remarkably since the 1970s, which is a direct result of implementing the comprehensive, multiyear Air Quality Management Plan (AQMP) to reduce air pollution from all sources. While air quality has dramatically improved over the years, the basin still exceeds Federal public health standards for both ozone (O_3) and particulate matter (PM) and experiences some of the worst air pollution in the nation (SCAQMD, 2017). The SCAB's air pollution problems are a consequence of the combination of emissions from the nation's second largest urban area, meteorological conditions adverse to the dispersion of the emissions, and mountainous terrain surrounding the basin that traps pollutants as they are pushed inland with the sea breeze (SCAQMD, 2017).

3.2.2.1 Criteria Pollutants

Criteria air pollutants are those contaminants for which State and Federal ambient air quality standards have been established for the protection of public health and welfare. Criteria pollutants include: Carbon monoxide (CO), O_3, oxides of nitrogen (NO_x), sulfur dioxide (SO_2), particulate matter with a diameter of 10 microns or less (PM_{10}) and particulate matter with a diameter of 2.5 microns or less ($PM_{2.5}$) as further described below.

Ozone (O_3). Ozone (O_3) is formed in the atmosphere through a series of complex photochemical reactions involving oxides of nitrogen (NO_x), reactive organic gases (ROG) (also known as ROCs or reactive organic compounds), and sunlight occurring over several hours. Since ozone is not emitted directly into the atmosphere, but is formed as a result of photochemical reactions, it is classified as a secondary or regional pollutant. Because these ozone-forming reactions take time, peak ozone levels are often found downwind of major source areas. Ozone

is considered a respiratory irritant and prolonged exposure can reduce lung function, aggravate asthma, and increase susceptibility to respiratory infections. Children and those with existing respiratory diseases are at greatest risk from exposure to ozone.

Carbon Monoxide (CO). Carbon monoxide (CO) is primarily formed through the incomplete combustion of organic fuels. Higher CO values are generally measured during winter when dispersion is limited by morning surface inversions. Seasonal and diurnal variations in meteorological conditions lead to lower values in summer and in the afternoon. CO is an odorless, colorless gas. CO affects red blood cells in the body by binding to hemoglobin and reducing the amount of oxygen that can be carried to the body's organs and tissues. CO can cause health effects to those with cardiovascular disease, and can also affect mental alertness and vision.

Nitric Oxide (NO). Nitric oxide (NO) is a colorless gas formed during combustion processes which rapidly oxidize to form nitrogen dioxide (NO_2) a brownish gas. The highest NO_2 values are generally measured in urbanized areas with heavy traffic. Exposure to NO_2 may increase the potential for respiratory infections in children and cause difficulty in breathing even among healthy persons and especially among asthmatics.

Sulfur Dioxide (SO_2). Sulfur dioxide (SO_2) is a colorless, reactive gas that is released from the burning of sulfur-containing fuels such as coal and oil, and by other industrial processes. Generally, the highest concentrations of SO_2 are found near large industrial sources. SO_2 is a respiratory irritant that can cause narrowing of the airways, leading to wheezing and shortness of breath. Long-term exposure to SO_2 can cause respiratory illness and aggravate existing cardiovascular disease.

Particulate Matter (PM). Ambient air quality standards have been set for two classes of particulate matter: PM_{10} (coarse particulate matter less than 10 microns in aerodynamic diameter) and $PM_{2.5}$ (fine particulate matter 2.5 microns or less in aerodynamic diameter). Both consist of different types of particles suspended in the air, such as: metal, soot, smoke, dust and fine mineral particles. Depending on the source of particulates, toxicity and chemical activity can vary. Particulate matter is a health concern because when inhaled it can cause permanent damage to the lungs. The primary source of PM_{10} emissions appears to be soil suspended in the air caused by vehicle traffic, construction, agriculture, and wind. Other sources of PM_{10} include sea salt, particulate matter released during combustion processes, such as those in gasoline or diesel vehicles, and wood burning. Fugitive emissions from construction sites, wood stoves, fireplaces and diesel truck exhaust are primary sources of $PM_{2.5}$. Both sizes of particulates can be dangerous when inhaled, however $PM_{2.5}$ tends to be more damaging because it remains in the lungs once it is inhaled.

