Appendix D

~~Draft~~ Final Environmental Analysis

Prepared for the Proposed

Control Measure for

Ocean-Going Vessels At Berth in California

Air Resources Board
1001 I Street
Sacramento, California, 95814

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ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
APE	area of potential effect
BAAQMD	Bay Area Air Quality Management District
CAA	Clean Air Act
CAAQS	California Ambient Air Quality Standards
CalEEMod	California Emissions Estimator Model
CalEnviroScreen	California Communities Environmental Health Screening Tool
CAPCOA	California Air Pollution Officers Association
CARB or Board	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CEQA	California Environmental Quality Act
CO2	carbon dioxide
CO2e	carbon dioxide equivalent
dBA	A-weighted decibels
Discussion Document	Sustainable Freight Pathways to Zero and Near-Zero Discussion Document
DPM	Diesel Particulate Matter
Draft EA	Draft Environmental Analysis
DWT	dead weight tonnage
EA	Environmental Analysis
EER	Equivalent Emissions Reduction
EGR	exhaust gas recirculation
EIR	environmental impact report
EPA	U.S. Environmental Protection Agency
EV	electric vehicle
Existing Regulation	Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port
FEU	forty-foot equivalent unit
FTA	Federal Transit Administration
g/kWh	gram per kilowatt hour
gal	gallon
GHG	greenhouse gas
HDV	heavy-duty vehicles
HFO	heavy fuel oil
hp	horsepower
HVL	high-voltage load
IMO	International Marine Organization
IMT	independent marine terminal

in/sec	inches per second
ISOR	Initial Statement of Reasons
kV	kilovolt
kW	kilowatt
L_{eq}	equivalent level measurements
L_{max}	maximum sound level
LNG	liquefied natural gas
LPG	liquefied petroleum gas
m/m	mass by mass
MDO	Marine Diesel Oil
MGO	Marine Gas Oil
MOTEMS	Marine Oil Terminal Engineering and Maintenance Standards
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NOx	nitrogen oxides or oxides of nitrogen
NOP	Notice of Preparation
NPDES	National Pollution Discharge Elimination System
OGV	ocean-going vessel
OSHA	Occupational Safety and Health Administration
PIEEE	Policy Institute for Energy, Environment, and the Economy
PG&E	Pacific Gas and Electric Company
PHEV	plug-in hybrid electric vehicles
PM	particulate matter
PM10	respirable particulate matter (particles with an aerodynamic diameter less than or equal to a nominal 10 micrometers)
PM2.5	fine particulate matter (particles with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers)
POLA	Port of Los Angeles
POLB	Port of Long Beach
PPV	peak particle velocity
PRC	Public Resources Code
Proposed Regulation	Proposed At Berth Regulation
ROG	reactive organic gases
ROPG	Reduced On-Board Power Generation
RPS	Renewables Portfolio Standard
Ro-Ro	roll-on/roll-off vessel
SB	Senate Bill
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SCR	Selective Catalytic Reduction
SDCACPD	San Diego County Air Pollution Control District

SDG&E	San Diego Gas & Electric
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SOx	oxides of sulfur
SPB	San Pedro Bay Ports (Ports of Los Angeles and Long Beach)
Staff Report	Initial Statement of Reasons for the Proposed “At-Berth Regulation”
State SIP Strategy	Proposed 2016 State Strategy for the State Implementation Plan
Strategy	State SIP Strategy
SWPPP	Stormwater Pollution Prevention Plan
TAC	toxic air contaminant
TCR	tribal cultural resources
TEU	twenty-foot equivalent unit
TIE	Terminal Incident Event
TPD	tons per day
TPY	tons per year
VdB	vibration decibels
VIE	Vessel Incident Event
VMT	vehicle miles traveled
ZEV	zero-emission vehicle

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PREFACE

The California Air Resources Board (CARB or Board) released a Draft Environmental Analysis (Draft EA) for the Control Measure for Ocean-Going Vessels At Berth, herein referred to as the Proposed Regulation (i.e., the proposed project under the California Environmental Quality Act [CEQA]) on October 15, 2019, for a 45-day public review and comment period that concluded December 9, 2019. During the public comment period for the Proposed Regulation, a total of 62 comments were received (60 electronically-submitted comment letters and two written comments that were presented during the public hearing). Twelve of the comment letters were determined to raise significant environmental issues related to the analysis in the Draft EA and are responded to in this document.

On March 26, 2020, CARB released a notice with modified regulatory language and supporting documentation for a review and comment period as required under the Administrative Procedure Act (APA). The review and comment period commenced on March 26, 2020, and ended on May 1, 2020, which exceeds the required 15 days. On July 10, 2020, CARB released another notice with modified regulatory language and supporting documentation for a review and comment period as required under the APA. The review and comment period commenced on July 10, 2020, and ended on July 27, 2020, which exceeds the required 15 days.

CARB staff made minor modifications to the Draft EA based on responses to comments received during all three public review and comment periods and based on other updates. To facilitate identifying modifications to the document, modified text is presented with ~~strike-through~~ for deletions and underline for additions. None of the modifications to the proposed Draft EA alter any of the conclusions reached in the EA or provide new information of substantial importance relative to the EA. As a result, these minor revisions do not require recirculation of the document pursuant to the CEQA Guidelines, California Code of Regulations, title 14, Section 15088.5, before consideration by the Board.

1.0 INTRODUCTION AND BACKGROUND

A. Introduction

This ~~Draft~~ Final Environmental Analysis (~~Draft~~ Final EA) is Appendix D of the California Air Resources Board (CARB or Board) initial statement of reasons (ISOR or Staff Report) that is presented to the Board for consideration of the proposed "Control Measure for Ocean-Going Vessels At Berth" (Proposed Regulation). The Project Description section of this ~~Draft~~ Final EA presents a summary of the Proposed Regulation. A detailed description of the Proposed Regulation is available in the Staff Report released October 15, 2019, which is hereby incorporated by reference and available at https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/appddraftea.pdf.

Based on CARB's review, staff determined that implementing the Proposed Regulation may result in adverse environmental impacts. Resource areas potentially impacted are; aesthetics, air quality, biological resources, cultural resources, geology and soils, hazards and hazardous materials, hydrology and water quality, mineral resources, noise, population and housing, public services, recreation, transportation and traffic, and utilities and services systems. For each resource area that has the potential to be adversely impacted, CARB is required to identify potentially feasible mitigation measures. This ~~Draft~~ Final EA also includes an analysis of potentially feasible alternatives that could avoid or substantially lessen the identified impacts. Where staff determined there would be no significant adverse impacts in those resource areas not already identified as having potential impacts, the rationale supporting that determination is included. This ~~Draft~~ Final EA also discusses environmental benefits expected from implementing the Proposed Regulation.

B. Background

In December 2007, CARB approved the "Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-Going Vessels At-Berth in a California Port" Regulation (Existing Regulation). The purpose of the Existing Regulation is to reduce emissions from diesel auxiliary engines on container vessels, refrigerated cargo (reefer) vessels, and passenger (cruise) vessels while berthing (also known as hoteling) at a California Port. At berth, auxiliary engines are used by vessels to run power for lighting, ventilation, pumps, communication, heating, and other onboard equipment while a vessel is docked.

Container or reefer vessels that make 25 visits or more per calendar year to a regulated port and cruise vessels that make 5 or more visits per year to a regulated port are subject to the requirements of the Existing Regulation. Smaller vessel fleets (i.e. fleets that are comprised of container, reefer vessels that make fewer than 25 visits or cruise with fewer than 5 visits) and vessels which do not often frequent California Ports are exempt from the Existing Regulation. The California ports included in the Existing Regulation are the Ports of Los Angeles (POLA), Long Beach (POLB), Oakland, Richmond, San Diego, San Francisco, and Hueneme.

The Existing Regulation provides fleet operators two different pathways to comply: the Reduced On-board Power Generation (ROPG) option, or the Equivalent Emissions Reduction (EER) option. The ROPG pathway has two separate requirements:

- A percentage of a fleet's visits that have to use shore power.
- A percentage reduction in a fleet's total power usage from the fleet's baseline power usage.

Compliance requirements for the ROPG pathway began in 2014 with a 50 percent visit and 50 percent power reduction requirement. This means a fleet must reduce their auxiliary engine power by 50 percent from the fleet's baseline power generation (baseline power generation equals a fleet's berthing time multiplied by the auxiliary engine(s) power requirement) during the vessel's stay on 50 percent of the fleet's annual vessel visits. The requirement increased to 70 percent in 2017, and will increase to 80 percent in 2020, which will represent full implementation of the Existing Regulation.

The EER pathway requires a percent of emissions reduction below a fleet's baseline emissions. The baseline emissions for a vessel fleet is calculated by multiplying each individual vessel's berthing time with the vessel's electrical power requirements. Fleets following this pathway can comply using shore power or a CARB approved alternative control technology, such as a barge-based capture and control system. Compliance under this option began in 2010 with a 10 percent reduction and phased in to 50 percent in 2014 to match the ROPG pathway. Since 2014, the reduction requirements for both pathways have aligned at 70% in 2017 and 80% in 2020.

The majority of vessels subject to the Existing Regulation comply using shore power. A small percentage of vessels that have not installed shore power use a CARB approved barge-based capture and control system for compliance. This emissions control system attaches to a vessel's exhaust stack to capture emissions and routes them to an emissions control unit where it is filtered and treated. For barge-based systems, this capture and control system is housed aboard a barge and can be moved via tug boat to service vessels in other locations. The barge-based capture and control systems can also be used in the event of shore power equipment failure or when a shore power berth is unavailable. Currently there are two barge-based CARB approved alternative technologies available for vessels to use for compliance in lieu of shore power. One system is located at POLA and the other at POLB.

The Proposed Regulation would supersede the Existing Regulation. The primary goal of the Proposed Regulation is to further protect public health and air quality in communities near port and marine terminals. Health and environmental benefits will be achieved by further reducing oxides of nitrogen (NOx), reactive organic gas (ROG), fine particulate matter (PM2.5), diesel particulate matter (DPM), greenhouse gas (GHG) and black carbon emissions from vessels at berth beyond those realized by the Existing Regulation. The Proposed Regulation seeks to expand upon the Existing Regulation by

increasing the number of vessel visits required to reduce emissions at berth (i.e. small fleets that are currently excluded) from the currently regulated vessel categories (container, cruise, reefer), improving transparency and enforceability, and achieving more emissions reductions with the inclusion of new vessel categories, ports and terminals. The overall strategy of the Proposed Regulation relies on shore power and other existing technologies and the development of promising stationary emissions control technologies in the process of being adapted for use in a marine environment. CARB anticipates continued development in the area of emissions controls for ocean-going vessels (vessels) as the International Maritime Organization (IMO) strengthens emissions standards for shipping in the coming years.

C. Environmental Review Process

1. Requirements Under CARB Certified Regulatory Program

CARB is the lead agency for the Proposed Regulation and has prepared this ~~Draft~~ Final EA pursuant to its California Environmental Quality Act (CEQA) certified regulatory program. Public Resources Code (PRC) Section 21080.5 allows public agencies with regulatory programs to prepare a "functionally equivalent" or substitute document in lieu of an environmental impact report (EIR) or negative declaration, once the program has been certified by the Secretary for Natural Resources as meeting the requirements of CEQA. CARB's regulatory program was certified by the Secretary of the Resources Agency in 1978 (14 California Code of Regulations (CCR) Section 15251(d)). As required by CARB's certified regulatory program, and the policy and substantive requirements of CEQA, CARB prepared this ~~Draft~~ Final EA to assess the potential for significant adverse and beneficial environmental impacts associated with the proposed actions and to provide a succinct analysis of those impacts (14 CCR section 60004.2). The resource areas from the CEQA Guidelines (14 CCR Section 15000 et. seq) Environmental Checklist (Appendix G of the Guidelines) were used as a framework for assessing potentially significant impacts.

CARB has determined that approval of the Proposed Regulation is a "project" as defined by CEQA. CEQA defines a project as "the whole of an action, which has a potential for resulting in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment, and that is an activity directly undertaken by any public agency (14 CCR Section 15378(a))." Although the policy aspects of the Proposed Regulation do not directly change the physical environment, indirect physical changes to the environment could result from reasonably foreseeable compliance responses taken in response to implementation actions identified in the Proposed Regulation.

The requirements of PRC Section 21159 apply when CARB adopts a rule or regulation requiring the installation of pollution control equipment, or a performance standard or treatment requirement. Thus, as required by CEQA, this ~~Draft~~ Final EA contains "an environmental analysis of the reasonably foreseeable methods by which compliance with that rule or regulation will be achieved (14 CCR Section 15378)." The analysis

shall include reasonably foreseeable environmental impacts of the methods of compliance, reasonably foreseeable feasible mitigation measures related to significant impacts, and reasonably foreseeable alternative means of compliance that would avoid or eliminate significant impacts.

2. Scope of Analysis and Assumptions

The degree of specificity required in a CEQA document corresponds to the degree of specificity inherent in the underlying activity it evaluates. An environmental analysis for broad programs cannot be as detailed as for specific projects (14 CCR Section 15146). For example, the assessment of a construction project would be naturally more detailed than one concerning the adoption of a local general plan because construction-related effects can be predicted with more accuracy (14 CCR Section 15146(a)). Because this analysis addresses a broad regulatory program, a general level of detail is appropriate. However, this ~~Draft~~ Final EA makes a rigorous effort to evaluate significant adverse impacts and beneficial impacts of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Regulation and contains as much information about those impacts as is currently available, without being unduly speculative.

The scope of analysis in this ~~Draft~~ Final EA is intended to help focus public review and comments on the Proposed Regulation, and ultimately to inform the Board of the environmental benefits and adverse impacts of the proposal. This analysis specifically focuses on potentially significant adverse and beneficial impacts on the physical environment resulting from reasonably foreseeable compliance responses resulting from implementation of the Proposed Regulation.

The analysis of potentially significant adverse environmental impacts of the Proposed Regulation is based on the following assumptions:

1. This analysis addresses the potentially significant adverse environmental impacts resulting from implementing the Proposed Regulation compared to existing conditions.

2. The analysis of environmental impacts and determinations of significance are based on reasonably foreseeable compliance responses taken in response to implementation of the Proposed Regulation.

3. The analysis addresses environmental impacts within California and outside the State to the extent they are reasonably foreseeable and do not require speculation.

4. The level of detail of impact analysis is necessarily and appropriately general because the Proposed Regulation is programmatic. While the general locations of ports in California which may be covered under the Proposed Regulation are known, decisions by the regulated entities regarding

compliance options and the precise location of the many components covered in the Proposed Regulation are unknown. Furthermore, attempting to predict decisions by entities regarding the specific location and design of infrastructure undertaken in response to implementation of the Proposed Regulation would be speculative (if not impossible) at this early stage, given the influence of other business and market considerations in those decisions. As a result, there is some inherent uncertainty in the degree of mitigation that would ultimately need to be implemented to reduce any potentially significant impacts identified in this ~~Draft~~ Final EA. Consequently, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate the potential that feasible mitigation may not be implemented by the agency with authority to do so, or may not be sufficient) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate. It is also possible that the amount of mitigation necessary to reduce environmental impacts to below a significant level may be less than disclosed in this ~~Draft~~ Final EA on a case-by-case basis. Specific actions undertaken to implement the Proposed Regulation would undergo project-level environmental review and compliance processes as required at the time they are proposed. It is expected that many individual development projects would be able to feasibly avoid or mitigate potentially significant impacts to a less-than-significant level.

5. This ~~Draft~~ Final EA generally does not analyze site-specific impacts when the location of future facilities or other infrastructure changes are speculative. However, the ~~Draft~~ Final EA does examine regional (e.g., air district and/or air basin) and local issues to the degree feasible where appropriate. As a result, the impact conclusions in the resource-oriented sections of Chapter 4, Impact Analysis and Mitigation Measures, cover broad types of impacts, considering the potential effects of the full range of reasonably foreseeable actions undertaken in response to the Proposed Regulation. For the development of the Proposed Regulation and in response to the Administrative Procedure Act's (APA) economic impact analysis provisions, CARB completed a berth-by-berth analysis for all vessel categories that would be required to reduce emissions, (Appendix E of ISOR; see California Government Code section 11346.3). California Government Code section 11346.3(a) requires that "[a] state agency proposing to adopt, amend, or repeal any administrative regulation shall assess the potential for adverse economic impact on California business enterprises and individuals, avoiding the imposition of unnecessary or unreasonable regulations or reporting, recordkeeping, or compliance requirements." For this analysis, CARB analyzed several different factors for each berth and determined a scenario that could reasonably occur under the Proposed Regulation, in order to be able to provide a quantified cost analysis as required under the APA. The purpose of the analysis under the APA was to determine how many systems would be expected in order to

ultimately provide a basis for determining cost. While the berth-by-berth analysis was completed for development of the Proposed Regulation (including to help inform CARB's APA related analysis), using the scenarios based on this evaluation would be speculative under CEQA.[1] The CARB staff analysis is a scenario that could occur (and allows CARB staff to arrive at a quantified cost estimate), but is not considered to be "reasonably foreseeable" as defined under CEQA, as various other scenarios could also occur. Conducting a berth-by-berth impact analysis for the hundreds of berths in California would provide information that could be misleading, should a different berth-by-berth scenario come to fruition. Therefore, this EA does not contain a berth-by-berth analysis, although it does provide information on the typical impacts which would result from the various control technologies and other compliance responses anticipated to occur.

D. Organization of the ~~Draft~~ Final EA

The ~~Draft~~ Final EA is organized into the following chapters to assist the reader in obtaining information about the Proposed Regulation and ~~their~~ its specific environmental issues.

- **Chapter 1, Introduction and Background,** provides a project overview and background information, and other introductory material.
- **Chapter 2, Project Description,** summarizes the Proposed Regulation, the potential reasonably foreseeable compliance responses, and implementation assumptions.
- **Chapter 3, Environmental and Regulatory Setting,** contains the environmental setting and regulatory framework relevant to the environmental analysis of the Proposed Regulation.
- **Chapter 4, Impact Analysis and Mitigation Measures,** identifies the potential environmental impacts associated with the Proposed Regulation and mitigation measures for each resource impact area.
- **Chapter 5, Cumulative and Growth-Inducing Impacts,** analyzes the potential for cumulative effects of implementing the Proposed Regulation against a backdrop of past, present, and reasonably foreseeable future projects.
- **Chapter 6, Mandatory Findings of Significance,** discusses the potential for adverse impacts on human beings, cumulatively considerable environmental

[1] CEQA Guidelines section 15145 states that, "[i]f, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact."

impacts, and whether the Proposed Regulation would have the potential to degrade the quality of the environment.

- **Chapter 7, Alternatives Analysis,** discusses a reasonable range of potentially feasible alternatives that could reduce or eliminate adverse environmental impacts associated with the Proposed Regulation.

E. Public Review Process for the Draft EA

On August 28, 2018, CARB issued a Notice of Preparation (NOP) for the Proposed Regulation, announcing that it would prepare an EA. At public workshops held on September 6, 2018 and September 17, 2018, CARB staff discussed proposed regulatory activities for drafting the new At Berth Regulation. Staff also described plans to prepare a Draft EA for the Proposed Regulation and invited public feedback on the scope of environmental analysis.