3.2.2.2 Local Air Quality

The air quality of Los Angeles County is monitored by 16 stations, with the nearest ambient air quality monitoring station located in South Long Beach, approximately 10 miles north of the Project site. Air quality data from this station is not available for all parameters; air quality data from the SCAB is presented in Table 3.2-3. As shown in Table 3.2-3, ozone concentrations monitored in the SCAB periodically exceed the State and Federal standards, with the State 1-

hour ozone standard exceeded an average of 57 days per year from 2014 through 2016. In addition, the Federal 24-hour $PM_{2.5}$ standard is periodically exceeded.

Table 3.2-3. Nonattainment Air Quality Summary (South Coast Air Basin)

Parameter	Standard	Year		
		2014	2015	2016
Ozone (O_3) - parts per million				
Maximum 1-hour concentration monitored (ppm)		0.141	0.144	0.163
Number of days exceeding State 1-hour standard	0.09 ppm	50	52	70
Maximum Federal 8-hour concentration monitored	0.07 ppm	0.110	0.127	0.121
Particulate Matter less than 2.5 microns ($PM_{2.5}$) - micrograms per cubic meter				
Federal maximum 24-hour standard	35 $\mu g/m^3$	73.6	70.3	58.8
Estimated days exceeding Federal standard	35 $\mu g/m^3$	*	17.6	7.3

Source: CARB, 2017a.
Notes: *Insufficient (or no) data available to determine the value

3.2.3 Regulatory Overview

Section 328 of the Clean Air Act Amendments (CAAA) of 1990 transferred authority to regulate stationary sources of air pollution on the Pacific Outer Continental Shelf (OCS) from the Minerals Management Service (MMS) to the United States (U.S.) Environmental Protection Agency (EPA). Section 328 of the Act required that the EPA establish requirements to control air pollution from Pacific OCS sources located within 25 nautical miles (28.8 statute miles) of the State's seaward boundaries that were the same as onshore requirements. The EPA promulgated 40 Code of Federal Regulation (CFR) Part 55 requiring Pacific OCS sources to be in full compliance with provisions of the OCS Air Regulations. The EPA designated applicable onshore air agencies as the Corresponding Onshore Area (COA) for purposes of establishing requirements to control air pollution from Pacific OCS sources to attain and maintain Federal and State ambient air quality standards. The SCAQMD is responsible for regulating stationary sources of air pollution within Los Angeles County. The SCAQMD is the COA for the proposed Project.

Table 3.2-4 provides a summary of applicable National and California Ambient Air Quality Standards, NAAQS and CAAQS, respectively. As of February 2016, the SCAB meets State and National standards for CO, NO_2 and SO_2, i.e., attainment. The basin is in nonattainment of the National and State standards for ozone and 2.5-micron particulate matter ($PM_{2.5}$). For 10-micron particulate matter (PM_{10}), the basin is in attainment of the National standard but nonattainment of the State standard.

3.2.3.1 Federal Regulations

Federal Clean Air Act (CAA). The Clean Air Act (CAA) was first enacted in 1955 and has been amended numerous times in subsequent years (1963, 1965, 1967, 1970, 1977, and

1990). The CAA establishes Federal air quality standards, known as NAAQS, and specifies future dates for achieving compliance, i.e., attainment. The CAA delegates enforcement of the Federal standards to the State. In California, the California Air Resources Board (CARB) is responsible for enforcing air pollution regulations. The CARB, in turn, delegates the responsibility of regulating stationary emission sources to local air districts. In the SCAB, the SCAQMD has this responsibility. The CAA also mandates that the State submit and implement a State Implementation Plan (SIP) for local areas not meeting those standards, i.e., nonattainment areas. The SIP must include pollution control measures that demonstrate how the standards will be met. Under the CAA, states can establish ambient air quality standards that are no less stringent than NAAQS.

Table 3.2-4. National and State Ambient Air Quality Standards

Pollutant	Averaging Time	CAAQS[1]	NAAQS[2]
Ozone (O_3)[3]	1 hour 8 hour	0.09 ppm 0.070 ppm	-- 0.070 ppm
Carbon Monoxide (CO)	1 hour 8 hour	20 ppm 9.0 ppm	35 ppm 9 ppm
Nitrogen Dioxide (NO_2)[4]	1 hour Annual	0.18 ppm 0.030 ppm	0.100 ppm 0.053 ppm
Sulfur Dioxide (SO_2)[5]	1 hour 3 hour 24 hour Annual	0.25 ppm -- 0.04 ppm --	0.075 ppm -- 0.14 ppm 0.030 ppm
Respirable Particulate Matter (PM_{10})[6]	24 hour Annual	50 µg/m^3 20 µg/m^3	150 µg/m^3 --
Fine Particulate Matter ($PM_{2.5}$)[6]	24 hour Annual	-- 12 µg/m^3	35 µg/m^3 12.0 µg/m^3

Source: CARB, 2017b.
Notes:

1 California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, and particulate matter (PM_{10}, $PM_{2.5}$, and visibility reducing particles), are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.

2 National standards (other than ozone, particulate matter, and those based on annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration measured at each site in a year, averaged over three years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg /m^3 is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the U.S. EPA for further clarification and current national policies.

3 On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.

4 To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrate ions at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the

national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.

5 On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.

6 On December 14, 2012, the national annual $PM_{2.5}$ primary standard was lowered from 15 µg/m3to 12.0 µg/m3. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m3, as was the annual secondary standard of 15 µg/m^3. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m3 also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

The 1990 amendments to the CAA identify specific emission-reduction goals for areas not meeting the NAAQS. These amendments require both a demonstration of reasonable further progress toward attainment and incorporation of additional sanctions for failure to attain or meet interim milestones. The sections of the CAA that would most substantially affect the development of the proposed Project include Title I (Nonattainment Provisions) and Title II (Mobile-Source Provisions).

Title I provisions were established with the goal of attaining the NAAQS for criteria pollutants. The NAAQS were amended in July 1997 to include an 8-hour standard for O_3 and adopt a NAAQS for fine particulate matter ($PM_{2.5}$). Most recently, in October of 2015 the final rule was signed, which revoked the 2008 8-hour 0.075 ppm standard for O_3 while transitioning to the current 2015 0.070 ppm standard.

Non-Road Diesel Fuel Rule. In May 2004, the EPA set sulfur limits for non-road diesel fuel, including marine vessels (excluding residual fuel used by ocean going vessels). Under this rule, diesel fuel was limited to low sulfur (500 parts per million by weight [ppmw]) starting June 1, 2007 and ultra-low sulfur (ULS, 15 ppmw) starting January 1, 2012 (USEPA, 2017). The California Diesel Fuel Regulations (described below) are generally more stringent than this rule for non-road mobile sources, such as switch yard locomotives, construction equipment, terminal equipment, and harbor craft. Notwithstanding refinery location, fuel suppliers in California must meet the most stringent diesel fuel specifications, whether Federal or State.

3.2.3.2 State Regulations

California Clean Air Act. The CARB is responsible for implementing the requirements of the Federal CAA, regulating emissions from motor vehicles and consumer products, and implementing the California Clean Air Act of 1988 (CCAA). The CCAA outlines a program to attain the CAAQS for O_3, NO_2, SO_2, and CO by the earliest practical date. Since the CAAQS are generally more stringent than the NAAQS, attainment of the CAAQS will require greater emission reductions than what would otherwise be required to show attainment of the NAAQS. Like the Federal system, the State requirements and compliance dates are based on the severity of the ambient air quality standard violation within a region (POLB, 2008). Under the Acts, CARB delegates regulation of stationary and affiliated sources (e.g., permanent on-site portable

equipment) to California's 35 local air districts, including the SCAQMD. As the COA agency, certain SCAQMD rules and regulations would apply to the proposed Project. Thus, while CARB has no direct authority over the proposed Project in Federal waters, indirect State authority exists via the SCAQMD as COA.

State Implementation Plan (SIP). The SCAQMD is responsible for developing and implementing control measures – via rules and regulations – that will eventually achieve attainment of the NAAQS and CAAQS within the SCAB. As such, the SCAQMD most recently developed the 2016 AQMP, which focuses on further emission reductions – including mobile sources regulated by CARB – to attain ozone and $PM_{2.5}$ standards, both Federal and State. Additionally, the 2016 AQMP also discusses the recently adopted Federal 8-hour ozone standard (70 parts per billion [ppb]). The proposed control measures in the 2016 AQMP are based on implementing all feasible control measures through the accelerated deployment of available cleaner technologies, best management practices, co-benefits from existing programs, and incentive measures (SCAQMD, 2017). The proposed Project in Federal waters would be compatible with the SIP via compliance with applicable SCAQMD rules and regulations and use of compliant equipment and fuels.

Statewide Portable Equipment Registration Program (PERP). The Portable Equipment Registration Program (PERP) established a uniform program to regulate portable engines and portable engine-driven equipment units (CARB, 2017c). Once registered in the PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. Any portable equipment utilized in support of the proposed Project that is not powered by the primary vessel would be required to have existing registrations (as applicable) in accordance with the PERP.