In accordance with CARB's certified regulatory program, and consistent with CARB's commitment to public review and input on regulatory actions, ~~this~~the Draft EA ~~is~~was subject to a public review process. The Staff Report, which includeds ~~this~~the EA, ~~is~~ was posted for a public review period that ~~begins~~ began on October 18, 2019 and ~~ends~~ ended on December 2, 2019. This period complies with requirements for a minimum of 45 days of public review.

At the conclusion of the public review period for the Draft EA, the Board ~~will hold~~ held public hearings on the Proposed Regulation. At the first hearing~~, currently scheduled for~~ on December 5, 2019, the Board ~~will~~ did not take any approval action on the proposal; however, the Board ~~may provide~~ provided direction to staff on modifications to make to the Proposed Regulation. On March 26, 2020, CARB released a notice with modified regulatory language and supporting documentation for a review and comment period as required under the Administrative Procedure Act. The review and comment period commenced on March 26, 2020 and ended on May 1, 2020, which more than satisfies the requirement to release modified language for at least 15 days of public review. CARB Staff's proposed changes included:

- allowing use of an Innovative Concepts (IC) provision as a compliance option. The IC provision would enable regulated entities to use lower cost options, for a specified limited period of time, to achieve earlier or equivalent (or greater) emissions reductions in port communities rather than reducing emissions directly at berth. The IC provision would provide a pathway for regulated vessel fleets to continue using fleet averaging methods to comply with the Proposed Regulation;

- extending the use of Vessel and Terminal Incident Events (VIEs and TIEs) to new and expanding fleets to encourage new business at California ports;

- providing additional operational flexibility by extending the time a vessel has to connect to shore power or another CARB approved emissions control strategy

(CAECS) from one hour to two hours by extending the timeframe for reporting deadlines and through an expansion of the remediation fund to ports and third-party CAECS operators;

- broadening the scope of the interim evaluation to include a review of public information provided to CARB, including terminal specific engineering evaluations, logistical considerations, public engagement, and independent studies will be used to help inform the evaluation and implementation timeline. Staff also propose adding language to the interim evaluation to consider potential control requirements for use with bulk and general cargo vessels, and for OGVs at anchor; and

- accelerating implementation dates for ro-ro and tanker vessels to achieve earlier public health benefits.

An additional hearing was held on June 25, 2020, and the Board provided additional direction to staff. On July 10, 2020, CARB released another notice with modified regulatory language and supporting documentation for a review and comment period as required under the Administrative Procedure Act. The review and comment period commenced on July 10, 2020, and ended on July 27, 2020, which exceeded the required 15 days. CARB Staff's proposed changes included:

- returning the implementation date for ro-ro vessels to the originally proposed compliance deadline and extending the compliance deadline for container, reefer, and cruise vessels; and

- updating TIE and VIE provisions, port and terminal submission plan dates, and the start of vessel visit reporting based on updated implementation dates.

Staff ~~would address~~ addressed ~~any~~ the proposed changes in ~~a notice that would be~~ notices that were issued with modified regulatory language and supporting documentation ~~for one or more 15-day review and comment periods~~ as required under the Administrative Procedure Act. At the conclusion of ~~all~~ the review periods, staff ~~will compile~~ compiled public comments and responses~~, including comments on the Draft EA made during the noticed 45-day comment period (or during any further comment period if CARB determines recirculation of the Draft EA is necessary),~~ and ~~prepare~~ prepared a final hearing package, which includes the Final EA and response to environmental comments, for the Proposed Regulation for the Board's consideration at a ~~second~~ public hearing. This ~~second~~ hearing is currently planned for ~~Spring~~ August 27, 2020. If the final Regulation is adopted by the Board at that time, a Notice of Decision will be posted on CARB's regulatory webpage and will be filed with the Secretary of the Natural Resources Agency. The Final Statement of Reasons (FSOR) for the Proposed Regulation would be prepared by staff and the completed regulatory package would be filed with the Office of Administrative Law.

F. Prior Environmental Analysis

When the Existing Regulation was approved in December 2007, the CARB Staff report included a chapter that was the substitute equivalent of a negative declaration, which analyzed the reasonably foreseeable environmental impacts of the methods of compliance (PRC § 21159, 14 CCR § 15187). The analysis concluded that the adoption of the Existing Regulation and the reasonably foreseeable compliance responses to the regulation would not result in significant adverse environmental impacts. In addition, the analysis determined the regulation would lead to significant health benefits from the reduction in NOx, DPM, and associated GHG reductions. When the Board approved the regulation in 2007, it found that no significant adverse impacts would result.[2]

[2] CARB, "Final Regulation Order, Airborne Toxic Control Measure for Auxiliary Diesel Engines Operated on Ocean-going Vessels At-Berth in a California Port," 2007 (accessed June 18, 2019), https://www.arb.ca.gov/ports/shorepower/finalregulation.pdf.

2.0 PROJECT DESCRIPTION

A. Description and Objectives

The proposed regulation seeks to further protect public health and air quality in communities near port and marine terminals. Health and environmental benefits will be achieved by further reducing oxides of nitrogen (NOx), reactive organic gas (ROG), fine particulate matter (PM2.5), diesel particulate matter (DPM), greenhouse gas (GHG) and black carbon emissions from vessels at berth beyond those realized by the Existing Regulation.

Key elements of the proposed regulation include:

1. Achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution.

2. Reduce at berth emissions at additional ports and terminals beyond those covered under the Existing Regulation.

3. Expand the existing emissions reductions requirements to include the additional categories of ro-ro vessels, and tankers.

4. Achieve reductions from small fleets, in addition to large fleets.

5. Reduce emissions from auxiliary engines that operate on liquefied natural gas (LNG) engines or other alternative fuels.

6. Allow ports and marine terminals the flexibility to select CARB approved technologies that are the most cost effective and feasible for their specific site and operations.

7. Reduce emissions from tankers operating boiler steam powered pumps (for off-loading crude) by requiring them to control their boiler emissions.

8. Implement a regulatory structure that is based on individual vessel visits.

9. Ensure all emission control technologies do not present any safety issues that cannot be addressed with a safety exemption provision.

10. Ensure that all parties necessary to achieving emissions reductions from individual vessel visits (including ports and terminals) undertake necessary actions to successfully reduce emissions from vessel visits.

11. Assist in achieving CARB's proposed strategy to attain health-based federal air quality standards over the next fifteen years as part of nonattainment area State Implementation Plans.

The Proposed Regulation and its requirements are described in more detail in Chapter III, "Summary of the Proposed Regulation," of the accompanying Staff Report.

B. Reasonably Foreseeable Compliance Methods for Vessels

1. Shore Power

At the time of this ~~Draft~~ Final EA's preparation, increased shore power and associated infrastructure is the most reasonably foreseeable compliance response for non-tanker vessels, which make frequent visits to California. Shore power includes equipment modifications to existing vessels and infrastructure and equipment modifications to terminals to connect to shore-based power systems. While connected to shore-based power a vessel's auxiliary engines are shut off.

Vessels using the shore power option would install equipment such as shore power connection panels, high voltage cables, and a cable drum and/or reel system for storing cables and for reaching the shore power connection shore-side. While the majority of these modifications are assumed to be made while the vessel is at its regular scheduled "dry dock," in rare occasions if a vessel is already built to be shore power capable, these modifications may take place while the vessel is in transit to California.

As part of the International Convention for the Safety of Life at Sea all merchant vessels are required to complete inspection of their hull in a dry dock at least twice within a 5-year period and the intermediate survey completed in no more than 36 months. All passenger vessels are required to dry dock annually.[3] While at dry dock, maintenance and inspections of the hull, propeller, rudder and other parts of a vessel that are usually immersed in water and inaccessible by vessel staff, are conducted. Installing shore power equipment would most likely be included in the already scheduled dry docking in order to avoid the vessel being taking out of service.

The majority of shore power installations are assumed to take place in dry docks outside of California. Labor and materials in California are consistently more expensive than other locations worldwide and as such, non-U.S. flagged vessels tend to commission construction and inspection services outside California for an economic advantage. For the small number of vessels subject to the "Jones Act," a federal law, which requires goods, shipped between U.S. ports to be transported on ships that are built, owned and operated by United States citizens or permanent residents, dry docking would be facilitated at dry docks located in and around U.S. major ports. Additional

[3] SOLAS - International Convention for the Safety of Life at Sea, Lloyd's Register Rulefinder 2005 – Version 9.4, p.43, September 21, 2009 (accessed July 24, 2019), http://www.mar.ist.utl.pt/mventura/Projecto-Navios-I/IMO-Conventions%20(copies)/SOLAS.pdf.

shore power equipment installation and maintenance would be consistent with the operations already found in dry dock operations.

In 2018, the top 10 countries (based on 2018 dollar value) with the most California imports were China, Mexico, Japan, Canada, South Korea, Malaysia, Taiwan, Vietnam, Germany, and Thailand.[4] CARB staff assumes a large share of the construction necessary to upgrade vessels with shore power would be carried out in these countries respectively. China, Japan and South Korea are the top three shipbuilding counties worldwide.

The 15-day changes published by CARB on March 26, 2020, included language to extend the time a vessel has to connect to shore power or another CARB-approved emissions control strategy from one hour to two hours. As discussed further in section 2.0(D)(1) below, this change would not generate new or substantially worse environmental impacts than what was previously analyzed in the Draft EA (Cal. Code Regs., tit. 14 Section 15188.5). The conclusions of the Draft EA remain valid, and the mitigation measures identified would continue to apply in instances where impacts were found to be potentially significant.

2. Capture and Control

In cases where vessels are not equipped for shore-based power or when vessels are infrequent (i.e. tramper) visitors to California, the most reasonable compliance response would be to use barge- or land-based capture and control systems. For this compliance strategy, no vessel modifications would be necessary.

Land- and barge-based emission control systems or “capture and control” systems are exhaust gas scrubbing technologies combined with after-treatment technologies that allow for the capture of auxiliary engine emissions as they exit the vessel’s stack. With this control system, a vessel will continue to burn compliant marine gas oil (MGO) or marine diesel oil (MDO) in its auxiliary engines and boilers while berthed. The exhaust from the operating auxiliary engines and boilers is treated to remove NOx, PM2.5, DPM, black carbon and ROG before it is released into the atmosphere. The exhaust cleanup system captures the vessel’s exhaust directly from the exhaust stack, using long, flexible ducting to transfer the exhaust back to the barge- or land- based system to be scrubbed/cleaned.

At the time of preparation of this ~~Draft~~ Final EA, there are two CARB approved barge-based capture and control devices in use in California one located in POLA and one in POLB. Both systems use two clean-diesel generators (100kW to 200kW each) for powering their systems and have a separate engine to power the crane arm (approximately 200kW) that operates an average of two hours per vessel visit. Due to

[4] U.S Census Bureau, “Total U.S. Imports to California Top 25 Countries Based on 2018 Dollar Value,” 2018 (accessed July 1, 2019), https://www.census.gov/foreign-trade/statistics/state/data/imports/ca.html#ctry.

the fuel burned in these systems' generators and the vessel's engines, despite a significant decrease in NOx, PM2.5, DPM and ROG by using these systems, the capture and control system's use is expected to increase greenhouse gas (GHG) emissions on an individual vessel visit basis unless GHG reduction measures (such as using renewable fuel) are implemented. An added benefit of using this technology is its ability to capture emissions from a vessel's boiler in addition to auxiliary engine emissions, something shore power is not capable of doing.

3. On-board Technologies

Many control technologies have been proven to reduce emissions of NOx, PM2.5, DPM, black carbon and ROG from land-based diesel-fueled engines, but there is still limited use and experience applying these technologies to marine vessel engines. While there are currently no on-board emission control strategies verified by CARB for ocean-going vessel applications, CARB believes such control strategies will be developed.

Demonstration projects have been conducted on vessels to reduce emissions. These involved the use of portable distributed generation, seawater scrubbers, on-demand water/fuel emulsion systems, and Selective Catalytic Reduction (SCR). Because these technologies are still at an early stage for ocean-going vessels, CARB staff cannot predict at this time the future deployment or feasibility of these alternative technologies as effective emission control measures.

Selective Catalytic Reduction (SCR)[5]
SCR is an effective control technology for reducing NOx emissions from combustion sources, including marine diesel engines. It is currently used as a control for NOx in both CARB approved barge-based capture and control systems. SCR systems treat exhaust gases with ammonia or urea and route it through a catalytic converter. In the catalytic converter, a selective chemical reaction takes place that targets NOx, breaking it down into nitrogen and water. SCR systems can reduce NOx emissions by over 90 percent, depending on a number of factors, such as the catalyst used, fuel quality, and engine exhaust temperature. SCR however does not reduce DPM, ROG or PM2.5 emissions. At this time, a vessel would need to use SCR in combination with a PM and ROG reducing strategy in order to comply with the Proposed Regulation.

SCR systems are easier to install on new builds compared to retrofit installations. These systems can take up significant amounts of space onboard vessels and each engine has to have its own SCR system, making SCR retrofits on marine vessels uncommon. Although most SCR systems are installed on the vessel main engines, there have been some retrofits on vessel auxiliary engines. SCRs are currently being

[5] CARB, "Draft Technology Assessment: Ocean-Going Vessels," 2018, https://www.arb.ca.gov/msprog/tech/techreport/ogv_tech_report.pdf.

used on ocean-going vessels and can be used for compliance with IMO NOx Tier III Regulations.[6]

Many catalyst materials contain heavy metal oxides that are hazardous to human health. The catalyst vanadium pentoxide, for example, is on the U.S. EPA's Extremely Hazardous Substances list. In California, spent catalyst from SCR is considered to be hazardous waste.

As mentioned previously, ammonia or urea is necessary for the chemical reactions in SCR. Urea is less expensive and less hazardous than ammonia, so almost all systems use urea. In the unlikely event in which ammonia is used in place of urea, there could be some environmental impacts. Ammonia is on the U.S. EPA's list of extremely hazardous substances under Title III, Section 302 of the Superfund Amendments and Reauthorization Act of 1986 (SARA).[7] Exposure to ammonia causes eye, nose, and throat irritation, and it will burn the skin.

Ammonia for an SCR unit is stored in a large tank or tanks. Accidental release from storage could pose problems to communities surrounding a vessel or facility equipped with SCR. Ammonia slip could also occur when excess ammonia is present in the final exhaust from the SCR process. This could happen because the ammonia is never entirely consumed, too much is added, the catalyst temperatures are inaccurate, or the catalyst has degraded.

Scrubbers

Scrubbers are exhaust after-treatment devices that remove pollutants in the exhaust stream through contact with a sorbent material. While there are both wet and dry types of scrubbers, the designs used for marine vessels are generally wet scrubbers. Wet scrubbers deliver a fine spray of fresh or seawater that mixes with the exhaust gases and dissolves oxides of sulfur (SOx). Scrubbers can also be either an "open-loop", a process where water is taken from the sea, used for scrubbing, and treated and discharged back to sea, or can be a "closed-loop" system (or even a hybrid), where freshwater treated with an alkaline chemical such as caustic soda is used for neutralization and scrubbing.[8] Open scrubber systems have faced restrictions, in places such as Singapore, Fujairah and China, over concerns that these devices pollute the water. The continued use of scrubbers depends on the successful completion of

[6] Yanmar, Marine SCR System for Compliance with IMO NOx Tier 3 Regulations," 2018 (accessed July 2, 2019), https://www.yanmar.com/sg/technology/technical_review/2018/0413_2.html.
[7] U.S. EPA "Superfund Amendments and Reauthorization Act of 1986," 1986 (accessed June 20, 2019), https://legcounsel.house.gov/Comps/Superfund%20Amendments%20And%20Reauthorization%20Act%20Of%201986.pdf.
[8] EGCSA "What is an exhaust gas cleaning system," 2019 (accessed June 20, 2019), https://www.egcsa.com/technical-reference/what-is-an-exhaust-gas-cleaning-system/

monitoring specified in the IMO guidelines,[9] that recommend continuous monitoring and long-term scientific studies to prove they do not negatively impact the environment.[10]

Although these systems are primarily designed to remove SOx, they also remove PM and, to a lesser degree, NOx emissions. Rigorous emission reduction tests of scrubber performance have shown SOx reductions similar to manufacturer claims and PM reductions somewhat lower than expected.[11] In order for scrubber to qualify as a compliance option for the Proposed Regulation, testing would have to be conducted on each vessel utilizing a scrubber and could potentially require additional emission control systems.

Water/Fuel Emulsion

Water/fuel emulsion is the method of adding water to the fuel, prior to injection into the combustion chamber of direct injection diesel engines. It is an effective way of reducing the flame temperature, thereby suppressing the formation of NOx. Studies have shown a reduction of NOx of approximately 20 percent. As well as, reduced PM emissions from more efficient combustion.[12] A vessel could use this strategy in a combination with others in order to reduce emissions to a CARB approved level.

Distributed Generation

Distributed generation is when a technology or technologies that generate electricity are at or near where it will be used, such as solar panels and combined heat and power. In the commercial and industrial sectors, distributed generation can include resources such as:[13]

- Combined heat and power systems.
- Solar photovoltaic panels.
- Wind.
- Hydropower.

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[9] IMO "2015 GUIDELINES FOR EXHAUST GAS CLEANING SYSTEMS," 2015 (accessed June 20, 2019), http://www.imo.org/en/KnowledgeCentre/IndexofIMOResolutions/Marine-Environment-Protection-Committee-(MEPC)/Documents/MEPC.259(68).pdf.

[10] U.S.EPA, "Exhaust Gas Scrubber Washwater Effluent" 2011 (accessed July 11, 2019), https://www3.epa.gov/npdes/pubs/vgp_exhaust_gas_scrubber.pdf.

[11] CARB "Draft Technology Assessment: Ocean-going Vessels," 2018, (accessed June 20, 2019) https://www.arb.ca.gov/msprog/tech/techreport/ogv_tech_report.pdf?_ga=2.81570579.504554219.1561053613-1098529853.1513270945.

[12] Suresh Vellaiyan, K.S. Amirthagadeswaran, "The role of water-in-diesel emulsion and its additives on diesel engine performance and emission levels: A retrospective review," Alexandria Engineering Journal Volume 55, Issue 3, September 2016, Pages 2463-2472.

[13] U.S. EPA, "Distributed Generation of Electricity and its Environmental Impacts," n.d. (accessed October 10, 2018), https://www.epa.gov/energy/distributed-generation-electricity-and-its-environmental-impacts

- Biomass combustion or cofiring.
- Municipal solid waste incineration.
- Fuel cells fired by natural gas or biomass.
- Reciprocating combustion engines, including backup generators, which may be fueled by oil.

The California Energy Commission's Assessment of Clean Energy Measures, reports that distributed generation and storage has already provided significant benefits to ports ranging from energy savings to emissions reductions.[14] CARB can foresee distributed generation as part micro grid. Since onboard technologies combinations have yet to be developed and approved for use with the Proposed Regulation, it is not possible to determine the environmental effects of their use at this time.