California Diesel Fuel Regulations. In 2004, the CARB set limits on the sulfur content of diesel fuel sold in California for use in on-road and off-road motor vehicles (CARB, 2004a). Harbor craft and intrastate locomotives were originally excluded from the rule, but were later included by a 2004 rule amendment (CARB, 2004b). Under this rule, diesel fuel used in non-road engines (except harbor craft and intrastate locomotives) had been limited to 500-ppmw sulfur since 1993. The sulfur limit was reduced to 15 ppmw beginning on September 1, 2006. (The Federal diesel rule similarly limited sulfur content nationwide for on-road vehicles to 15 ppm on October 15, 2006.) Diesel fuel used in harbor craft in the SCAB also was limited to 500 ppmw sulfur starting January 1, 2006 and was lowered to 15 ppmw sulfur in September 1, 2006. The CARB regulation that went into effect on January 1, 2012 requires the use of marine gas oil (MGO) or marine diesel oil (MDO) with a sulfur content limit of 0.1 percent by weight (1,000 ppmw) in the main and auxiliary engines and boilers of all Ocean-going Vessels (OGVs) within 24 nautical miles of the California coastline.

General Conformity Rule. Section 176(c) of the CAA states that a Federal agency cannot issue a permit for or support an activity within a nonattainment or maintenance area unless the agency determines it will conform to the most recent EPA-approved SIP. This means that projects using Federal funds or requiring Federal approval must not: (1) cause or contribute to any new violation of a NAAQS; (2) increase the frequency or severity of any existing violation; or (3) delay the timely attainment of any standard, interim emission reduction, or other milestone.

As discussed above, the proposed Project in Federal waters would be compatible with the SIP via compliance with applicable SCAQMD rules and regulations and use of compliant equipment and fuels, thus meeting General Conformity criteria.

3.2.3.3 Greenhouse Gases

Greenhouse gases (GHGs) are defined as gases that absorb infrared radiation in the atmosphere and include, but are not limited to, water vapor, carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These GHGs – collectively quantified to as carbon dioxide equivalents or CO_2e – lead to the trapping and buildup of heat in the atmosphere near the earth's surface, commonly known as the Greenhouse Effect. There is increasing evidence that the Greenhouse Effect is leading to global climate change. The primary source of GHG in the U.S. is energy-use related activities, which include fuel combustion, as well as energy production, transmission, storage and distribution. These energy-related activities generated 85 percent of the total U.S. emissions on a carbon equivalent basis in 1998 and 86 percent in 2004. Fossil fuel combustion represents the vast majority of the energy related GHG emissions, with CO_2 being the primary GHG.

40 CFR Part 98 – Greenhouse Gas Reporting. On October 30, 2009, the EPA issued the Mandatory Reporting of Greenhouse Gases Rule (74 FR 56260, 40 CFR 98, effective December 29, 2009), which requires reporting of GHG data and other relevant information from large sources and suppliers in the United States pursuant to Fiscal Year 2008 Consolidated Appropriations Act (HR 2764; Public Law 110-161). The rule facilitates collection of accurate and comprehensive emissions data to provide a basis for future EPA policy decisions and regulatory initiatives. The rule requires specified industrial source categories and facilities with an aggregated heat input of 30 million BTU or more per hour or that emit 25,000 MT or more per year of CO_2e to submit annual reports to the EPA. The gases covered by the rule are carbon dioxide, methane, nitrous oxide, and HFCs, PFCs, sulfur hexafluoride, and other fluorinated gases including nitrogen trifluoride and hydrofluorinated ethers. Since the proposed Project does not meets the definition of an affected stationary source of GHGs, it is not subject to this rule.

General Conformity and GHGs. A General Conformity determination is required for federally sponsored, permitted, or funded actions in NAAQS nonattainment areas or in certain maintenance areas when the total direct and indirect net emissions of nonattainment pollutants (or their precursors) exceed specified thresholds (CAA Amendments of 1990 Section 176[c]). This regulation ensures that Federal actions conform to SIPs and agency NAAQS attainment plans. Since GHGs are not criteria pollutants, General Conformity does not apply to GHG emissions.