4. Alternative Fuels

At the time of preparation of this ~~Draft~~ Final EA, two and four stroke marine engines operating on liquefied natural gas (LNG) have substantially lower emission of SOx, NOx, CO2, and PM emissions. Emissions of unburnt methane (known as "methane slip") and the corresponding GHG emissions can vary depending on the engine type. The amount of methane slip is found to be higher in the four-stroke Otto-cycle engines compared to the two-stroke Diesel-cycle engines.[15] Methane slip in LNG-powered vessels is a result of gas leaks during bunker transfers, when a small proportion of natural gas in the engine combustion chambers fails to burn and escapes through the exhaust system to the atmosphere.[16] The Existing Regulation exempts vessels using natural gas in their auxiliary engines from the requirements. However, the Proposed Regulation would no longer exempt vessels using alternative fuels. To use alternative fuels as an emission control strategy the Proposed Regulation would require entities to submit a test plan and proof that emissions reductions obtained by using alternative fuels will meet specified reduction requirements.

Retrofitting existing vessel engines and boilers to run on LNG is constrained by the space available onboard the vessel and is a costly procedure that is unlikely to occur. On the other hand, according to the U.S. Maritime Administration, the shipping industry

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[14] CEC, "California Energy Commission, Assessment of Clean Energy Measures for California Ports'" 2016, (accessed June 20, 2019), https://www.energy.ca.gov/2016publications/CEC-500-2016-060/CEC-500-2016-060.pdf.

[15] CARB, "Technical Support Document: Initial Statement of Reasons for the Proposed Rulemaking Regulations to Reduce Emissions from Diesel Auxiliary Engines on Ocean-Going Vessels while At-Berth at a California Port," 2007, (accessed July 11, 2019), https://ww3.arb.ca.gov/regact/2007/shorepwr07/tsd.pdf.

[16] Mike Corkhill, LNG World Shipping, "LNG fuel and the ship emissions debate," July 31, 2018 (accessed October 8, 2018).

considers LNG as a feasible, economical, and a low-emitting alternative to traditional petroleum fuels. For these reasons, natural gas is emerging as an attractive fuel for many newly constructed vessels.[17] Vessels (retrofitted or new builds) using LNG would be modified or built while at dry dock and would be consistent with other vessel repair activities, so such retrofitting would not create any new significant environmental impacts. Incorporation of LNG at ports does require extensive infrastructure investments, which is discussed in this ~~Draft~~ Final EA.

Other fuel alternatives like biodiesel and biodiesel blends are currently not available for delivery through normal fuel pipelines or at the quantities needed, and thus have limited availability. These fuels and any possible environmental effects associated with their use are not included for evaluation in this ~~Draft~~ Final EA.

5. Vessel Incident Event (VIE) or Remediation Fund

Vessel Incident Events (VIE) aim to address instances when a vessel is unable to connect to an emissions control strategy. A VIE allows for limited visits where a vessel is unable to reduce emissions. The allowed VIEs are based on a percentage of visits by a California fleet during the previous year, and the number of VIEs allowed for each fleet is determined at the beginning of each year. This additional compliance option accounts for the uncertainty that often surrounds vessel movements and cargo operations, such as vessel redeployment. VIEs are limited to certain operational events and the number of VIEs available for use are capped in order to keep emissions reductions high for surrounding port communities. Note that VIEs would serve some of the same function as the compliance advisories under the Existing Regulation (see section 3.0).

Another compliance option is the remediation fund. As described in greater detail in Chapters III and IV of the Initial Statement of Reasons (ISOR), ~~T~~the remediation fund compliance option was developed for use in limited circumstances where investments needed to comply with the Regulation have already been made, but reductions are not achievable during a vessel's visit at berth. The fund option allows vessels to comply with the Proposed Regulation by remediating lost emissions reductions due to qualified events such as equipment repair, construction projects, delays in connecting to a control strategy and alternative control technology failure. The remediation fund is designed to allow vessel and terminal operators to mitigate uncontrolled at berth emissions in limited situations. Any remediation funds are required to be invested into projects benefitting the communities impacted by the uncontrolled vessel visits. The Proposed Regulation also includes criteria for using the remediation fund so that it is used to obtain emissions reductions that meet health and air quality goals of the Proposed Regulation. CARB gives remediation fund administrators (e.g. districts) substantial discretion in deciding which kinds of activities to implement with funding from

[17] James J. Corbett, Ph.D, Heather Thomson, Ph.D., and James J. Winebrake, Ph.D, University of Delaware for the U.S. Department of Transportation, "Methane Emissions from Natural Gas Bunkering Operations in the Marine Sector: A Total Fuel Cycle Approach," November 21, 2015.

this mechanism, and these projects may need to undergo CEQA review when they are identified and undertaken. As such, the evaluation of these impacts would be speculative under CEQA (Cal. Code Regs., tit. 14 Section 15145). ~~More detailed information about VIEs and the remediation fund can be found in Chapter III of the Proposed Regulation's Initial Statement of Reasons (ISOR).~~

The 15-day changes published by CARB on March 26, 2020, included language that would expand the use of VIEs to new and expanding fleets. The 15-day changes published by CARB on July 10, 2020, updated VIE and TIE provisions to match the updated implementation schedule. The structure of the TIE/VIE provision specifically caps the number of TIEs/VIEs at a low percentage rate. Therefore inclusion of this provision is expected to result in little to no decrease in the overall emissions reductions that would be achieved from the Proposed Regulation. These changes would not generate new or substantially worse environmental impacts than what was previously analyzed in the Draft EA (Cal. Code Regs., tit. 14 Section 15188.5). The conclusions of the Draft EA therefore remain valid.

6. Innovative Concepts Provision

The 15-day changes published by CARB on March 26, 2020, included an IC provision as a compliance option for the Proposed Regulation. The IC provision enables entities to use lower cost options to achieve an earlier or equivalent emissions reduction through providing additional pathways for regulated vessels to continue using fleet averaging methods of compliance. To utilize the IC provision, applicants must first receive approval from the Executive Officer to ensure that equal or better reductions in DPM, NOx, and ROG emissions would be achieved without increasing GHG emissions. IC projects would need to achieve reductions in and around the proximity of a covered port to ensure that these emissions reductions have localized air quality benefits. CARB anticipates that impacts relating to this option, to the extent there may be any, would be in-line with the infrastructure-related compliance responses already analyzed in the Draft EA. However, IC projects could manifest in a number of forms and it remains unclear whether, where, how, and when this additional compliance option would be used. Even if the Executive Officer approves an innovative concept application, that approval does not mean an innovative concept will ultimately be developed or used for compliance with the proposed regulation. Vessel and terminal operations are fluid and may change from year to year in response to an array of economic, political, and logistical factors. As such, it is speculative to predict how emissions reductions could be realized through the IC provision (Cal. Code Regs., tit. 14 Section 15145). Therefore, CARB need not evaluate environmental impacts of compliance responses associated with the IC provision.

C. Summary of Reasonably Foreseeable Compliance Responses: All Vessels

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel

systems) to existing vessels to accommodate shore power usage. Implementation could also result in modifications to vessels for the installation of LNG tanks or other onboard technologies.

The majority of shore power installations are assumed to take place in dry docks outside of California. CARB staff believes modifications required for compliance responses would mostly be in countries where labor is less expensive and vessels would frequent anyway, such as in China, Mexico, Japan, Canada, South Korea, Malaysia, Taiwan, Vietnam, Germany, and Thailand. No new servicing facilities would be expected for foreseeable vessel compliance responses.

D. Reasonably Foreseeable Compliance Responses: for Ports and Terminals

CARB anticipates that physical and operational changes would likely result from the Proposed Regulation. Due to the operational differences between the ports and terminals in California, reasonably foreseeable compliance responses to the Proposed Regulation, as described below, could be either from ports or terminal operators, or a combination of the two.

1. Ports and/or Terminals – Shore Power Option

California ports and/or terminals that support vessel visits that exceed the regulated vessel visit thresholds would be required to help facilitate vessels' hoteling emissions reductions while at berth. Terminal visit thresholds are for container, reefer, cruise, ro-ro, or tanker terminals in California that receive 20 or more visits from any of those five specific vessels types. Reasonably foreseeable compliance responses for ports and/or terminals could include making modifications to berths for shore-based power infrastructure.

Ports and/or terminals subject to the Proposed Regulation may need to perform analysis of sites to determine the best compliance options for terminals and berths. Upon determination of the best compliance pathway(s), ports and/or terminals may also need to construct shore-side infrastructure.

For shore power options, ports and/or terminals may need to install equipment such as new high-voltage cable lines, power meters, and circuit breaker main cabinets. Shore power substations may be required. Substations are used to convert electricity from high-voltage transmission lines, to a lower voltage and then distributed to an end use, such as shore power.[18] Development of substations could include construction of concrete pads that house equipment like transformers, power circuit breakers, and high-voltage load (HVL) break interrupters. Shore power outlet vaults could be located either above or below ground at an affected berth. Figure D-1 below shows a vault that is

[18] United States Department of Labor, "Illustrated Glossary: Substations," Accessed July 24, 2019, https://www.osha.gov/SLTC/etools/electric_power/illustrated_glossary/substation.html.

located below the berth. Some berths may choose to install cable management systems to expand the reach from an outlet or “vault,” to a vessel (Figure D-2).

Figure D-1: Shore Power Vault

Figure D-2: Cable Management System

Adding berth-side equipment may require ports and/or terminals to upgrade wharf infrastructure. This may include the addition of new pilings and new surface area to existing piers/ports and/or terminals to allow for additional weight or space for vault and cable systems. In addition, the use of shore power may require a small increase in the

number of workers at the port or terminal, shore power often only requires one to two shore-side workers to assist with shore power connection and disconnection operations.

Increasing power loads for vessels to use while at berth may require electrical and support infrastructure, which would be installed by existing utility service providers. It is reasonably assumed that additional power would require the installation of new or additional high-voltage lines and substations to increase the power supply required by vessels while at berth. Construction equipment, workers, and material deliveries for power utility modifications would be needed at the ports/terminals, as well as in areas subject to upgrading along the utilities' existing infrastructure.

In rare cases, additional power generation may be needed to accommodate the large electrical loads generated by vessels at berth. In these cases, power plants that generally run only when there is a high demand for electricity (called peaking power plants or "peaker plants"), or power storage systems (lithium-ion batteries), may be required. In such cases, it is reasonable to assume there would be an increase in construction-related activities associated with implementing infrastructure changes, an increase in power generation from power plants during periods of peak energy demand requiring the use of peaker plants, and an increase in demand for lithium-ion based batteries for electricity storage to serve the demands of these vessels.

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations.

An increase in demand for lithium-ion based batteries could require an increase in manufacturing and recycling facilities and associated increases in lithium mining and exports from countries with raw mineral supplies (e.g., Chile, Argentina, and China). The United States is also a source for lithium (e.g., a mining operation currently exists in Nevada). Disposal of batteries would be subject to, and comply with, existing laws and regulations governing solid waste and hazardous waste, such as California's Universal Waste Rule (22 California Code of Regulations [CCR] Chapter 23). That is, disposal of used batteries into solid waste landfills is prohibited; however, batteries could be refurbished or re-used, recycled or disposed of as hazardous waste. To meet an increased demand of refurbishing or reusing batteries, it is anticipated that new facilities or modifications to existing facilities would be needed.

The 15-day changes published by CARB on March 26, 2020, included language to extend the time a vessel has to connect to shore power or another CARB-approved emissions control strategy from one hour to two hours. This change would not generate new or substantially more severe environmental impacts than what was previously analyzed in the Draft EA (Cal. Code Regs., tit. 14 Section 15088.5).

Extending the time to begin controlling emissions from 1 hour to 2 hours from "ready to work" is expected to only minimally affect the projected emissions reductions from the proposed Control Measure. As explained in the first 15-day notice, staff analyzed a worst case scenario where every vessel visit utilized the additional hour to connect to a CAECS. This was calculated using the emissions inventory methodology assumptions (ISOR Appendix H) for power used by vessels statewide and average visit durations. In a worst-case scenario, emissions reductions would decrease no more than 2.6 percent overall from the original regulatory proposal when compared to a one hour connection limit.

The actual impact to emissions is expected to be much lower. Based on past compliance data for the 2007 At-Berth Regulation, over half of all vessel visits were able to connect to shore power within two hours of tying first line to the dock. With the change of a visit shifting from "first line" until "Ready to Work" in the Proposed Regulation (when the vessel is fully tied to the dock and cleared by all relevant government agencies), these visits are expected to connect within one hour of "ready to work". Staff anticipate most of the remaining visits will connect within 2 hours of "ready to work". Only a small portion of vessel visits will be worst case, requiring the entire two hours to connect to shore power or to an alternative CAECS.

The 2 hour limit will provide increased regulatory certainty to vessel operators and terminal operators with minimal impact on emissions. Furthermore, as shown throughout the ISOR and the Final EA, the proposed regulation would result in substantial overall emissions reductions compared to existing conditions. This would remain true with this change. In summary, none of the proposed changes would result in a new significant environmental impact, or substantially increase the severity of a previously-identified significant impact. Therefore, the conclusions of the Draft EA remain valid, and recirculation of the Environmental Analysis is not required.

2. Ports and/or Terminals Capture and Control Device Option

California terminals subject to the Proposed Regulation would be required to facilitate vessel air pollution emission reductions while at berth. Reasonably foreseeable compliance responses for ports and/or terminals include installing modifications to berths for providing shore-side capture and control devices and providing barge-based systems for vessels at berth.

Capture and control devices approved for use with the Existing Regulation can be either shore-side or barge-based. Installation of capture and control systems on shore would require construction of such systems within the port or terminal.

At areas around berths where capture and control systems will operate, modifications to existing infrastructure or the building of new piers may be required to allow for additional weight and space requirements from system equipment.

Construction equipment, workers, and material deliveries for capture and control would be needed at affected ports and terminals. In addition, an increase in the number of workers may be required to install and operate capture and control devices.

3. Ports and/or Terminals Other Land-Based Upgrades and Equipment

There is inherent uncertainty surrounding which compliance pathways any given entity affected by the Proposed Regulation would select; however, during discussions with stakeholders, various feasible options were introduced and discussed. For example, with respect to crude oil tanker vessels, whose emissions primarily originate from offloading crude oil, use of electric booster pumps, increasing oil pipeline capacity, and additional tank storage may be feasible emission reduction strategies for these vessels at berth, by reducing the engine load and time the auxiliary engines are operating.

Additional land-based control options would involve modification to infrastructure. Changes to individual ports and terminals may require site specific permitting and other individualized requirements from independent and regulatory entities. For example, any infrastructure modifications to tanker terminals would require construction to follow Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS). Each tanker project is reviewed by the MOTEMS Commission, and should be MOTEMS compliant prior to use or reuse. In addition, changes to the terminal or port infrastructure may be required to obtain wetlands permitting, follow guidelines and receive approval of the U.S. Coast Guard, observe Health and Safety Assessments for work activities, and at each port, Air District, city or coastal permitting may apply. In most cases, individual CEQA evaluations would be completed for each project. Infrastructure needs would be contingent upon a variety of factors that are not under the control or authority of CARB and not within its purview.

i. Alternative Fuels

At the time of writing this ~~Draft~~ Final EA, LNG was determined to be a fuel used in vessel auxiliary engines with the potential to considerably reduce SOx, NOx, CO2, ROG and PM emissions. To enable use of alternative fuels, substantial new and improved infrastructure would be required in and near ports across the state, and in other areas to support the alternative fuel supply chain. This includes equipment such as natural gas pipelines, holding tanks, distribution centers, and fueling stations. At the time of writing this ~~Draft~~ Final EA, it is assumed that deployment of alternative fuels and associated infrastructure would be dependent upon a variety of factors that are not under the control or authority of CARB and not within its purview. There are many different programs, agencies and regulatory entities which cover California's energy and fueling infrastructure. Agencies such as the Federal Energy Regulatory Commission, North American Electric Reliability Corporation, California Energy Commission, the California Public Utilities Commission, California Department of Water Resources and local Air Districts may all have different requirements for infrastructure. Each project may have one or many requirements of which CARB staff is not fully aware and the particular

impacts are too speculative for evaluation, therefore CARB has not quantified the potential air quality and GHG emissions impacts of alternative fuel use.

ii. Fuel Cells

Fuel cells have potential application as an emissions reducing technology on vessels. Fuel cells convert the chemical energy of fuel, typically hydrogen or natural gas, to electricity through electrochemical reactions. Currently, fuel cells can be used as a supplemental system or for auxiliary power, but they have not yet been widely technically or commercially tested in a port environment. In 2016, the U.S. Department of Energy, Sandia National Laboratories and Young Brothers tested a first-of-its-kind 100 kW generator with 72 kg of hydrogen storage fuel cell designed and built by Hydrogenics for port use. For 10 months, Young Brothers used the fuel cell generator to power refrigerated containers in Honolulu, HI.[19]

Costs of this system include: purchasing fuel cell modules as well as any purchased or subcontracted balance of plant components such as hydrogen tanks, sensors, environmental system, cooling system, and other power-conditioning and electronic equipment. The study found the average cost for a fuel cell generator project to be approximately $1,000/kW.[20] With the average vessel subject to the Proposed Regulation power demand being 700 kW to 5,000 kW or more, the capital costs and price of operating and maintaining a vessel using fuel cells is considerably higher than other compliance options. In addition to high costs, at the time of this ~~Draft~~ Final EA, there is limited availability of fuel cell infrastructure.

4. Terminal Incident Events (TIE) or Remediation Fund

Terminal Incident Events (TIE) aim to address instances when a terminal is unable to connect a vessel to an emissions control strategy. A TIE allows for limited visits where a vessel does not reduce emissions. The allowed TIEs are based on a percentage of visits to a California terminal during the previous year, and the number of TIEs allowed for each terminal is determined at the beginning of each year. This additional compliance option accounts for the uncertainty that often surrounds vessel movements and terminal cargo operations, such as terminal congestion, misalignment issues, or when vessels berthed with the shore power plug on the opposite side of the vault. TIEs are limited to certain operational events and the number of TIEs available for use are capped in order to keep emissions reductions high for surrounding port communities.

Another compliance option is the remediation fund. As described in greater detail in Chapters III and IV of the Initial Statement of Reasons (ISOR), ~~T~~the remediation fund compliance option was developed for use in limited circumstances where investments needed to comply with the Regulation have already been made, but reductions are not

[19] Joseph W. Pratt and Shuk Han Chan, Maritime Fuel Cell Generator Project, "Energy Innovation Department, Sandia National Laboratories," May 2017.
[20] Joseph W. Pratt and Shuk Han Chan, Maritime Fuel Cell Generator Project, "Energy Innovation Department, Sandia National Laboratories," May 2017.

achievable during a vessel's visit at berth. The fund option allows terminals to comply with the Proposed Regulation by remediating lost emissions reductions due to qualified events such as, extended equipment repair, construction, delays in connecting to a control strategy and alternative control technology failure. The remediation fund is designed to allow vessel and terminal operators to mitigate uncontrolled at berth emissions in limited situations. Any remediation funds are required to be invested into projects benefitting the communities impacted by the uncontrolled at berth emissions. The Proposed Regulation also includes criteria for using the remediation fund so that it is used to obtain emissions reductions that meet health and air quality goals of the Proposed Regulation. CARB gives remediation fund administrators (e.g. districts) substantial discretion in deciding which kinds of activities to implement with funding from this mechanism, and these projects may need to undergo CEQA review when they are identified and undertaken. As such, the evaluation of these impacts would be speculative under CEQA (Cal. Code Regs., tit. 14 Section 15145). ~~More detailed information about TIEs and the remediation fund options can be found in Chapter III of the Proposed Regulation's ISOR.~~

The 15-day changes published by CARB on March 26, 2020, included language that would expand the use of TIEs and VIEs to new and expanding fleets. The 15-day changes published by CARB on July 10, 2020, updated VIE and TIE provisions to match the updated implementation schedule. The structure of the TIE/VIE provision specifically caps the number of TIEs/VIEs at a low percentage rate, therefore inclusion of this provision is expected to result in little to no decrease in the overall emissions reductions that would be achieved from the Proposed Regulation. The 15-day changes also expanded the remediation fund to ports. These changes would not generate new or substantially more severe environmental impacts to ports and berths than what was previously analyzed in the Draft EA (Cal. Code Regs., tit. 14 Section 15088.5). The conclusions of the Draft EA remain valid.

5. Innovative Concepts Provision

The 15-day changes published by CARB on March 26, 2020, included an IC provision as a compliance option for the Proposed Regulation. The IC provision enables entities to use lower cost options to achieve an earlier or equivalent emissions reduction through providing additional pathways for regulated ports to continue using fleet averaging methods of compliance. To utilize the IC provision, applicants must first receive approval from the Executive Officer to ensure that equal or better reductions in DPM, NOx, and ROG emissions would be achieved without increasing GHG emissions. IC projects would need to achieve emissions reductions in and around a covered port to ensure that these emissions reductions have localized air quality benefits. CARB anticipates that impacts relating to this option, to the extent there may be any, would be in-line with the infrastructure-related compliance responses already analyzed in the Draft EA. However, IC projects could manifest in a number of forms and it remains unclear whether, where, how, and when this additional compliance option would be used. Even if the Executive Officer approves an innovative concept application, that approval does not mean an innovative concept will ultimately be developed or used for

compliance with the proposed regulation. Vessel and terminal operations are fluid and may change from year to year in response to an array of economic, political, and logistical factors. As such, it would be speculative to predict how emissions reductions could be realized through the IC provision (Cal. Code Regs., tit. 14 Section 15145). Therefore, CARB need not evaluate environmental impacts of compliance responses associated with the IC provision.

E. Summary of Reasonably Foreseeable Compliance Responses: Ports and Terminals

Implementation of the Proposed Regulation could result in construction of new infrastructure or modification to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increase shore power, as well as modifications to berths to provide shore-side capture and control systems and barge-based systems. Shore power and capture and control systems could require the construction of new pilings and surface area upon which such systems would be installed. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries to provide additional electricity to vessels with large electrical loads. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure to support the use of alternative fuels and fuel cells. As described in detail in At Berth ISOR Appendix E, staff anticipated that only one cruise vessel berth, at the Port of San Francisco, may need to be retrofitted to provide shore power where none currently exists. There are different ways in which the Port of San Francisco may decide to modify a berth to accommodate shore power. Because of the uncertainty in infrastructural changes staff has determined assessing the emissions associated with construction of a new shore power at a berth at the Port of San Francisco too speculative for evaluation. CARB staff understand that the development, review and approval process for projects located in California requires environmental review consistent with California environmental laws (e.g., CEQA) and other applicable local requirements (e.g., local air quality district rules and regulations). During that time, the environmental review process would include an assessment of whether or not implementation of the project at the Port of San Francisco could result in short-term or long-term construction-related air quality impacts.

Staff does not foresee any container and reefer terminals which would need to install shore power where none currently exists. However, staff assumes that up to five additional shore power vaults may need to be installed at container and reefer terminals that are already shore power capable in order to accommodate larger vessels and berthing positions. These additional vaults may be located in Oakland (three vaults) and Los Angeles (two vaults).

CARB staff does not foresee shore power as an expected compliance method for ro-ro vessels. Staff's assumptions regarding anticipated technology at each ro-ro terminal and berth are stated in the ISOR Appendix E. Staff believes ro-ro vessels and their corresponding terminals will not utilize shore power because; (1) a high number of ro-ro vessels are infrequent visitors to California ports compared to container and reefer

vessels; (2) ro-ro vessels tend to visit multiple California berths in a single voyage requiring consistent emission control infrastructure; (3) ro-ro vessels have short visits compared with the length of time it takes to connect vessels to shore power; and (4) the cost to install shore power on vessels that infrequent visits to California ports is too expensive. Therefore, staff has assumed ro-ro vessels would primarily use barge- and land- based capture and control systems for compliance. Staff assumed most terminals would be utilizing barge-based systems but land-based capture and control would work well in Hueneme, Long Beach and San Diego. Staff has assumed landside system at each of those ports.

Tanker fleets, terminals and operators have indicated to CARB that, due the difficulty of equipping a global fleet of tanker vessels with shore power equipment, tankers would likely use capture and control options at all terminals statewide where emissions control would be required. Therefore, CARB does not assume any shore power infrastructure required for tanker vessels or the terminals they visit. It is assumed that tankers would use landside capture and control systems where exhaust gas is captured in a duct from the vessel stack and routed to an emission control system. Five land-based capture and control systems would be needed in Carquinez, four in Long Beach, five in Los Angeles, four in Richmond, two in Rodeo, and one in Stockton.

Prior to construction, projects may require permits/approvals from local air districts, cities, and other agencies. An example of the agencies and the permits that could be required for the construction of shore power or land-based capture and control systems is shown in Table D.2-1 below. The permits/approvals described may vary depending on each project and throughout the project process, and some may require review under CEQA.

Table D.2-1: Example of Agencies and Permits that may be Required for Compliance Response Projects (Infrastructure Installations)

Jurisdiction	Responsible Agency	Permit Type
Federal	State Water Resources Control Board	National Pollutant Discharge Elimination System (NPDES) permit Stormwater Pollution Prevention Plan (SWPPP)
	U.S. Army Corps of Engineers	Clean Water Act Section 404
	National Oceanic and Atmospheric Administration	Endangered Species Act Incidental Take Permit
	Regional Water Quality Control Board	Clean Water Act Section 401
State	Air Districts (e.g. SCAQMD, SDCAPCD, BAAQMD)	Various (e.g., fugitive dust plan, permit to construct)
	Regional Water Quality Control Board	Water Quality Certification
	California Department of Fish and Wildlife	Lake and Streambed Alteration Agreement
	California Department of Transportation	Permit to operate oversized-transport vehicles on State highways
Local	Harbor Department (e.g. Los Angeles)	Permit

3.0. ENVIRONMENTAL AND REGULATORY SETTING

CEQA Guidelines require an environmental impact report (EIR) to include an environmental setting section that discusses the current environmental conditions in the vicinity of the project. This environmental setting normally constitutes the baseline physical conditions against which an impact is compared to determine whether or not it is significant (14 California Code of Regulations (CCR) Section 15125). For this EA, CARB is using a 2018 baseline, as that is the year in which the environmental analysis commenced (the NOP was posted on August 28, 2018). The baseline therefore includes the Existing Regulation, as it applies in 2018.[21]

As discussed in Chapter 1 of this ~~Draft~~ Final Environmental Analysis (~~Draft~~ Final EA), the California Air Resources Board (CARB or Board) has a CEQA certified regulatory program and prepares an environmental analysis (EA) in lieu of an EIR. This ~~Draft~~ Final EA is a functional equivalent to an EIR under CEQA; therefore, in an effort to comply with the policy objectives of CEQA, an environmental setting and a regulatory setting with environmental laws and regulations relevant to the Proposed Regulation have been included as Attachment A to this ~~Draft~~ Final EA.

[21] Note that in 2013, 2015, and 2017, advisories were issued to inform affected vessel fleets and terminal operators as to how CARB would proceed with enforcement of the Existing Regulation. Under these advisories, fleets could apply on a case-by-case basis for scenario relief, with the objective of providing flexibility to fleets that have equipped their vessels to use shore power or contracted to use an alternative control technology. Implementation fixes and other aspects of the Proposed Regulation would help address the challenges and a fleet's ability to comply with the Existing Regulation that is currently accomplished with the advisory scenarios.

4.0. IMPACT ANALYSIS AND MITIGATION MEASURES

A. Approach to the Environmental Impacts Analysis and Mitigation Measures

This chapter contains an analysis of environmental impacts and mitigation measures associated with Proposed Regulation. The California Environmental Quality Act (CEQA) states the baseline for determining the significance of environmental impacts would normally be the existing conditions at the time the environmental review is initiated (14 California Code of Regulations [CCR] Section 15125(a)). Therefore, significance determinations reflected in this ~~Draft~~ Final Environmental Analysis (~~Draft~~ Final EA) are based on a comparison of the potential environmental consequences of the Proposed Regulation with the regulatory setting and physical conditions in 2018 (see Attachment A). For the purpose of determining whether the Proposed Regulation may have a potential effect on the environment, the California Air Resources Board (CARB or Board) evaluated the potential physical changes to the environment resulting from the reasonably foreseeable compliance responses described in further detail in Chapter 2 of this ~~Draft~~ Final EA. A table summarizing all the potential impacts and proposed mitigation for each resource area discussed below is included at Attachment C to this document.

The reasonably foreseeable compliance responses associated with the Proposed Regulation are analyzed in a programmatic manner for several reasons: (1) any individual action or activity would be carried out under the same authorizing regulatory authority; (2) the reasonably foreseeable compliance responses would result in generally similar environmental effects that can be mitigated in similar ways (14 CCR Section 15168(a)(4)); and (3) while the types of foreseeable compliance responses can be reasonably predicted, the specific location, design, and setting of the potential actions cannot feasibly be known at this time. If a later activity would have environmental effects that are not examined within this ~~Draft~~ Final EA, the public agency with authority over the later activity may be required to conduct additional environmental review as required by CEQA or other applicable law.

The analysis is based on reasonably foreseeable compliance responses that are based on a set of reasonable assumptions. While the compliance responses described in this ~~Draft~~ Final EA are not the only conceivable ones, they provide a credible basis for impact conclusions that is consistent with available evidence. And, as discussed in Final EA Chapter 2.0, Project Description, the evaluation of certain compliance responses would be speculative under CEQA. Those compliance responses are: the use of the remediation fund, and the use of the Innovative Concepts Provision. CEQA does not require evaluation of speculative impacts (Cal. Code Regs., tit. 14 Section 15145). For that reason, an evaluation of effects of these compliance responses is not required and is not included in this analysis. The analysis also includes actions that could likely occur under a broad range of the potential scenarios. The impact discussions reflect a conservative assessment to describe the type and magnitude of effects that may occur (i.e., in that the conclusions tend to overstate adverse effects)

because the specific location, extent, and design of potential new and/or modified facilities cannot be known at this time.

1. Significant Adverse Environmental Impacts and Mitigation Measures

The potentially significant adverse impacts on the environment discussed in this ~~Draft~~ Final EA, and significance determinations for those effects, reflect the programmatic nature of the reasonably foreseeable compliance responses of the regulated entities. These reasonably foreseeable compliance responses are described in more detail in Chapter 2 (Project Description) of this ~~Draft~~ Final EA. The ~~Draft~~ Final EA addresses broadly defined types of impacts or actions that may be taken by others in the future as a result of implementation of the Proposed Regulation.

This ~~Draft~~ Final EA takes a conservative approach and considers some environmental impacts as potentially significant because of the inherent uncertainties in the relationship between physical actions that are reasonably foreseeable under the Proposed Regulation and environmentally sensitive resources or conditions that may be affected. This conservative approach tends to overstate environmental impacts in light of these uncertainties and is intended to satisfy the good-faith, full-disclosure intention of CEQA. If and when specific projects are proposed and subjected to project-level environmental review, it is expected that many of the impacts recognized as potentially significant in this ~~Draft~~ Final EA can actually be avoided or reduced to a less-than-significant level.

The ~~Draft~~ Final EA contains a degree of uncertainty regarding implementation of mitigation for potentially significant impacts. The programmatic analysis in this ~~Draft~~ Final EA does not allow for a precise description of the details of project-specific mitigation because CARB cannot predict the location, design, or setting of specific compliance responses that may result, and does not have authority over implementation of specific infrastructure projects that may occur. As a result, there is inherent uncertainty in the degree of mitigation that would ultimately need to be implemented to reduce any potentially significant impacts identified in this ~~Draft~~ Final EA. Consequently, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusions (i.e., tending to overstate the risk that feasible mitigation may not be sufficient) and discloses, for CEQA compliance purposes, that potentially significant environmental impacts may be unavoidable, where appropriate. It is also possible that the amount of mitigation necessary to reduce environmental impacts to below a significant level may be far less than disclosed in this ~~Draft~~ Final EA on a case-by-case basis. It is expected that proponents for many individual development projects would be able to feasibly avoid or mitigate to a less-than-significant level. If a potentially significant environmental effect cannot be feasibly mitigated with certainty, this ~~Draft~~ Final EA identifies it as potentially significant and unavoidable.

Where applicable, consistent with CARB's certified regulatory program requirements (17 CCR Section 60004.2), this ~~Draft~~ Final EA also acknowledges potential beneficial

effects on the environment in each resource area that may result from implementation of the Proposed Regulation. Any beneficial impacts associated with the Proposed Regulation are included in the impact analysis for each resource area listed below.

B. Resource Area Impacts and Mitigation Measures

The following discussion provides a programmatic analysis of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Regulation, described in Chapter 2 of this ~~Draft~~ Final EA. The impact analysis is organized by where impacts would likely occur: (1) to ports, terminals and other land-based areas and (2) to vessels. These impacts are discussed under each environmental resource areas in accordance with the topics presented in the Environmental Checklist in Appendix G to the CEQA Guidelines (14 CCR Section 15000 et. seq). These impact discussions are followed by the types of mitigation measures that could be required to reduce potentially significant environmental impacts.

1. Aesthetics

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide land-based capture and control devices. In addition, the Propose Regulation may increase the use of barge-based control systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells. Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Landscape character can be defined as the visual and cultural image of a geographic area. It consists of the combination of physical, biological, and cultural attributes that make each landscape identifiable or unique. Visual character may range from predominately natural to heavily influenced by human development. Its value is related, in part, to the importance of a site to those who view it. Viewer groups typically include residents, motorists, and recreation users.

a) Land-Based Impacts

Impact 1.A-1: Short-Term Construction-Related Impacts on Aesthetics

Short-term construction-related activities associated with compliance with the Proposed Regulation may require construction projects, which include the installation of additional infrastructure to allow shore power capable vessels to obtain power shore-side through flexible electrical cables. In response to the Proposed Regulation, energy providers (e.g., Pacific Gas and Electric Company [PG&E], San Diego Gas & Electric [SDG&E], Southern California Edison [SCE]) could install several hundred to thousands of feet of new conduit from existing overhead poles or underground lines located adjacent to ports and terminals.

Modifying an existing port for shore power capabilities may include activities such as trenching to install new cable lines, installing new power meters and circuit breaker main cabinets, all of which would be installed in the approximate vicinity of existing service areas. Shore power substations may require construction of an enclosed concrete pad, which houses equipment such as transformers, power circuit breakers, and high voltage load (HVL) break interrupters. Shore power outlet vaults could be located above or below ground at each berth and would measure approximately 12 by 2 by 4 feet. Further, construction under the Proposed Regulation would also result in pile driving activities. These activities would introduce tall equipment on various project sites.

The barge- and land- based capture and control systems captures the vessel's exhaust directly from the exhaust stack, using long, flexible ducting to transfer the exhaust to the control system (usually an SCR) to be cleaned this can be either on a barge or on land. The flexible ducting is brought by crane to the vessel's stack. Although barge-based systems do not require construction for the terminal or vessel, land-based systems are could have similar construction activities as shore power infrastructure. Depending on the size and scope of the modifications to facilities, construction equipment could range from earth-moving equipment such as backhoes and excavators to hand and power tools to install smaller devices (e.g., valves, flanges). Depending on the hours when construction is conducted, sources of glare or lighting could be present. Although there is inherent uncertainty regarding the specific locations where shore power and capture and control systems would be placed within a port or terminal, it would be expected that locating such infrastructure within an existing port or terminal would not affect a scenic vista or views from a State scenic highway.

Construction activities associated with the Proposed Regulation would be of similar scale and size to current maintenance and associated upgrades that occur occasionally within port and marine terminal facilities. In general, terminals and ports are sites that are, or have been, subjected to extensive disturbance including grading, trenching, paving, and construction of roads and structures. Existing daily activities at ports and terminals include human activity; movement of vessels, cranes, trucks, and heavy equipment; and operation of stationary equipment. While construction or installation of shore power and capture and control systems could potentially alter the appearance of some existing visual settings, the presence of construction equipment would not substantially affect the visual character of an industrial site because a variety of operation and maintenance activity is typical within ports.

Increased nighttime lighting may occur for nighttime construction during installation of shore power or capture and control infrastructure. However, ports and terminals are generally already well lit due to nighttime operations at surrounding sites. Therefore, nighttime lighting would be consistent with existing lighting and would not add a new substantial source of nighttime lighting.

Although it is reasonably foreseeable that activities associated with new or modified facilities for lithium battery and fuel cell recycling and refurbishment could occur, there is uncertainty as to the exact location or character of construction of any new facilities or modification of existing facilities. It is possible that increased recycling and refurbishment could be performed within existing recycling centers that undergo internal retrofitting with minimal ground-disturbing activity. The outward appearance of such facilities during their retrofit would not involve activities outside of the building that could degrade the visual character or quality of the surrounding area; thus, visual impacts would not be substantial in these cases. However, in cases where new facilities are required, short-term construction-related equipment could be introduced to areas of scenic importance. Heavy-duty equipment such as dozers, cranes, and others, in addition to construction materials, could degrade the visual quality of a landscape. The addition of these elements could adversely affect aesthetics.

To meet increased demand for LNG, lithium-ion batteries, fuel cells and other alternative fuels, substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals) would be required across the state and could be located in areas that support landscapes of high visual character. There is uncertainty as to the exact location of this new infrastructure and its location in relation to viewers. Construction and modification of these facilities, though likely to occur in areas with consistent zoning where other similar facilities may already be under construction or modification, could introduce or increase the presence of artificial elements (e.g., heavy-duty equipment, removal of existing vegetation, grading) in areas with national, State, or county designated scenic vistas and/or scenic resources visible from State scenic highways. The visual impact of such development would depend on several variables, including sensitivity of viewers, size of facilities, viewer distance, and angle of view, visual absorption capacities, and equipment placement in the landscape. Although temporary introduction of construction in a highly sensitive and natural area, for

example, could substantially degrade the area's visual quality. Additionally, construction may require nighttime lighting for security or to accommodate nighttime work. In areas with minimal existing lighting, construction lighting may be a substantial new source of nighttime lighting.