3.2.3.4 Local Policies, Plans and Programs - Los Angeles County

Port of Los Angeles (POLA) No Net Increase Policy (June 2005). The Port of Los Angeles/Port of Long Beach (POLA/POLB) complex is the fifth busiest container port in the world, and approximately 40 percent of the nation's import cargo passes through these two ports (No Net Increase Task Force, 2005). Due to concern over the effects of air pollution on the public, and on the local communities of San Pedro and Wilmington, which are immediately adjacent to the POLA, the Los Angeles Board of Harbor Commissioners established a policy that there would

be "*no net increase in air [pollutant] emissions*" from POLA activities over October 2001 levels. Vessels used for the proposed Project would be staged out of POLB and would be expected to comply with the policy by, for example, limiting main engine idling when not underway.

SCAQMD AQMP (2016). The SCAQMD's AQMP proposed control measures are based on implementing all feasible control measures through the accelerated deployment of available cleaner technologies, best management practices, co-benefits from existing programs, and incentive measures (SCAQMD, 2017). The AQMP details emissions occurring in the SCAQMD during the base year 2012 and attainment demonstration years of 2019, 2022, 2023, 2025, and 2031. The future emission forecasts are based on demographic and economic growth projections provided by the SCAG. Even without any additional controls, VOC and NO_x emissions are expected to decrease due to existing regulations, such as controls on off-road equipment, new vehicle standards, and the Regional Clean Air Incentives Market (RECLAIM) programs (SCAQMD, 2017). Several SCAQMD rules would apply to the proposed Project, as summarized in the following section.

San Pedro Bay Ports Clean Air Action Plan (CAAP). The 2006 CAAP was created with the cooperation and participation of the SCAQMD, CARB and U.S. EPA. The goal of the 2006 CAAP was to improve air quality in the SCAB by adopting the CAAP. The 2006 CAPP was a sweeping plan aimed at significantly reducing the health risks posed by air pollution from port-related ships, trains, trucks, terminal equipment and harbor craft (CAAP, 2017). The CAAP was updated in 2010 to provide near-term planning through 2014 and establishing long-term goals. Currently, a 2017 CAPP Update is in the draft process to provide even more strategies and emission-reduction targets to cut emissions from sources operating in and around the Ports, setting the Ports firmly on the path toward zero-emissions goods movement (CAPP, 2017). The proposed Project use of modern vessels with newer, lower-emitting engines and ULS diesel fuel would be consistent with the CAPP.

POLB/POLA Vessel Speed Reduction (VSR) Program. The VSR program has been in place since 2001 under which ocean-going vessels (OGVs) slow to 12 knots when they are within 20 nautical miles of Point Fermin. The POLA, EPA, CARB, SCAQMD, the Pacific Merchant Shipping Association (PMSA), and the Marine Exchange of Southern California signed a memorandum of understanding to voluntarily reduce the speed of OGVs to 12 knots or less within 20 nautical miles of Point Fermin. Reduction in speed demands less power from the main engine(s) of a vessel, which in turn reduces fuel consumption and thus emissions. In 2008, the POLA adopted a VSR Incentive Program for OGVs and expanded the program out to 40 nautical miles from Point Fermin. Compliance with the voluntary VSR program has steadily increased over the years since it was originally adopted. During the proposed Project, survey vessel speeds would normally range from 4 to 10 knots and thus be in compliance with the VSR program.

Port of Long Beach (POLB) Green Port Policy. In November 2004, the Board of Harbor Commissioners (BHC) directed the POLB to develop a policy that would build on the existing Healthy Harbor program to encompass wide ranging environmental goals. In January 2005, the BHC adopted the Green Port Policy, which serves as a guide for decision making and established a framework for environmentally friendly Port operations. The goal of the air quality program element of the POLB Green Port Policy is to reduce harmful air pollutant emissions from Port

activities (POLB, 2005). The proposed Project use of modern vessels with newer, lower-emitting engines and ULS diesel fuel would be consistent with the Green Port Policy.

3.2.3.5 Rules and Regulations - SCAQMD

As the COA pursuant to CAA Section 328 and 40 CFR 55, several SCAQMD rules and regulation would apply to the proposed Project, as outlined below:

Rule 219 – Equipment Not Requiring a Written Permit Pursuant to Regulation II. The purpose of this rule is to identify equipment, processes, or operations that emit small amounts of air contaminants that shall not require written permits. The proposed Project would qualify for the following exemptions for mobile equipment: 1) marine vessels as defined by Health and Safety Code Section 39037.1; or 2) a marine vessel that uses one internal combustion engine to propel the marine vessel and operate other equipment mounted on the marine vessel; or 3) equipment which is mounted on a marine vessel if such equipment does not emit air contaminants.

SCAQMD Rule 222 – Filing Requirements for Specific Emission Sources Not Requiring a Written Permit Pursuant to Regulation II. The purpose of this rule is to provide an alternative to written permits. This rule requires owners/operators of specified emission sources to submit information regarding the source, including, but not limited to: 1) a description of the source; 2) data necessary to estimate emissions from the source; and 3) information to determine whether the equipment is operating in compliance with applicable District, State and Federal rules and regulations.

The statewide Portable Equipment Registration Program (PERP) was established by CARB to provide a uniform regulatory program for portable engines and portable engine-driven equipment units rated at 50 brake horsepower (BHP) or greater (CARB, 2017c). Once registered in PERP, engines and equipment units may operate throughout California without the need to obtain individual permits from local air districts. PERP generally applies to land-based construction equipment such as generators, pumps, and air compressors.

On May 5, 2017 the SCAQMD Board approved amendments to Rule 222 that included the equipment category of *Engines Registered Under the Statewide Portable Equipment Registration Program (PERP) Used in the Outer Continental Shelf (OCS)*. Section (d) of the Rule contains detailed requirements for registration (i.e., forms & fees), recordkeeping, and reporting. Since CARB, a State agency, has no jurisdiction in Federal waters, PERP would not apply to the proposed Project. However, SCAQMD Rule 222 registration requirements would apply to the proposed Project. For example, if a generator 50 BHP or greater were needed to power survey-related equipment aboard a vessel, it would need to be registered pursuant to Rule 222.

If Rule 222 registered equipment is temporarily used for the proposed Project, the following recordkeeping requirements would apply, subject to District inspection upon request: 1) hours of operation; 2) materials used or processed [fuel type]; 3) fuel usage; 4) throughput; and 5) operating parameters [equipment specifications necessary to calculate emissions]. These records, including calculated emissions, would need to be retained for a period of five years.

SCAQMD Rule 402 – Nuisance. This rule prohibits discharge of air contaminants or other material that cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public; or that endanger the comfort, repose, health, or safety of any such persons or the public; or that cause, or have a natural tendency to cause, injury or damage to business or property. No nuisance to onshore receptors is expected from survey activities in Federal waters.

SCAQMD Rule 431.2 – Sulfur Content of Liquid Fuels. This rule limits the sulfur content in diesel and other liquid fuels for the purpose of both reducing the formation of sulfur oxides and particulates during combustion and to enable the use of add-on control devices for diesel fueled internal combustion engines. The rule applies to all refiners, importers, and other fuel suppliers such as distributors, marketers and retailers, as well as to users of diesel, low sulfur diesel, and other liquid fuels for stationary source applications in the District. The rule also affects diesel fuel supplied for mobile source applications. Use of Federal and California ULS diesel fuel, as described above, by the proposed Project ensures compliance with this rule.

SCAQMD Rule 1901 – General Conformity. This rule implements the provisions of Part 51, Subchapter C, Chapter I, Title 40, of the Code of Federal Regulations (CFR). As discussed above, the proposed Project in Federal waters would be compatible with the SIP via compliance with applicable SCAQMD rules and regulations and use of compliant equipment and fuels, thus meeting General Conformity criteria.

3.2.4 Criteria Pollutant Emissions

3.2.4.1 Methodology and Assumptions

The proposed scope of work offshore will require operating a node deployment/recovery vessel, geophysical survey vessel, support vessels; as well as transit of the vessels between the survey area and nearby harbors. The geophysical survey vessel will tow one source array consisting of three sub-arrays along the pre-determined transects as shown in Section 1.4 - Proposed Geophysical Survey Area to acquire reflection data from the subsurface rock beds within the survey area.

The proposed node deployment/recovery vessel is the Marine Vessel (M/V) *Clean Ocean*. The M/V *Clean Ocean* is based out of the POLA/POLB and is an offshore supply vessel that will be configured to support node storage, deployment, and recovery. It is expected that the M/V *Clean Ocean* will be available to support the 2018 survey activities, however if the M/V *Clean Ocean* is unavailable; an equivalent vessel will be secured. The Project survey vessel has not been selected at this time; however, either a locally available work vessel utilizing containerized equipment (e.g. M/V *Silver Arrow*) or specialized geophysical survey vessel (e.g. Research Vessel [R/V] *Marcus G. Langseth*) will be used to conduct the survey. For the purposes of the enclosed analysis, the equipment aboard the M/V *Silver Arrow* is referenced as a likely case scenario, but an alternative vessel would have similar equipment and equivalent (or better) effects. The M/V *Jab* or equivalent will also provide support during the proposed survey for operations coordination activities. For a detailed description of the proposed operations please refer to Section 1.5.3 - Offshore Survey Operations. The proposed Project equipment list is

presented below in Table 3.2-5 and shows which vessels and equipment will be used. It is important to note that the seismic source array will be powered by the primary vessel, or would utilize equipment that has already been permitted. Any and all other equipment utilized in support of the Project will require preregistration with the SCAQMD (as necessary).