Therefore, short-term construction-related aesthetic impacts to ports and other land areas associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 1.A-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, and regulations, and policies that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:

- Proponents of new or modified facilities constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body shall certify that the environmental document was prepared in compliance with applicable regulations and approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project.

- The project proponent would color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent would submit a surface treatment plan to the lead agency for review and approval.

- To the extent feasible, the sites selected for use as construction staging and laydown areas shall be areas that are already disturbed and/or are in locations of low visual sensitivity. Where possible, construction staging and laydown areas for equipment, personal vehicles, and material storage shall be sited to take advantage of natural screening opportunities provided by existing topography and vegetation.

- All construction areas shall be kept clean and tidy, including the revegetating and regarding disturbed soil, and storage shall be screened from view and/or are generally not visible to the general public.

- Siting projects and their associated elements next to prominent landscape features or in a setting for observation from national historic sites, national trails, and cultural resources shall be avoided to the greatest extent.

- The project proponent shall prepare and implement a construction lighting mitigation plan and submit the plan to the local jurisdiction for review. The plan shall describe the measures to be used to reduce the visibility of on-site construction lighting from neighboring properties.

Impacts related to aesthetics could be reduced to a less-than-significant level through the implementation of mitigation measure 1.A-1 that can and should be implemented by local lead agencies but is beyond the authority of CARB to implement and enforce. The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic vista, scenic highway, visual character and quality, and nighttime lighting impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses that short-term construction-related scenic and nighttime lighting effects resulting from reasonably foreseeable compliance responses to the Proposed Regulation would be **potentially significant and unavoidable**.

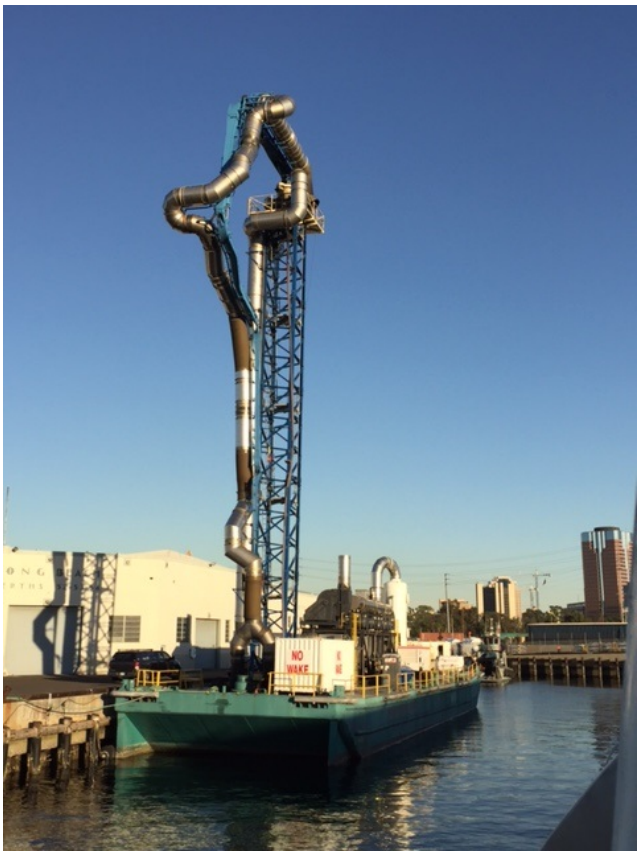
Impact 1.A-2: Long-Term Operational-Related Impacts on Aesthetics

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to

California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

As discussed above, the Proposed Regulation would result in construction of new and modified infrastructure and facilities to support the use of shore power and alternative control technologies. Additionally, the Proposed Regulation would result in the potential operation of barge-based systems, which would be located in port waterways. These systems would be smaller than ocean-going vessels in size and similar to other harbor crafts typically operated at ports. Land-based capture and control systems would have capture devices attached to an approximately 65-foot long arm to reach the height of the vessel's exhaust stacks (Figure D-3).

Figure D-3: Barge-based Capture and Control System



These features would be consistent with the existing visual characteristics of a port facility. Additionally, implementation of the Proposed Regulation would add additional maintenance, inspection, and upgrade requirements to ports throughout the State;

however, these would be similar to existing operations and would not affect the visual character of individual sites.

To enable the use of alternative fuels (e.g., LNG), fuel cells and provide adequate lithium-ion batteries for storage, substantial new and improvement infrastructure may be required outside of ports in areas of high visual quality. Development of new facilities for the manufacture and distribution of alternative fuels would be expected to occur in areas appropriately zoned; however, such facilities could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, new or expanded buildings) in areas of scenic importance, such as landscapes from State scenic highways. The visual impact of such development would depend on several variables, including the type and size of infrastructure, distance and angle of view, visual prominence, and placement in the landscape. In addition, operation may introduce substantial sources of glare and nighttime lighting for safety and security purposes. These types of impacts could result in significant effects on aesthetic resources.

Increased demand for lithium-ion storage batteries and fuel cells could produce additional demand for lithium and platinum. Worldwide, the majority (80 to 90 percent) of raw lithium is currently mined and exported from Australia, Chile, Argentina, and Bolivia.[22] Lithium is typically derived from hard rock mining practices or from brine extraction. Hard rock mining, which is typical in Australia and, at the timing of writing this ~~Draft~~ Final EA, is not practiced within the United States or California, requires the use of heavy-duty equipment (e.g., crushers, rigs, loaders, cutting equipment, cranes) and could result in harmful visual changes to the natural environment such as hillside erosion, contamination of surface waters, artificial drainage patterns, subsidence, night-time lighting, and deforestation. In contrast, brine extraction, which occurs in Chile, Argentina, Bolivia, and the United States, involves vertical pumping of brine, which evaporates to form brown and white cones of salt minerals. It is reasonably foreseeable that increased demand for lithium-ion batteries could cause additional lithium extraction resulting in these types of adverse visual effects in areas where hard rock mining (Australia) and brine extraction activities (Chile, Argentina, Bolivia, and United States) occur. As such, operational impacts associated with brine extraction could be potentially significant.

Platinum mining is typically conducted in South Africa, Russia, Canada, Zimbabwe, and the United States.[23,24] Mining is typically done in underground or open pit mines where platinum containing ore is extracted and could result in harmful visual changes to the

[22] U.S. Geological Survey, "Mineral Commodity Summaries 2017 Lithium," n.d. (accessed July 11, 2019), https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf

[23] Mineral Education Coalition, Periotic Table of Elements, Platinum, n.d. (accessed 07/29/2019), https://mineralseducationcoalition.org/elements/platinum/

[24] Bonnie J. Glaister, Gavin M. Mudd, "The environmental costs of platinum–PGM mining and sustainability: Is the glass half-full or half-empty?" Minerals Engineering 23 (2010) 438–450, December 16, 2009, https://conferences.ufs.ac.za/dl/Userfiles/Documents/00000/573_eng.pdf

natural environment such as hillside erosion, contamination of surface waters, artificial drainage patterns, subsidence, night-time lighting, and deforestation. The platinum containing substance is then ground down separated. From there, the ore is smelted into matte (metal contained in sulfur). From there the platinum containing matte is purified at a precious metals refinery.[25] It is reasonably foreseeable that increased demand for fuel cells could cause additional platinum extraction resulting in these types of adverse visual effects in areas platinum mining extraction occurs (Russia, Canada, Zimbabwe, and the United States). As such, operational impacts associated with platinum mining could be potentially significant.

Therefore, long-term operational-related aesthetics effects to ports and other land areas associated with implementation of the Proposed Regulation could be potentially significant.

Mitigation Measure 1.A-2
The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of aesthetic resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to aesthetic resources include:

- Proponents of new or modified facilities constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body shall certify that the environmental document was prepared in compliance with applicable regulations and approve the project for development.

- The project proponent shall color and finish the surfaces of all project structures and buildings visible to the public to ensure that they: (1) minimize visual intrusion and contrast by blending with the landscape; (2) minimize glare; and (3) comply with local design policies and ordinances. The project proponent shall submit a surface treatment plan to the lead agency for review and approval.

[25] Bonnie J. Glaister, Gavin M. Mudd, "The environmental costs of platinum–PGM mining and sustainability: Is the glass half-full or half-empty?" Minerals Engineering 23 (2010) 438–450, December 16, 2009, https://conferences.ufs.ac.za/dl/Userfiles/Documents/00000/573_eng.pdf

- Siting projects and their associated elements next to prominent landscape features or in a setting for observation from national historic sites, national trails, and cultural resources shall be avoided to the greatest extent.

- The project proponent shall prepare and implement a lighting mitigation plan and submit the plan to the local jurisdiction for review. The plan shall describe the measures to be used to reduce visibility of on-site lighting from neighboring properties.

Potential scenic, glare, and lighting impacts could be reduced to a less-than-significant level by mitigation measures prescribed by local, State, federal, or other land use or permitting agencies (either in the United States or abroad) with approval authority over the development projects. The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant scenic vista, scenic highway, visual character and quality, and nighttime lighting impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses that long-term operational-related scenic and nighttime lighting effects resulting from reasonably foreseeable compliance responses to the Proposed Regulation would be **potentially significant and unavoidable**.

B) Vessel-Related Impacts

Impact 1.B-1: Short-Term Construction-Related Impacts on Aesthetics

Implementation of the Proposed Regulation could result in infrastructure modifications and vessel retrofitting such as, shore power connection cables, high voltage cables, and cable drums/reel systems, frequency converters, switchgear, transformers and vessel cables.[26]

Vessel-side retrofits performed for compliance with the Proposed Regulation would be performed while the vessel is dry docked or in rare occasions while the vessel is in-transit to California. Dry docks are used for the construction, maintenance, and repair of vessels. As such, they have an industrial visual character. Dry docks typically contain earthen berms and concrete, rigs, metal cables, and other industrial equipment required to perform maintenance or repair to vessels. Vessels undergoing retrofits

[26] Cochran Marine, "Shore Power Spec Sheet," n.d. (accessed July 11, 2019), http://www.cochranmarine.com/wp-content/uploads/2013/06/Cochran-Marine-Shore-Power-Spec-Sheet4.pdf

would require equipment of similar visual appearance to existing equipment. In the rare cases when modifications are made during transit to California, such activities would occur on the vessel at sea, where they are not visible to the public. As such, short-term construction-related aesthetic impacts to vessels would be **less than significant**.

Impact 1.B-2: Long-Term Operational-Related Impacts on Aesthetics

Implementation of the Proposed Regulation could result in infrastructure modifications and vessel retrofitting such as, shore power connection cables, high voltage cables, and cable drums/reel systems, frequency converters, switchgear, transformers and vessel cables.[27]

As shown in Figure D-4 below, these retrofits may require the vessel to install an additional access door in its hull, or have fixed or removable equipment on deck (i.e. containerized). While installation of some of these features could potentially alter the appearance of the vessel, the modifications would be consistent with the visual character of specialized equipment already present. Thus, long-term operational-related aesthetic impacts to vessels would be **less than significant**.

[27] Cochran Marine, "Shore Power Spec Sheet," n.d. (accessed July 11, 2019), http://www.cochranmarine.com/wp-content/uploads/2013/06/Cochran-Marine-Shore-Power-Spec-Sheet4.pdf

Figure D-4: Containerized Vessel Shore Power

2. Agricultural and Forest Resources

A) Land-Based Impacts

Impact 2.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts on Agricultural and Forest Resources

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices or could require the operation of barge-based systems. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and

increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Affected ports and terminals would be in areas zoned for industrial uses. The Proposed Regulation would not incentivize or otherwise increase the number of port facilities in California or expand the footprint of existing port facilities. However, increased use of alternative fuels and lithium-ion batteries could require the construction and operation of new or expanded infrastructure across the state, which could be in areas currently zoned for or supporting agriculture and forest resources.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

There is uncertainty as to the exact locations of these new and modified facilities and therefore their location in relation to agricultural land, including farmland, land zoned for agricultural use, and land under Williamson Act contract. Similarly, it is uncertain where new and modified facilities would be located in relation to forest land and timberland. Construction and modification of these facilities, though likely to occur in areas with appropriate zoning that would not have agricultural or forestry uses, could result in conversion of agricultural land or forest land if they are sited in areas of Prime Farmland, Unique Farmland, or Farmland of Statewide Importance, Williamson Act conservation contracts, forest land or timberland. Some of the conversion could be permanent where facilities are constructed, while temporary conversion may be needed to facilitate temporary construction activities. Many local governments have adopted land use policies to protect important agricultural and forest land from conversion to urban development, including industrial facilities. Land use policies controlling the location of new industrial facilities and diverting development away from agricultural and forest land could avoid some conversion of agricultural and forest land, but likely would not prevent all conversion of agricultural and forest land. As a result, this impact could be potentially significant if a substantial amount of land is converted to non-agricultural or non-forest use.

Increased demand for lithium-ion storage to support heavy electrical loads produced by large vessels could place additional demand on lithium ore extraction internationally. Lithium ore derived from brines typically occurs within desert areas, which would not be considered valuable land for agricultural or forestry practices; however, lithium ore

extracted from hard rock mining could result in the loss of agricultural and forest lands of importance if new facilities are located on land used for agriculture or forestry. Further, increased use of shore power could also require the use of peaker plants and fuel cells to provide alternative or additional electricity to vessels with large electrical loads. Similar to lithium-ion storage, an increase in demand for fuel cells could result in lithium and platinum mining and exports from source countries or other states and increase recycling, refurbishment, or disposal of hydrogen fuel cells. As such, if these activities occur within agricultural or forestry lands, they could result in loss of these lands. Therefore, short-term construction-related and long-term operational-related agricultural and forest resources impacts to ports and other lands associated with implementation of the Proposed Regulation could be potentially significant.

Mitigation Measure 2.A-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of agricultural and forest resources. CARB does not have the authority to require implementation of mitigation related to new or modified facilities or infrastructure that would be approved by other State agencies or local jurisdictions. The ability to require such mitigation measures is within the purview of jurisdictions with discretionary land use approval and/or permitting authority. Project-specific impacts and mitigation may be identified during the project review process and carried out by agencies with discretionary project approval authority. Recognized practices routinely required to avoid and/or minimize construction-phase impacts to agriculture and forest resources include:

- Proponents of new or modified facilities constructed because of reasonably foreseeable compliance responses would coordinate with local or State land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project because CARB has no land use authority, mitigation is not within its purview to reduce potentially significant impacts to less-than-significant levels. Any mitigation specifically required for a new or modified facility would be determined by the local lead agency and future environmental documents by local and State lead agencies should include analysis of the following:

    - Avoid lands designated as Important Farmland (State defined Prime Farmland, Farmland of Statewide Importance, and Unique Farmland) as defined by the Farmland Mapping and Monitoring Program. Before converting Important Farmland to non-agricultural use, analyze the feasibility

of using farmland that is not designated as Important Farmland prior to deciding on the conversion of Important Farmland.

- Avoid lands designated as forest land or timberland before converting forestland or timberland to non-forest use, analyze the feasibility of using other lands prior to deciding on the conversion of forest land or timberland.

- Any mitigation for permanent conversion of Important Farmland caused by facility construction or modification shall be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to:

  - Permanent preservation of off-site Important Farmland of equal or better agricultural quality, at a ratio of at least 1:1. Preservation may include the purchase of agricultural conservation easement(s); purchase of credits from an established agricultural farmland mitigation bank; contribution of agricultural land or equivalent funding to an organization that provides for the preservation of Important Farmland towards the ultimate purchase of an agricultural conservation easement.

  - Participation in any agricultural land mitigation program, including local government maintained, that provides equal or more effective mitigation than the measures listed.

- Any mitigation for permanent conversion of forest land or timberland caused by facility construction or modification shall be completed prior to the issuance of a grading or building permit by providing the permitting agency with written evidence of completion of the mitigation. Mitigation may include but is not limited to permanent preservation of forest land or timberland of equal or better quality at a ratio of 1:1 or 1.5:1 because some lost ecological value may not be replaceable. Preservation may include purchase of easements or contribution of funds to a land trust or other agency.

Potential agricultural and forest resource impacts could be reduced to a less-than-significant level by mitigation measures prescribed by local, State, federal, or other land use or permitting agencies with approval authority over the development projects. The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts related to the conversion of agriculture and forest resources. Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for

CEQA compliance purposes, that short-term operational-related and long-term operational-related impacts to agriculture and forest resources to ports and other lands resulting from the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impacts 2.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Agriculture and Forest Resources

Implementation of the Proposed Regulation could result in infrastructure modifications (i.e., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage and installment of LNG and barge-based capture and control systems. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

Execution of the aforementioned compliance responses to the Proposed Regulation would affect vessels. Vessels are not operated where agriculture and forest resources are located, and modifications to vessels would not result in conversion of agriculture and forest resources to other uses. As such, there would be **no impact.**

3. Air Quality

The Proposed Regulation's fundamental purpose is to reduce emissions from ocean-going vessels. The Proposed Regulation was developed as a component of the State Implementation Plan and would assist in minimizing adverse ambient air quality within California. The State SIP Strategy (Strategy) describes CARB's commitment to achieve the mobile source and consumer products reductions needed to meet federal air quality standards over the next 15 years.[28] This Strategy provides CARB's commitment to bring proposed statewide control measures to the Board for adoption and to achieve the NOx and ROG reductions needed for attainment by 2023 and 2031. The Proposed Regulation is one of the control measures that is committed in this Strategy to be brought before the Board for adoption to achieve the reductions necessary for the State to attain its ambient air quality standards. Under the Strategy the Proposed Regulation is expected to achieve statewide NOx reductions of 2.0 tpd by 2031.[29] The Proposed Regulation is projected to achieve much better emissions benefits. In the year 2031, the Proposed Regulation is expected to reduce NOx emissions 5.9 tpd (Appendix H of ISOR).

Given that air emissions are largely a regional concern, to more accurately assess the net short-term construction-related and long-term operational-related air quality impacts

[28] CARB, "Revised Proposed 2016 State Strategy for the State Implementation Plan," March 7, 2017 (accessed October 20, 2018), https://www.arb.ca.gov/planning/sip/2016sip/rev2016statesip.pdf.
[29] CARB, "Mobile Source Strategy," May 2016, https://ww3.arb.ca.gov/planning/sip/2016sip/2016mobsrc.pdf.

related to the Proposed Regulation, land- and vessel-based impacts are discussed together below. For more detail regarding quantified emission reductions associated with the Proposed Regulation, see the Staff Report published concurrently with this ~~Draft~~ Final EA, which is incorporated herein by reference.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Impact 3.A-1: Short-Term Construction-Related Impacts on Air Quality

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells. Implementation of the Proposed Regulation could also result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

Compliance responses associated with the Proposed Regulation would result in construction and installation of similar features already associated with port terminals. As part of the proposed projects, electricity companies (e.g., PG&E, SDG&E) could install several hundred to thousands of feet of new conduit from existing overhead poles or underground power lines located adjacent to terminal operations.

Although detailed construction information is not available at this time, modifying an existing port for shore power capabilities may include trenching to install new cable

lines, power meters and circuit breaker main cabinets, all of which would be installed near existing service areas. Shore power substations may require construction of an enclosed concrete pad which houses equipment like transformers, power circuit breakers, and HVL break interrupters. Shore power outlet vaults can be located above or below ground at a berth and would measure approximately 12 by 2 by 4 feet. The shore power outlet connection equipment is generally placed in an underground vault to minimize impacts to terminal operations.

Depending on the size and scope of the modifications to facilities, construction equipment could range from earth-moving equipment such as backhoes and excavators to hand and power tools to install smaller devices (e.g., valves, flanges). Construction activities would include demolition and excavation, backfilling, compacting, paving, and equipment delivery. Construction may last a year or more for each location at which construction occurs.

Installation of land-based capture and control systems could potentially require trenching to install electrical infrastructure, exhaust ducting, or structural modifications to support additional weight of landside systems. Although detailed construction information is not available, construction activity could include installation of components consisting of a hood, ductwork, and variable speed fan(s) to collect vessel emissions and direct them to a NOx control unit and/or a Selective Catalytic Reduction (SCR) system to minimize NOx and particulate filters to remove PM2.5, DPM and black carbon.[30]

Based on the anticipated types of activities and equipment listed above, it would be expected that the primary sources of construction-related emissions would occur from soil disturbance and use of construction equipment. It is expected that during the construction phase for any new project, criteria air pollutants (e.g., NOx, SOx, and particulate matter (PM)) and toxic air contaminants (TACs) could be generated from a variety of activities and emission sources, such as equipment use and worker commute trips. These emissions would be temporary and occur intermittently depending on the intensity of construction on any given day. Levels and characteristics of emissions fluctuate depending on the particular type, number, and duration of the use of various equipment. CARB, in addition to many local air districts, implements many regulations with the purpose of reducing NOx and PM, and limits idling from in-use vehicles and equipment. Further, the Truck and Bus Regulation, the Regulation for In-Use Off-Road Diesel Fueled Fleets, and the Portable Engine Airborne Toxic Control Measure are just a few examples of statewide programs and regulations which would apply to construction activities.

Site grading and excavation activities would generate fugitive PM dust emissions. Fugitive PM dust emissions (e.g., respirable PM of a diameter of 10 micrometers

[30] POLB, "The Port of Long Beach Notice of Preparation and Initial Study, Mitsubishi Cement Terminal," August 26, 2011 (accessed July 11, 2019), http://www.polb.com/civica/filebank/blobdload.asp?BlobID=8645.

[PM10] or less and fine PM of a diameter of 2.5 micrometers [PM2.5] or less) vary as a function of several parameters, such as soil silt content and moisture, wind speed, acreage of disturbance area, and the intensity of activity performed with construction equipment.

Shore power and land-based capture and control infrastructure site preparation is expected to generate the most substantial emission levels because of the on-site equipment and ground-disturbing activities associated with grading, compacting, pile driving and excavation. However, site upgrades and modifications to all affected California ports and terminals required under the Proposed Regulation could result in significant air quality emissions depending on the location of the project and current attainment status in the air basin, the intensity of construction activities, and the duration of construction activities. As a result, short-term construction-related impacts on air quality associated with implementation of compliance responses of ports and terminals would be potentially significant.

Construction air pollutant emissions for each of the scenarios for reasonably foreseeable compliance responses for vessel categories included in the Proposed Regulation (shore power, land-based capture and control) have been calculated using the California Emissions Estimator Model (CalEEMod) version 2016.3.2, developed by the California Air Pollution Officers Association (CAPCOA), as well as the Harbor Craft, Dredge and Barge Emission Factor Calculator developed by the Sacramento Metropolitan Air Quality Management District (SMAQMD). Details of the modeling assumptions and emissions factors are provided in Attachment B of this ~~Draft~~ Final EA.

CalEEMod is a statewide land use emissions computer model designed to provide a reliable way to quantify potential criteria and GHG emissions associated with both construction and operations from a variety of land use projects. CalEEMod was developed in collaboration with California's air districts to account for local requirements and conditions. The Harbor Craft, Dredge and Barge Emission Factor Calculator developed by SMAQMD is a tool that estimates air pollutant emission rates for harbor craft engines, which are based on CARB's emission estimation databases. These models are considered by CARB to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from construction projects throughout California. CalEEMod calculates air pollutant emissions from off-road equipment usage as well as on-road vehicle travel associated with haul, delivery and construction worker trips and the Harbor craft, Dredge and Barge Emission Factor Calculator was used to estimate air pollutant emissions from marine vessel supporting in-water construction. Air pollutant emissions during construction were forecasted based on estimated representative project schedules developed in coordination with the industry experts. Construction air quality modeling includes air pollutant emissions generated from fugitive dust, mobile sources (e.g., heavy truck and worker traffic), and construction activities that reflect the types and quantities of construction equipment that would be used in removing pavement from existing facilities, grading and excavating new sites, construction and building of shore-side equipment housing etc.

As a result of the Proposed Regulation, it is possible that multiple construction projects could occur in a district simultaneously (e.g. SCAQMD). The Proposed Regulation allows a regulated entity to choose a compliance method that best fits the unique operation of each terminal. As such, the ability for CARB staff to correctly estimate the amount and types of projects which could occur in each district because of the Proposed Regulation, has been determined to be too speculative for a thorough evaluation. CARB staff has presented construction emissions for each of the most likely construction projects resulting from the Proposed Regulation, the addition of a shore power vault, a landside capture and control system, a tanker landside capture and control system, and a tanker dockside capture and control system.

CARB staff modeled construction criteria pollutants and GHG emissions for four representative example and conservative scenarios: (1) Additional Vault; (2) Landside System; (3) Tanker Dockside Control System; (4) Tanker Landside Control System. A in depth description of all four scenarios can be found Attachment B of this ~~Draft~~ Final EA. Tables D.4-1 through D.4-4 show the estimated unmitigated air pollution emissions during the construction for the four example scenarios. These construction air pollutant emissions were compared to significance thresholds established by air districts that contain a port. Since CARB will not be the lead agency overseeing construction of these facilities, we do not have any direct control over the implementation of any measures aimed at reduction marine and on-shore construction air pollutant emissions. Consequently, mitigated construction air pollutant emissions were not quantified in this EA.

Note that tables D.4-1 through D.4-4 show emissions from one representative installation within each district, compared against that district's threshold. While it is possible multiple installations could occur within a given district, it is not reasonably foreseeable at this time whether such installations would occur, specifically where they would occur, or whether they would overlap in time. CARB has provided these tables to give the public an idea as to the potential emissions from a representative control equipment installation.

Table D.4-1: Unmitigated Construction Air Pollutant Emissions – Representative Additional Vault Installation Example

Category	ROG/VOC	NOx	PM10	PM2.5	SOx	CO
Bay Area Air Quality Management District (Average Daily)						
Unmitigated Construction Emissions (ppd)	1	12	1	1	--	--
Significance Threshold (ppd)	54	54	82	54	--	--
Exceed Significance Threshold (yes or no)?	No	No	No	No	--	--
Ventura County Air Pollution Control District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	2	18	--	--	--	--
Significance Threshold (ppd)	25	25	--	--	--	--
Exceed Significance Threshold (yes or no)?	No	No	--	--	--	--
South Coast Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	2	18	1	1	<1	16
Significance Threshold (ppd)	75	100	150	55	150	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Diego County Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	2	18	1	<1	1	16
Significance Threshold (ppd)	75	250	100	55	250	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Joaquin Valley Air Pollution Control District (Annual)						
Unmitigated Construction Emissions (tpy)	<1	<1	<1	<1	<1	<1
Significance Threshold (tpy)	10	10	15	15	27	100
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No

Table D.4-2: Unmitigated Construction Air Pollutant Emissions – Representative Landside System Example

Category	ROG/VOC	NOx	PM10	PM2.5	SOx	CO
Bay Area Air Quality Management District (Average Daily)						
Unmitigated Construction Emissions (ppd)	2	18	1	1	--	--
Significance Threshold (ppd)	54	54	82	54	--	--
Exceed Significance Threshold (yes or no)?	No	No	No	No	--	--
Ventura County Air Pollution Control District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	2	18	--	--	--	--
Significance Threshold (ppd)	25	25	--	--	--	--
Exceed Significance Threshold (yes or no)?	No	No	--	--	--	--
South Coast Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	2	18	1	1	<1	16
Significance Threshold (ppd)	75	100	150	55	150	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Diego County Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	2	18	1	1	<1	16
Significance Threshold (ppd)	75	250	100	55	250	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Joaquin Valley Air Pollution Control District (Annual)						
Unmitigated Construction Emissions (tpy)	<1	<1	<1	<1	<1	<1
Significance Threshold (tpy)	10	10	15	15	27	100
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No

Table D.4-3: Unmitigated Construction Air Pollutant Emissions - Tanker Landside Emissions Control System Example

Category	ROG /VOC	NOx	PM10	PM2.5	SOx	CO
Bay Area Air Quality Management District (Average Daily)						
Unmitigated Construction Emissions (ppd)	4	36	2	2	--	--
Significance Threshold (ppd)	54	54	82	54	--	--
Exceed Significance Threshold (yes or no)?	No	No	No	No	--	--
Ventura County Air Pollution Control District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	26	61	--	--	--	--
Significance Threshold (ppd)	25	25	--	--	--	--
Exceed Significance Threshold (yes or no)?	Yes	Yes	--	--	--	--
South Coast Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	26	61	3	3	<1	52
Significance Threshold (ppd)	75	100	150	55	100	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Diego County Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	26	61	3	3	<1	52
Significance Threshold (ppd)	75	250	100	55	250	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Joaquin Valley Air Pollution Control District (Annual)						
Unmitigated Construction Emissions (tpy)	<1	4.44	<1	<1	<1	4
Significance Threshold (tpy)	10	10	15	15	27	100
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No

Table D.4-4: Unmitigated Construction Air Pollutant Emissions - Tanker Dockside Emissions Control System Example

Category	ROG/VOC	NOx	PM10	PM2.5	SOx	CO
Bay Area Air Quality Management District (Average Daily)						
Unmitigated Construction Emissions (ppd)	4	39	2	2	--	--
Significance Threshold (ppd)	54	54	82	54	--	--
Exceed Significance Threshold (yes or no)?	No	No	No	No	--	--
Ventura County Air Pollution Control District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	29	61	--	--	--	--
Significance Threshold (ppd)	25	25	--	--	--	--
Exceed Significance Threshold (yes or no)?	Yes	Yes	--	--	--	--
South Coast Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	29	61	3	3	<1	52
Significance Threshold (ppd)	75	100	150	55	150	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Diego County Air Quality Management District (Peak Daily)						
Unmitigated Construction Emissions (ppd)	29	61	3	3	<1	52
Significance Threshold (ppd)	75	250	100	55	250	550
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No
San Joaquin Valley Air Pollution Control District (Annual)						
Unmitigated Construction Emissions (tpy)	<1	5	<1	<1	<1	4
Significance Threshold (tpy)	10	10	15	15	27	100
Exceed Significance Threshold (yes or no)?	No	No	No	No	No	No

Air pollutant emissions from material delivery trips and additional construction worker-commute trips may contribute to short-term increases in NOx, SOx, ROG, and PM emissions. Levels and characteristics of emissions fluctuate depending on the particular type, number, and duration of use of equipment. CARB implements many regulations with the purpose of reducing NOx, SOx, ROG, and PM, and limits idling from in-use vehicles and equipment. The Truck and Bus Regulation, the Regulation for In-Use Off-Road Diesel Fueled Fleets, and the Portable Engine Airborne Toxic Control Measure are examples of statewide regulations and programs that would apply to construction activities.

Staff expects that vessel modifications for compliance options other than barge-based capture and control would generally take place at dry dock and would not generate emissions considerably greater than existing levels at dry docks. Moreover, dry docks are generally located within highly disturbed, industrial areas and would likely not be located near sensitive receptors. However, it is conceivable that dry docks could experience high levels of construction-related emissions, and air pollutants generated from vessel modifications could exacerbate such conditions to unhealthy concentrations. The addition of criteria pollutants, including ozone precursors, could

result in an increase in ambient concentrations of these pollutants in air basins across the state and, moreover, increase the likelihood that ambient concentrations exceed the CAAQS and NAAQS from tanker dockside and landside emission control system construction (see Table D.4-4). Human exposure to ozone may cause acute and chronic health impacts including coughing, pulmonary distress, lung inflammation, shortness of breath, and permanent lung impairment. However, it would be misleading to correlate the levels of criteria air pollutant and precursor emissions associated with compliance options to specific health outcomes to sensitive receptors. While the description of effects noted above could manifest in the recipient receptors, actual effects on individuals depend on individual factors, such as life stage (e.g., older adults are more sensitive), preexisting cardiovascular or respiratory diseases, and genetic polymorphisms. Even armed with this type of specific medical information (which is confidential to the individual), there are wide ranges of potential outcomes from exposure to ozone precursors and particulates, from no effect to the effects described above. Furthermore, the specific locations at which particular control options may be installed remain unknown, since individual terminals and ports have flexibility to select among different control options, based on their needs and financial considerations. Also, over the longer term, the Proposed Regulation's emissions benefits are expected to far outweigh any construction-related emissions increases, resulting in net positive health benefits over the Proposed Regulation's lifetime. Therefore, other than determining the types of health effects that could occur, it would be speculative to more specifically correlate exposure to criteria pollutants and precursors from this project to specific health outcomes to receptors. By evaluating emissions of air pollutants against construction-related significance thresholds, it is foreseeable that health complications associated with ozone and PM10 exposure could be exacerbated to nearby sensitive receptors by construction-generated emissions.

Overall, short-term construction-related land- and vessel-based impacts associated with implementation of the Proposed Regulation could be potentially significant.

Mitigation Measure 3.A-1

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of air quality. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is within the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified facilities in the State would likely qualify as a "project" under CEQA, because they would generally need a discretionary public agency approval and could affect the physical environment. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA. Project-specific impacts and mitigation measures may be identified during the environmental review by agencies with project-approval authority. Recognized practices routinely required to avoid and/or minimize impacts to air quality include the following:

- Proponents of new or modified facilities or infrastructure constructed as a result of reasonably foreseeable compliance responses would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents will implement all feasible mitigation to reduce or substantially lessen the potentially significant air quality impacts of the project.

- Project proponents will apply for, secure, and comply with all appropriate air quality permits for project construction from the local agencies with air quality jurisdiction and from other applicable agencies, if appropriate, prior to construction mobilization.

- Project proponents will comply with the federal Clean Air Act (CAA) and the California Clean Air Act (CCAA) (e.g., New Source Review and Best Available Control Technology criteria), if applicable.

- Project proponents will comply with local plans, policies, ordinances, rules, and regulations regarding air quality-related emissions and associated exposure (e.g., construction-related fugitive PM dust regulations, indirect source review, and payment into offsite mitigation funds).

    - For projects located in PM10 nonattainment areas, prepare and comply with a dust abatement plan that addresses emissions of fugitive dust during construction and operation of the project.

    - Ensure the cleanest possible construction practices and equipment are used. This includes eliminating the idling of diesel-powered equipment and providing the necessary infrastructure (e.g., electrical hookups) to support zero and near-zero equipment and tools.

- Implement, and plan accordingly for the necessary infrastructure to support the zero and near-zero emission technology vehicles and equipment that will be operating on-site. Necessary infrastructure may include the physical (e.g., needed footprint), energy, and fueling infrastructure for construction equipment, on-site vehicles and equipment, and medium-heavy and heavy-heavy duty trucks.

- In construction contracts, include language that requires all off-road diesel-powered equipment used during construction to be equipped with Tier 4 or cleaner engines, except for specialized construction equipment in which Tier 4 engines are not available. In place of Tier 4 engines, off-road equipment can

incorporate retrofits such that emission reductions achieved equal or exceed that of a Tier 4 engine.

- In construction contracts, include language that requires all off-road equipment with a power rating below 19 kilowatts (e.g., plate compactors, pressure washers) used during project construction be battery powered.

- In construction contracts, include language that requires all heavy-duty trucks entering the construction site, during the grading and building construction phases be model year 2014 or later. All heavy-duty haul trucks should also meet CARB's lowest optional low-NOx standard starting in the year 2022.31

- In construction contracts, include language that requires all construction equipment and fleets to be in compliance with all current air quality regulations. CARB staff is available to assist in implementing this recommendation.

These short-term construction-related air quality effects could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB. Because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts. With mitigation, construction emissions could still exceed local air district threshold levels of significance, depending on the intensity, location, and duration of construction.

Consequently, while impacts could and should be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term construction-related air quality effects resulting from compliance responses associated with the Proposed Regulation would be **potentially significant and unavoidable**.

Impact 3.A-2: Long-Term Operational-Related Impacts on Air Quality

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Increased

[31] CARB, Optional Reduced NOx Emission Standards for On-Road Heavy-duty Engines, August 8, 2019 (accessed 07/29/2019), https://ww3.arb.ca.gov/msprog/onroad/optionnox/optionnox.htm.

use of shore power could also require the use of peaker plants and lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

Despite the dramatic emission reductions and air quality improvements achieved to date, areas of California, including Southern California and the San Joaquin Valley, continue to exceed the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS) for PM10, PM2.5, and ozone. The Proposed Regulation would require all vessels subject to the regulation to power off their diesel auxiliary engines and plug in to a shore based electrical power system running off California's electricity grid or use alternative technologies that are CARB approved and have comparable emission reductions. A shore power system's energy is generally supplied by the regional electricity grid. Air pollutant emissions associated with producing electricity for shore power will vary depending on the relative shares of zero/low-emission sources (e.g., hydro, wind, solar) and higher emission sources (e.g., coal- and natural gas-fired power plants) that are used. The relative shares of fuel sources will change over time (and even vary hour-to-hour depending on electricity demand).

California's Renewables Portfolio Standard (RPS), which was established by legislation enacted in 2002, requires that California's electric utilities procure 50 percent of their electricity from renewable resources by 2030. The RPS also established interim targets for utilities as shown below.[32]

- 20 percent of retail sales by December 31, 2013.
- 25 percent of retail sales by December 31, 2016.
- 33 percent of retail sales by December 31, 2020.
- 40 percent of retail sales by December 31, 2024.
- 45 percent of retail sales by December 31, 2027.

[32] CEC, "California's Renewables Portfolio Standard (RPS)," Accessed July 11, 2019, https://www.energy.ca.gov/programs-and-topics/programs/renewables-portfolio-standard.

- 50 percent of retail sales by December 31, 2030.

According to the California Public Utilities Commission, in 2018 California's three large investor-owned utilities (i.e., Pacific Gas and Electric (PG&E), Southern California Edison (SCE), and San Diego Gas and Electric (SDG&E)) collectively had 34 percent of their retail electricity source from renewable power. As grid power electricity becomes cleaner over time to meet the RPS targets, shore power emissions reductions compared to diesel auxiliary engines will grow accordingly. As such, the shift to shore power from on-vessel fuel combustion would yield increasing operational air quality benefits over time as the State's electrical grid becomes more renewable pursuant to the RPS. Over all the years in which the Proposed Regulation is in effect, emissions would continue to decrease, relative to both the baseline and the Existing Regulation.