It is assumed that all marine vessels engines will use ULS diesel fuel for the duration of the Project. Project emissions were estimated by utilizing the emission factors and assumptions from the following guidance documents: the CARB *Commercial Harbor Craft Regulatory Activities - Appendix B: Emission Estimation Methodology for Commercial Harbor Craft Operating in California* (CARB, 2007), the Port of Long Beach 2013 Air Emission Inventory (POLB, 2013), and the Port of Long Beach 2005 Air Emission Inventory (POLB, 2005). Daily maximum emissions were calculated, as well as emission totals for the Project. Please refer to Appendix F - Air Emission Calculations for more detail on the estimated emissions.

Table 3.2-5. Proposed Project Equipment List

Marine Vessels
M/V *Clean Ocean* (node deployment/recovery)
M/V *Silver Arrow* (geophysical survey)
M/V *JAB* (operations support)
Engines
M/V *Clean Ocean* - (3) 500 BHP Cummins QSK 19 (Tier 3), (2) 150 hp John Deere 99Kw (Tier 3), (1) 405 hp Cummins QSL 9 (Tier 3)
M/V *Silver Arrow* - (2) 2000 BHP CAT 3516C and (3) 715 hp CAT C18
M/V *JAB* - (2) 500 BHP Cummins QSC 8.3L

3.2.5 Impact Assessment

3.2.5.1 Project Emissions

As shown in Table 3.2-6, maximum daily emissions of criteria pollutants would be approximately 64 pounds of ROG, 459 pounds of NO_x, 323 pounds of CO, 15 pounds of PM_{10}, and less than one pound of SO_2. Project activities are expected to take place over a span of weeks, and the total Project emissions will be distributed throughout that timeframe. Total Project emissions are presented in Table 3.2-7 and are expected to be approximately 7.6 tons of NO_x, 1.1 tons of ROG, 0.3 tons of PM_{10}, 5.0 tons of CO, and 0.01 tons of SO_2.

Table 3.2-6. Estimated Daily Project Emissions

Project Phase	**Peak Pounds per Day**				
	NO_x	**ROG**	**PM_{10}**	**CO**	**SO_2**
Pre-Survey	51.3	6.8	1.5	37.5	0.1
Mobilization	222.4	29.8	7.3	156.4	0.4
Node Deployment	120.3	16.5	3.5	31.9	0.2

Project Phase	Peak Pounds per Day				
	NO_x	ROG	PM_{10}	CO	SO_2
Project Survey	458.9	63.6	15.0	323.0	0.8
Demobilization	222.4	29.8	7.3	156.4	0.4
Post-Survey	51.3	6.8	1.5	37.5	0.1
Daily Maxima	**459**	**64**	**15**	**323**	**1**

Table 3.2-7. Estimated Total Project Emissions

Total Emissions - Tons				
NO_x	ROG	PM_{10}	CO	SO_2
7.6	1.1	0.3	5.0	0.01

Due to transport, offshore emissions of NO_X, ROG, and $PM_{10}/PM_{2.5}$ have the potential to affect progress toward the attainment of the Federal and State ozone and $PM_{10}/PM_{2.5}$ standards in onshore areas of the SCAB. However, all emissions from the proposed Project would be temporary and permanently cease upon completion of the survey activities. Thus, the proposed Project would not have a long-term impact on air quality in the SCAB, nor would the temporary emissions affect long-term air quality attainment plans of the SCAQMD.

Project Incorporated Measures to Reduce Potential Impacts:

- **Project Engines.** The seismic source array will be powered by the primary vessel, or would utilize equipment that has already been permitted. Any and all other equipment utilized in support of the Project will require preregistration with the SCAQMD (as necessary).
- **Project Equipment.** Prior to and during Project activity, Project equipment will be maintained in proper working order according to manufacturer's specifications.
- **Rule 222 Registration.** If applicable, temporary PERP equipment used by the proposed Project in the OCS would be registered with the SCAQMD pursuant to Rule 222. Recordkeeping and reporting requirements would apply.
- **Vessel Engines.** Prior to and during Project activity, diesel engines on Project vessels will be maintained in proper working order according to manufacturer's specifications. Only ULS diesel fuel will be used.
- **Vessel Speed Reduction.** To and from the Port of Long Beach (POLB), Project vessels will comply with the Vessel Speed Reduction (VSR) Program, and maintain a speed limit of no greater than 12 knots within 40 nautical miles of the Point Fermin Lighthouse.