Emissions associated with the generation of electricity used for shore power (i.e., emissions from power plants that supply electricity to the grid) are considered in the reduction benefits of the Proposed Regulation. The emissions reductions achieved from shore power are the net benefits, overall emissions reductions minus emissions associated with the grid power consumption.

With respect to land- and barge-based capture and control systems, auxiliary engines on vessels are used to power lighting, ventilation, pumps, communication, and other onboard equipment while a vessel is at berth. The emissions are expelled through the vessel's stack. A capture and control device, which can be either land- or barge-based, runs a hood-like structure with ducting over the vessel's stack and collects the vessel's emissions. These emissions are typically treated with SCR for NOx, diesel particulate filters for PM, and SOx scrubbers. Notably, this equipment is most often powered by generators which directly generate air pollutants associated with diesel combustion. The determination of the system's emission reduction performance includes the added emissions from the control side generator.

For example, when a new technology applies to CARB to become an approved control strategy, the system must demonstrate emission reductions that achieve emission rates less than 2.8 g/kW-hr for NOx, 0.03 g/kW-hr for PM2.5, and 0.1 g/kW-hr for ROG for auxiliary engines which is generally at least an 80 percent in emission reductions of NOx, PM2.5, and ROG. Additionally, for strategies approved after 2020, GHG emissions must be grid-neutral for the year that the technology is granted an Executive Order. Default emission rates of auxiliary engines on ocean-going vessels are 13.8 g/kW-hr for NOx, 0.17 g/kW-hr for PM2.5, and 0.52 g/kW-hr for ROG. The emissions from the systems generators are considered in the emissions reductions. Overall, reducing the system's emissions efficiency. More detailed information is available for each control system's Executive Order posted on the CARB shore power website.[33]

[33] CARB, Shore Power At-Berth Executive Orders, Accessed 7/29/2019, https://ww3.arb.ca.gov/ports/shorepower/eo/eo.htm.

Barge-based systems are moved by tug boats, which would directly contribute to overall emissions at a port. According to alternative control system operators, the amount of time tug boats operate with barge-based capture and control devices is between one and three hours in the San Pedro Bay Port areas. This includes transit time for the tugboat to reach the barge and to maneuver it into position alongside a vessel at berth. Based on these data, we assume each barge-based system requires a total of two hours of tug operation. There is inherent uncertainty regarding the type and size of tug boat that would be available to assist the barge-based system. According to POLB's Air Emissions inventory - 2017[34], the average harbor tug boat has 1.94 main engines each running at 943 horsepower (hp) and an average of 1.5 auxiliary engines operating at 78 hp each. The Port of Long Beach Emission Inventory also indicates that on average, harbor tug boats have model year 2012 main and auxiliary engines. Emission factors and load factors were obtained from CARB's Emissions Estimation Methodology for Commercial Harbor Craft Operating. Load factors are 0.68 and 0.43 for main and auxiliary engines (emission factors were obtained for PM, NOx, and ROG in Appendix A).[35] Analysis assumed CO2 emission factors were 529 g CO2/bhp-hr for main engines, and 589 g CO2/bhp-hr for auxiliary engines, consistent with CARB's 2017 off-road emission inventory.

CARB completed a berth-by-berth analysis for all vessel categories that would be required to reduce emissions, for the development of the Proposed Regulation and in response to the Administrative Procedure Act's economic impact analysis provisions (Appendix E of ISOR). For this analysis, CARB analyzed several different factors for each berth and determined a scenario that could reasonably occur under the Proposed Regulation. During this analysis, CARB estimated that throughout California approximately 600 vessel visits would utilize a barge-based capture and control system. While the berth-by-berth analysis was completed for development of the Proposed Regulation (including to help inform CARB's Administrative Procedure Act related analysis), a calculation of emissions for the scenarios based on this evaluation would be speculative under CEQA.[36] The CARB staff analysis is a scenario that could occur, but is not necessarily "reasonably foreseeable" under CEQA, as various other scenarios could also occur. Conducting a berth-by-berth emissions analysis for the hundreds of berths in California would provide information that could be misleading, should a different berth-by-berth scenario come to fruition. Therefore, this EA does not contain a berth-by-berth emissions analysis. Using the information in the CARB staff analysis, however, CARB has conducted larger-scale estimates for this analysis. CARB

[34] Port of Long Beach "Air Emissions Inventory - 2017," July 2018 (accessed July 11, 2019), http://www.polb.com/civica/filebank/blobdload.asp?BlobID=14652.

[35] CARB, "Emissions Estimation Methodology for Commercial Harbor Craft Operating in California," 2012, (accessed July 11, 2019) https://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf.

[36] CEQA Guidelines section 15145 states that, "[i]f, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact."

estimates that the additional tug boat emissions could be up to 7.1 tons/year NOx, 0.14 tons/year DPM, 1.2 tons/year ROG and 827 metric tons/year of CO2 throughout California. These estimates may be lower in future years due to full implementation of CARB's Existing Commercial Harbor Craft Regulation, and anticipated future requirements that may take effect beginning in 2023 for tug boats and other harbor craft.[37] Tug boat emissions attributed to the placement of barge-based capture and control systems are considerably lower than the overall emissions reductions achieved from the use of the system on a vessel. For example, in the year 2021, capture and control systems are expected to reduce NOx emissions by approximately 32 tpy and 970 tpy in 2031.

The Proposed Regulation marginally increases costs to California ports and terminals, and the vessels that visit them, which has resulted in some feedback from industry stakeholders that vessels may be directed elsewhere in an effort to avoid the increased costs at California ports and terminals. Cargo owners and international cargo transport delivery companies rely on sophisticated proprietary models and factors to guide decisions on where to ship goods. The factors include access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans-loading infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs, including compliance costs for all regulations. To date, the available data and research has been insufficient to quantify the Proposed Regulation's potential effects regarding cargo diversion. CARB staff directly engaged industry stakeholders for their experience or data and found that a company's decision to divert cargo from one port to another is complex and unique to individual businesses. CARB staff was unable to obtain information on business level responses to regulatory costs due to the highly competitive nature of the freight industry.

Quantifying the potential for the Proposed Regulation to cause cargo diversion requires a detailed understanding of how increased regulatory costs would impact each beneficial cargo owner's use of a specific port, such as from the perspective of a person making those decisions for a cargo owner. Alternatively, absent industry knowledge, assessing the potential for diversion would require making inferences about what changes in port uses were caused by cost changes, which requires an understanding of all factors that affect choice of port and, then, isolating the changes caused by port use cost. CARB staff did not find empirical research that focused on the impact of regulatory costs on cargo diversion. A number of studies have explored the relationship between general cost increases and the likelihood of cargo diversion. One case study on the potential impact of a container fee suggested that cargo diversion is unlikely for

[37] CARB "Airborne Toxic Control Measure for Commercial Harbor Craft," April 2006 (accessed July 11, 2019), https://govt.westlaw.com/calregs/Document/I0FD137A0A3C111E0BACCB30E82542E24?contextData=%28sc.Default%29&originationContext=documenttoc&transitionType=CategoryPageItem&viewType=FullText.

modest per TEU cost increases, up to $30 per TEU.[38] To put this into context, the Proposed Regulation would add additional costs of approximately $1.11 per TEU in 2030 for container and reefer vessels, far below the $30 level (Appendix D of ISOR). However, studies also found that there is a very wide range of estimates for how increased costs may impact cargo volumes,[39,40,41] that the estimates are highly uncertain, and that these responses may change markedly in the span of only several years due to the dynamics of industry and global economics.

Furthermore, analyzing direct regulatory cost increases from a particular regulation is of limited use in determining the potential for diversion or leakage. Direct regulatory cost is also only one variable that can affect choices about shipping routes. Other variables include, but are not limited to: access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans-loading infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs generally, including compliance costs for all regulations. A 2018 study conducted by the Texas A&M Transportation Institute, *The Potential Impacts of the Panama Canal Expansion on Texas Ports*, found that intermodal routes throughout California are consistently more favorable for high-valued goods. Intermodal routes between East Asia, California, and Texas are faster than all water routes to Texas from East Asia, and research shows shippers prefer more expensive routes through West Coast ports, including California, because of the shorter travel time.[42]

In sum, it is difficult to predict how businesses may react to increased costs of using California ports in response to implementation of the Proposed Regulation. It is possible, though unlikely, that some may decide to change shipping mode or may divert to another port. In that case, the Proposed Regulation could result in additional emissions of air pollutants associated with mode shift and diversion. If California berths continue to be used as they would regardless of the Proposed Regulation, as expected, long-term operational-related air quality impacts would be beneficial.

As discussed above, vessels that elect to supply their electrical load with shore-power would receive electricity from public utility companies that will become increasingly more

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[38] Corbett, James J., James J. Winebrake, and Erin Green, (2006) "Cargo on the Move through California: Evaluating Container Fee Impacts on Port Choice," https://www.nrdc.org/sites/default/files/air_06081401a.pdf, Accessed July 23, 2019.

[39] Leachman, Robert C., (2005) "Final Report: Port and Modal Elasticity Study," http://www.freightworks.org/Documents/Port%20and%20Modal%20Elasticity%20Study.pdf.

[40] Leachman, Robert C., (2010) "Final Report: Port and Modal Elasticity Study, Phase II," http://www.freightworks.org/DocumentLibrary/Port%20and%20Modal%20Elasticity%20Study%20Phase%20II%20-%20Final%20Report.pdf

[41] Corbett, James J., James J. Winebrake, and Erin Green, (2006) "Cargo on the Move through California: Evaluating Container Fee Impacts on Port Choice," Accessed July 23, 2019, https://www.nrdc.org/sites/default/files/air_06081401a.pdf.

[42] Prozzi, Overmyer, Texas A&M Transportation Institute "The Potential Impacts of the Panama Canal Expansion on Texas Ports," PRC 17-78, January 2018.

renewable over the coming years to comply with the targets mandated by the RPS. Implementation of the Proposed Regulation would minimize emissions associated with operation of vessels at berth and would assist the State in meeting the National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS).

The addition of criteria pollutants, including ozone precursors, could result in an increase in ambient concentrations of these pollutants in air basins across the state and increase the likelihood that ambient concentrations exceed the CAAQS and NAAQS. Human exposure to pollutants can result in health impacts; for example, ozone may cause acute and chronic health impacts including coughing, pulmonary distress, lung inflammation, shortness of breath, and permanent lung impairment. However, it would be misleading to correlate the levels of criteria air pollutant and precursor emissions associated with compliance options to specific health outcomes to sensitive receptors. While the description of effects noted above could manifest in the recipient receptors, actual effects on individuals depend on individual factors, such as life stage (e.g., older adults are more sensitive), preexisting cardiovascular or respiratory diseases, and genetic polymorphisms. Even armed with this type of specific medical information (which is confidential to the individual), there are wide ranges of potential outcomes from exposure to pollutants, from no effect to the effects described above. Furthermore, the specific locations at which particular control options may be installed remain unknown, since individual terminals and ports have flexibility to select among different control options, based on their needs and financial considerations. Also, over the longer term, the Proposed Regulation's emissions benefits are expected to far outweigh any construction-related emissions increases, resulting in net positive overall health benefits over the Proposed Regulation's lifetime. Therefore, other than determining the types of health effects that could occur, it would be speculative to more specifically correlate exposure to criteria pollutants and precursors from this project to specific health outcomes to receptors. It is possible that health complications associated with pollutant exposure could be exacerbated to nearby sensitive receptors.

Implementation of the Proposed Regulation could result in additional emissions of air pollutants associated with mode shift and diversion, the operation of clean diesel generators for land- and barge-based capture and control systems, and lithium mining. However, these emissions would be substantially less than the baseline emissions levels produced by OGVs at berth in California, which produce energy from the operation of diesel-powered generators and are not subject to capture and control systems. Moreover, as discussed above, OGVs that elect to supply their electrical load with shore-power would receive electricity from public utility companies that will become increasingly more renewable over the coming years to comply with the targets mandated by the RPS. Implementation of the Proposed Regulation would minimize emissions associated with operation of OGVs at berth and would assist the State in meeting the NAAQS and CAAQS both regionally and statewide. For these reasons, long-term operational-related air quality impacts to ports and OGVs related to implementation of the Proposed Regulation would be **less than significant**.

4. Biological Resources

a) Land-Based Impacts

Impact 4.A-1: Short-term Construction-Related Impacts on Biological Resources

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Shore power and capture and control devices could require the construction of new pilings and surface area. Pile driving can cause impacts on aquatic species, including acoustic impacts and individual mortality. Increased use of shore power could also require the use of peaker plants and~~,~~ lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Construction activities related the implementation of the Proposed Regulation could cause temporary direct and indirect adverse impacts to special status species (including coastal species such as California Least Tern, California Brown Pelican). To support capture and control systems, ports may need to pile drive marine areas near vessels. Although unlikely, dredging activity could adversely affect subtidal benthic species and communities by producing suspended sediments and disturbing latent toxic substances that could increase the turbidity and affect water quality ~~of water~~. Sediments could later settle on subtidal species.

Most of the foreseeable compliance responses would generally be situated above-ground; therefore, the potential for adverse construction-related effects related to these activities on biological resources would mainly be limited to pile driving, installation of piping and staging areas associated with facility modifications. Direct mortality could result from destruction of dens, burrows, or nests through ground compaction, ground disturbance, debris, or vegetation removal within port facility and marine terminal sites. Indirect impacts to species could result from construction noise disturbance that might cause nest or den abandonment and loss of reproductive or foraging potential around the site during construction, transportation, or destruction of equipment and existing structures.

In general, ports and terminals exist in areas that are, or have been, subjected to substantial disturbance including grading, trenching, paving, and construction of roads and structures. Daily activities often include the presence of humans, movement of automobiles, trucks, vessels, heavy equipment, and the operation of stationary equipment. In general, port facilities where vessels are berthed are not considered conducive to many biological resources. Vegetation is often removed and controlled, and local wildlife is displaced to more suitable surroundings. Port-related modifications associated with the Proposed Regulation would occur within the industrial facility boundaries or in areas already highly disturbed with industrial applications (e.g. electricity grid transmitters). These areas are all highly disturbed and not likely to be supportive of a large range of biological species.

There are, however, some plant and animal species that occur in industrially developed areas. For example, birds may nest in built infrastructure on coastlines. However, most shore birds prefer open, sparsely vegetated nesting cover near shallow water.[43] (U.S. Department of Agriculture Natural Resources Conservation Service 2000). Further, alternative fuel-related infrastructure constructed as a result of implementation of the Proposed Regulation could occur on undeveloped areas that support species and habitat of special consideration. Construction of new infrastructure could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for fuel lines, and paving of delivery areas and roadways. Construction noise may also disturb birds nesting nearby.

Thus, implementation and compliance with the Proposed Regulation could result in potentially significant impacts to biological resources. Depending on the regulatory status of the species (e.g., listed as endangered under the Endangered Species Acts), and the nature of the habitat disturbance, compliance with permitting requirements under the National Environmental Policy Act, the federal or state Endangered Species Act, Migratory Bird Treaty Act, Clean Water Act Section 404, or related state or local laws would be required. It is expected that potential impacts to special-status species and sensitive habitats would be minimized through compliance with the aforementioned protective regulations; however, the terms of permits obtained under these regulations

[43] Natural Resources Conservation Service, Shorebirds, Accessed August 26, 2019, https://www.shorebirdplan.org/wp-content/uploads/2014/01/ShorebirdManagementLeafletNrcs.pdf.

are unknown as are the precise locations at which construction work would occur. Moreover, it is beyond the authority of CARB to enforce such compliance.

Therefore, short-term construction-related biological resource impacts to ports and marine terminals and other lands associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 4.A-1:
CARB does not have the authority to require implementation of mitigation related to new or modified infrastructure. Approval is handled by local jurisdictions. The ability to require such measures is under jurisdictions with local or State land use approval and/or permitting authorities. New or modified port and terminal infrastructure in California would likely qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to biological resources include:

- Proponents of construction activities implemented as a result of reasonably foreseeable compliance responses associated with the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts on biological resources associated with the project.

- Actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified port/terminal facility or other lands would be determined by the local lead agency.

    - Retain a qualified biologist to prepare a biological inventory of site resources prior to ground disturbance or construction. If protected species or their habitats are present, comply with applicable federal and State endangered species acts and regulations. Construction and operational planning would require that important fish or wildlife movement corridors or nursery sites are not impeded by project activities.

    - Retain a qualified biologist to prepare a wetland survey of onsite resources. This survey shall be used to establish setbacks and prohibit disturbance of riparian habitats, streams, intermittent and ephemeral drainages, and other

wetlands. Wetland delineation is required by Section 404 of the Clean Water Act and is administered by the U.S. Army Corps of Engineers.

- Prohibit construction activities during the rainy season with requirements for seasonal weatherization and implementation of erosion prevention practices.
- Require acoustic mitigation, such as a bubble curtain, for noise impacts.
- Prohibit construction activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring, as needed, to address project activities that could cause an active nest to fail.
- Prepare site design and development plans that avoid or minimize disturbance of habitat and wildlife resources and prevent storm water discharge that could contribute to sedimentation and degradation of local waterways. Depending on disturbance size and location, a National Pollution Discharge Elimination System (NPDES) construction permit may be required from the California State Water Resources Control Board.
- Prepare spill prevention and emergency response plans, and hazardous waste disposal plans as appropriate to protect against the inadvertent release of potentially toxic materials.
- Plant replacement trees and establish permanent protection suitable habitat at ratios considered acceptable to comply with “no net loss” requirements.
- Contractor will keep the site and materials organized and store them in a way to discourage wildlife through reducing potential places for wildlife to hide or nest (e.g., capping pipes, covering trashcans, and emptying trash receptacles consistently and promptly when full).

The impacts to biological resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by federal, state, and local lead agencies, but is beyond the authority of CARB. The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. Thus, there is inherent uncertainty in the degree of mitigation that may ultimately be implemented to reduce potentially significant impacts.

While impacts may be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, CARB takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that short-term construction-related impacts to biological resources associated with the Proposed Regulation would be **potentially significant and unavoidable.**

Impact 4.A-2: Long-term Operational-Related Impacts on Biological Resources

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Implementation of the Proposed Regulation would consist of modifications to existing port and terminal facilities, such as installation of alternative marine power housing, cables, transformers, and other related infrastructure. Compliance responses associated with the Proposed Regulation would result in installation of shore power equipment, land-based capture and control systems and other similar features already associated with ports and terminals. Operational activities associated with implementation of the Proposed Regulation would include monitoring (e.g., inspections, repairs) and reporting activities. These activities would not be anticipated to affect biological resources to an extent substantially greater than under the existing standard operations at any one port facility because operations associated with the Proposed Regulation would be similar to those already occurring at port and terminal facilities.