3.2.6 Greenhouse Gas Emissions

A GHG is defined as any gas that absorbs infrared radiation in the atmosphere, including water vapor, CO_2, CH_4, N_2O, and fluorocarbons. GHGs are emitted by natural processes, as well as by human activities. The predominant GHGs that are emitted from both natural processes and human activities are CO_2, CH_4, and N_2O. Examples of GHGs that are created and emitted primarily as the result of human activity include fluorinated gases (hydrofluorocarbons [HFCs] and perfluorocarbons [PFCs]) and sulfur hexafluoride (SF_6).

The accumulation of GHGs in the atmosphere regulates the earth's temperature. Without these natural GHGs, the earth's surface would be approximately 61 degrees Fahrenheit cooler (AEP, 2007). GHGs differ from criteria pollutants in that GHG emissions do not cause direct, adverse human health effects. Rather, the direct environmental effect of GHG emissions is an increase in global temperatures, which in turn has numerous indirect effects on the environment and humans (POLA, 2008).

Each GHG has a varying global warming potential (GWP), depending on the projected timeframe, e.g., 20, 100, or 500 years. The GWP is the ability of a gas or aerosol to trap heat in the atmosphere. Per the Intergovernmental Panel on Climate Change (IPCC, 2007), CO_2 is assigned a GWP of 1. By comparison, CH_4 has a 100-year GWP of 25, which means that it has a global warming effect 25 times greater than CO_2 on an equal-mass basis. N_2O has a 100-year GWP of 298, which means that it has a global warming effect 298 times greater than CO_2 on an equal-mass basis. To account for these different GWPs, GHG emissions are reported as a CO_2 equivalent (CO_2e). CO_2e is calculated by multiplying emissions of each GHG by its respective GWP, and adding the results together to produce a single, combined emission rate representing all GHGs, i.e., CO_2e.

3.2.6.1 Project Emissions

Estimated total GHG emissions for the proposed Project are presented in Table 3.2-8.

Table 3.2-8. Estimated Project Survey GHG Emissions

Source	CO_2 Emissions (metric tonnes)	CH_4 Emissions (metric tonnes)	N_2O Emissions (metric tonnes)	CO_2e[1] (metric tonnes)
All Project Activities	734.0	0.05	0.02	741

Notes:
CO_2e conversion factors (GWPs) per IPCC Fourth Assessment Report (AR4, 2007).

GHG emissions calculated using CARB's OFFROAD Model and emission factors provided in the California GHG Inventory available at http://www.arb.ca.gov/cc/inventory/doc/doc_index.php.

Because the GHG emission sources associated with the Project are internal combustion engines, the predominant GHG emitted by the Project would be carbon dioxide (CO_2). As a result, GHG emissions for the Project are calculated based on estimated fuel usage. Emission factors provided in California's GHG Emissions Inventory were used to calculate GHG emissions. The

proposed Project activities would release an estimated total of 741 metric tonnes of CO_2 equivalent ($MTCO_2e$).

3.2.6.2 Impact Assessment

While it is not possible that project-related GHG emissions alone could impact world climate, these emissions, when combined with emissions throughout the area, the County of Los Angeles, the SCAB, and the world, could incrementally contribute to climate change. Locally, there are onshore industrial, commercial and residential projects within the Project area that also contribute to cumulative impacts due to the release of GHGs. The California GHG Emissions Inventory (CARB, 2017d), estimates that GHG emissions in California during 2015 were about 440 million metric tonnes (MMT) CO_2e. Therefore, the GHGs released during the Project (741 $MTCO_2e$) would represent a negligible percentage (i.e., 0.00017 percent) of the annual GHG emissions within the State.

While global climate change is, by definition, a significant cumulative environmental impact there is currently no agreed-upon methodology to adequately identify it under NEPA. However, based on the very small percentage of GHG emissions associated with the proposed Project, when compared to statewide annual GHG emissions, emissions associated with Project activities would not be expected to cause a quantifiable negative impact on the environment.

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3.2.7 References

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