Implementation of the Proposed Regulation could require operation of alternative fuel infrastructure such as compressor stations, pipelines, and export terminals, as well as

lithium-ion battery infrastructure such as mining facilities, and recycling or refurbishment facilities. Long-term operation of these facilities would often include the presence of workers; movement of automobiles, trucks, and heavy-duty equipment; and operation of stationary equipment. This environment would generally not be conducive to the presence of biological resources located on-site or nearby. For example, operation of a new facility could deter wildlife from the surrounding habitat or could impede wildlife movement through the area. As is already the case with these facilities, this impact would be substantial if there is not adequate habitat nearby. Vegetation management may be necessary to comply with fire codes and defensible space requirements, which may require tree trimming and other habitat modification that could, for example, result in species mortality or nest failure. Furthermore, operation of facilities could result in the accidental introduction of hazardous substances to the environment which could adversely affect biological resources.

Increased demand in lithium-ion batteries and fuel cells could result in increased mining-related activities, including hard rock and continental brines for the procurement of lithium ore. Mining of hard rock would require the use of conventional mining practices including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Lithium may also be collected from lake brines and clays. This process involves the pumping of salty groundwater into lagoons where it undergoes evaporation producing salts containing lithium compounds. Further, increased use of shore power could also require the use of peaker plants and fuel cells to provide alternative or additional electricity to vessels with large electrical loads. Similar to lithium-ion storage, an increase in demand for fuel cells could result in lithium and platinum mining and exports from source countries or other states and increase recycling, refurbishment, or disposal of hydrogen fuel cells. If these activities occur on or near biological resources, they could result in loss or degradation of these resources. Such activities could result in substantial disturbances to biological resources and could cause a reduction in sensitive habitat, interference with a wildlife corridor, loss of special-status species, or conflict with a habitat conservation plan or natural community conservation plan. Therefore, long-term operational-related impacts to biological resources associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 4.A-2

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of biological resources. CARB does not have the authority to require implementation of mitigation related to new or modified infrastructure that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified infrastructure in California could qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation could be identified during the environmental review by agencies with project-approval authority. Recognized practices

that are routinely required to avoid and/or minimize impacts to biological resources include:

- Proponents of new or modified infrastructure constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant biological impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Prohibit vegetation management activities in the vicinity of raptor nests during nesting season or establish protective buffers and provide monitoring as needed to ensure that project activity does not cause an active nest to fail.

- Maintain site design and development plan features that avoid or minimize disturbance of habitat and wildlife resources, and prevents stormwater discharge that could contribute to sedimentation and degradation of local waterways during project operation.

- Maintain and replace, as needed replacement trees and permanently protected suitable habitat identified during the construction phase of the project.

Potential operational-related biological resources impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies but is beyond the authority of CARB and not within its purview (in the United States and abroad). The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than- significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related impacts to biological resources associated with the Proposed Regulation would be **potentially significant and unavoidable.**

b) Vessel-Related Impacts

Impact 4.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts on Biological Resources

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage or on-board control technology. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or, in some rare cases, while a vessel is in-transit to California. All modifications to vessels would take place on the vessel. Vessels do not support special-status species or sensitive habitats. As such, implementation of the Proposed Regulation would not have an impact on biological resources as they pertain to vessels. There would be **no impact.**

5. Cultural Resources and Tribal Cultural Resources

a) Land-Based Impacts

Impact 5.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts on Cultural Resources

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries to provide additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries could result in increased mining and exports of lithium, and increased recycling, refurbishment, or disposal of lithium batteries. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

In general, ports/terminal facilities are in industrial, previously disturbed locations. Regardless, there is a possibility that they may be in or adjacent to a region consisting of significant prehistoric and/or historic-era cultural resources or resources that are considered tribal cultural resources. As such, it is foreseeable that undocumented cultural resources could be unearthed or otherwise discovered during ground-disturbing and construction activities. Unique archaeological or historical resources might include stone tools, tool-making debris, stone milling tools, shell or bone items, and fire-affected rock or soil darkened by cultural activities. Historic materials might include metal, glass, or ceramic artifacts. Tribal cultural resources include sites, features, places, cultural landscapes, sacred places, and objectives with cultural value to a California Native American tribe.

Implementation of the Proposed Regulation would consist of modifications to existing facilities, such as installing new cable lines, new meters and circuit breakers, additional buildings and structures to house equipment associated with shore power, alternative fuels, and capture and control systems and other industrial features already associated with port and terminal facilities. Construction and operation of alternative fuel-related (e.g., LNG) infrastructure not within the proximity of a port could also occur due to an increase in alternative fuel use.

Construction related activities required by the implementation of the proposed regulation may require earth-moving and grading activities that could affect undiscovered and known cultural resources, depending on their location in relation to known resources and whether the substrate is conducive to hosting archaeological resources. As a result, construction impacts would be potentially significant.

Operation of these facilities would not result in additional ground disturbance beyond that which occurred during construction and modification because operation activities would occur within the footprint of the constructed or modified facility. Therefore, most operational activities would not have the potential to affect archaeological, paleontological, or historical resources. Presence of new infrastructure may, however, change the visual setting of the surrounding area, which could adversely affect historic resources and districts with an important visual component. For example, although it is unlikely such a facility would be sited in a historic district, a new industrial building or control system may not be consistent with the visual character of a historic district. As a result, operation impacts would be potentially significant.

The increased demand for lithium-ion battery storage and fuel cells to support heavy electrical loads and alternative power supplies for large vessels could result in increased lithium and platinum mining. Ground disturbing activities from hard rock and continual brine mining activities could affect areas and artifacts of cultural, historical, and/or paleontological significance.

Therefore, short-term construction-related and long-term operational-related impacts to cultural resources associated with implementation of the Proposed Regulation would be potentially significant.

Mitigation Measure 5.A-1

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of cultural resources. CARB does not have the authority to require implementation of mitigation related to modification and expansions to port and terminal infrastructure that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. Any modification to facilities in California would most likely qualify as a "project" under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to cultural resources include:

- Proponents of construction activities implemented as a result of reasonably foreseeable compliance responses associated with the Proposed Regulations would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents would implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts on cultural resources associated with the project.

Actions required to mitigate potentially significant cultural impacts may include the following; however, any mitigation specifically required for a modified facility would be determined by the local lead agency.

- Retain the services of cultural resources specialists with training and background that conforms to the U.S. Secretary of Interior's Professional Qualifications Standards, as published in Title 36, Code of Federal Regulations, part 61.

- Seek guidance from the State and federal lead agencies, as appropriate, for coordination of Nation-to-Nation consultations with the Native American Tribes.

- Provide notice to Native American Tribes of project details to identify potential tribal cultural resources (TCRs). In the case that a TRC is identified, prepare mitigation measures that:

    - Avoid and preserve the resource in place.

    - Treat the resource with culturally appropriate dignity.

    - Employ permanent conservation easements.

  - Protect the resource.

- Seek guidance from the State Historic Preservation Officer and federal lead agencies, as appropriate, for coordination of Nation-to-Nation consultations with the Native American tribes.

- Regulated entities shall consult with lead agencies early in the planning process to identify the potential presence of cultural properties. The agencies shall provide the project developers with specific instruction on policies for compliance with the various laws and regulations governing cultural resources management, including coordination with regulatory agencies and Native American Tribes.

- If a resource determined to be significant by the qualified archaeologist (i.e., because the find is determined to constitute either an historical resource or a unique archaeological resource), the archaeologist shall work with the project applicant to avoid disturbance to the resources, and if complete avoidance is not possible, follow accepted professional standards in recording any find Preservation in place is the preferred manner of mitigating impacts to archaeological sites.

- Regulated entities shall define the area of potential effect (APE) for each project, which is the area where project construction and operation may directly or indirectly cause alterations in the character or use of historic properties. The APE shall include a reasonable construction buffer zone and laydown areas, access roads, and borrow areas, as well as a reasonable assessment of areas subject to effects from visual, auditory, or atmospheric impacts, or impacts from increased access.

- Regulated entities shall retain the services of a paleontological resources specialist with training and background that conforms with the minimum qualifications for a vertebrate paleontologist as described in Measures for Assessment and Mitigation of Adverse Impacts to Non-Renewable Paleontological Resources: Standard Procedures, Society of Vertebrate Paleontology, 1995[44].

- Regulated entities shall conduct initial scoping assessments to determine whether proposed construction activities, if any, could disturb formations that may contain important paleontological resources. Whenever possible, potential impacts to paleontological resources should be avoided by moving the site of construction or removing or reducing the need for surface disturbance. The

[44] Society of Vertebrate Paleontology Impact Mitigation Guidelines Revision Committee, Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources, 2010, (accessed August 08, 2019), http://vertpaleo.org/Membership/Member-Ethics/SVP_Impact_Mitigation_Guidelines.aspx

scoping assessment shall be conducted by the qualified paleontological resources specialist in accordance with applicable agency requirements.

- The regulated entity's qualified paleontological resources specialist shall determine whether paleontological resources would likely be disturbed in a project area on the basis of the sedimentary context of the area and a records search for past paleontological finds in the area. The assessment may suggest areas of high known potential for containing resources. If the assessment is inconclusive a surface survey is recommended to determine the fossiliferous potential and extent of the pertinent sedimentary units within the project site. If the site contains areas of high potential for significant paleontological resources and avoidance is not possible, prepare a paleontological resources management and mitigation plan that addresses the following steps:
    - A preliminary survey (if not conducted earlier) and surface salvage prior to construction.
    - Physical and administrative protective measures and protocols such as halting work, to be implemented in the event of fossil discoveries.
    - Monitoring and salvage during excavation.
    - Specimen preparation.
    - Identification, cataloging, curation and storage.
    - A final report of the findings and their significance.
    - Choose sites that avoid areas of special scientific value.

Impacts to cultural resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by federal, state, and local lead agencies, but is beyond the authority of the CARB and not within its purview. The authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and that the programmatic analysis does not allow project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related and long-term operational-related impacts regarding cultural resources associated with the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impact 5.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts on Cultural Resources

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

It would not be expected that vessels accessing California ports would contain culturally, historically, or archeologically significant resources. Moreover, modifications and retrofits to vessels would not alter the integrity of a vessel or involve substantial physical alterations. There would be **no impact.**

6. Energy Demand

Energy impacts associated with the Proposed Regulation would overlap between ports, other land-based areas, and vessels. To more accurately assess short-term construction-related and long-term operational-related energy impacts related to the Proposed Regulation, land- and vessel-based impacts are discussed together below.

a) Short-Term Construction-Related Impacts on Energy Demand

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and

exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells. Implementation of the Proposed Regulation could also result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or, in some rare cases, while a vessel is in-transit to California.

Supply of shore power to vessels at berth may require new or increased support infrastructure, which would be supplied by the appropriate utility service provider. It is reasonably foreseeable that additional power would require the installation of newer or additional high voltage lines and substations to meet the increased power demand of vessels at berth. In rare cases, additional power generation could be required to accommodate the substantial electrical loads of large vessels at berth. This additional power provided by the utility may be in the form of "peaker plants" or power storage systems (e.g. lithium ion). Further, fuel cells convert the chemical energy of fuel, typically hydrogen or natural gas, to electricity through electrochemical reactions. Currently, fuel cells can be used as a supplemental system or for auxiliary power, but they have not yet been widely technically or commercially tested in a port environment.

Short-term construction-related activities associated with implementation of the Proposed Regulation would be similar to construction and maintenance activities already on-going within port facilities. Thus, the temporary increase in energy demand for the construction of shore power systems and land- and barge-based capture and control systems would not be considered inefficient, wasteful, or unnecessary.

Modifications to existing vessels would likely occur to vessels with at dry dock, which could be performed by existing equipment. These modifications would be required to comply with the Proposed Regulation and would not involve the wasteful or inefficient use of energy because their purpose would be for the sake of reducing air quality emissions in the long-term. Moreover, energy needed to power necessary equipment would not be anticipated to generate high electrical demand beyond baseline energy load. Dry docks support high existing electrical demand which would be expected to be sufficient to power the heavy-duty equipment or tools required to implement vessel retrofits. Moreover, such modifications would be short term in nature and would not require the construction of additional energy-related infrastructure. Short-term construction-related energy impacts associated with the Proposed Regulation would be **less than significant.**

b) Long-Term Operational-Related Impacts on Energy Demand

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Shore power equipment could require repairs and replacements, which would increase vehicle mileage of workers and could result in an increase in fuel consumption associated with worker commute. However, any additional mileage would be minimal and/or infrequent, and would not amount to a substantial increase in fuel consumption that is a wasteful or unnecessary use of energy. According to capture and control system operators these systems would take on average two to three people to operate.[45] Use of capture and control systems would typically be powered by CARB diesel, which would not place additional energy load on the State's electrical grid. Alternatively, in some cases control systems could be fueled on biodiesel, CNG, LNG or even fuel cells.

Some capture and control systems may be powered by electricity, but it is expected the additional electricity needed would be minimal. Supply of shore power to vessels at

[45] CAEM-AEG-WSPA-USCG-CSLC Meeting Notes, "04-16-2019 CAEM-WSPA-USCG-CSLC Meeting," April 16, 2019.

berth may require new or increased support infrastructure. Use of shore power would divert electricity demand from on-board vessel diesel-powered generators to California's energy grid, which could increase local and regional energy use. Vessels have varying levels of energy demands, and the potential for a change in energy demand would be site-specific and dependent on the type of vessel and port complexes' operations (i.e. how many vessels are using shore power at once). However, for large vessels with substantial electrical loads, peaker plants or lithium-ion storage batteries could be relied on during periods where a vessel's demand is high and the energy grid is experiencing peak levels of demand.

However, the State's energy capacity is expected to increase as a result of a menu of greenhouse gas (GHG) reducing regulations and policies. To meet the statewide targets of 1990 levels of GHG emissions by 2020 (i.e., Assembly Bill [AB] 32) and 40 percent below 1990 levels of GHG emissions by 2030 (i.e., Senate Bill [SB] 32), reductions will need to be made from several sectors including the energy and mobile source sectors. Statewide regulations such as the Zero-Emission Vehicle (ZEV) Mandate and the Innovative Clean Transit Regulation aim to achieve GHG reductions from the mobile source sector through the deployment of electric vehicles (EVs), which would replace vehicles powered by internal combustion engines.

One consequence of electrifying the transportation sector is the addition of electricity demand on public utility companies from the diversion of energy previously derived from the direct during of fossils fuels to the grid. As a result, utilities are working in coordination with the California Public Utilities Commission to fund infrastructure expansion projects to meet this future demand.[46] Additional energy capacity would be achieved through improved energy efficiency, energy storage, demand response, and generation of renewable resources. The efficiency of new homes is continually improving through triennial updates to the Title 24 Part 6 Building Standards Code (California Energy Code) which achieve energy reductions through use of mandatory and prescription energy efficiency design features. Moreover, as mandated by SB 100, the State must achieve 60 percent and 100 percent renewable energy by 2030 and 2045, respectively.

The abovementioned factors combine to expand the State's energy capacity as compared to previous years. For example, in-state energy capacity rose from 55,362 megawatts (MW) in 2001 to 80,304 MW in 2018.[47] In 2018 California's total system electricity generation was 285,488 GW/hrs.[48] In 2031, once full implementation of the Proposed Regulation is in place, energy demand from shore power is estimated to be

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[46] Southern California Edison, "The Power Grid of the Future: Building a Smarter Grid for Southern California," n.d. (accessed July 11, 2019), https://newsroom.edison.com/internal_redirect/cms.ipressroom.com.s3.amazonaws.com/166/files/20165/the-grid-of-the-future.pdf.

[47] CEC, "Electric Generation Capacity & Energy," n.d. (accessed July 11, 2019), http://www.energy.ca.gov/almanac/electricity_data/electric_generation_capacity.html.

[48] CEC, 2018 Total System Electric Generation in Gigawatt Hours, 2018 (accessed July 29, 2019) https://ww2.energy.ca.gov/almanac/electricity_data/total_system_power.html.

291 GW/hrs, which is equivalent to 0.001 percent of the total power used in California. The difference between the Existing Regulation and the Proposed Regulation is expected to be an addition of approximately 100 GW/hrs. As such, due to this increased capacity as a result of statewide regulations and policies and the minimal energy demand shore power would require, it would not be expected that increase shore power under the Proposed Regulation would be substantial such that local utilities would be required to expand their capacity. Capture and control systems that run on diesel generators will require additional fuel demand. Although the size, quantity, and hours each system is used, will be site, time, and vessel specific, CARB staff analyzed the additional fuel that a typical capture and control system could require.

According to specifications, a Cummins tier IV generator will burn about 17.9 gal/hr of on-road diesel fuel while operating at a 75% load.[49] Typically, a capture control system will use two of these generator types running at approximately a 75% load.

CARB staff analyzed California State Land Commission vessel visit and port supplied Wharfinger data and identified how many previously unregulated vessel visits would use either shore power or capture and control systems. Specifics on this data can be found in SRIA Appendix A (Tables X-III A-D). The average amount of time each vessel category stays during a vessel visit was also calculated and can be found in SRIA Appendix A (Table VI). For each vessel type staff multiplied the yearly vessel visits by the average hours of which they stayed (Table D.4-5) (Appendix C, SRIA Appendix A).

Table D.4-5: 2031 Yearly Vessel Visits, Time at Berth and Additional Shore Power/Capture and Control Hours (Appendix H)

Vessel Type	Vessel Visits/year -Shore Power	Vessel Visits/year - Capture and Control Systems	Average Berth Time (hours)	Additional Shore Power Hours	Vessel Visits/year -Shore Power
Container/Reefer	348	55	38.8	13,502.4	3,630
Cruise	66	0	11.2	739.2	0
Ro-ro	0	599	19.8	0	11,860.2
Tanker	0	1,320	40.7	0	53,724
Total:	**414**	**1,974**	**--**	**14,241.6**	**69,214.2**

The additional capture and control time during full implementation (2031) is calculated to be 69,214 hours. This was then multiplied by the 17.9 gal/hr engine assumption for a total increase of on-road diesel fuel required due to the use of capture and control under the Proposed Regulation to be approximately 2.4 million tons per year

[49] Cummins Power Generator, Specification sheet Rental Power 275 kW U.S. EPA Tier IV Emissions, 2016

(1,238,931 gal/year x 2 generators). However, the Proposed Regulation includes fuel savings from the use of shore power. In 2031, as calculated by CARB's emissions inventory shore power would reduce the amount of marine distillate burned by 6.5 million gallons a year.[50]

The potential for an increase in fuel consumption would be site-specific and depend on the particular methods used to comply with the Proposed Regulation (e.g. if labor is part of the existing terminal staff or contractors from another facility). Any increases in fuel consumption due to the operation and use of shore power would be minimal and not substantial in comparison to the demand already associated with port complexes.

Furthermore, implementation of the Proposed Regulation could result in the increased use of alternative fuels such as LNG, which would displace diesel fuel currently used to power on-board generators. Appendix F of the CEQA Guidelines identifies the use of alternative fuels as a measure to reduce energy demand. Moreover, Appendix F also lists increased use of renewable energy as an appropriate strategy to mitigate energy impacts. Use of shore-power, as discussed above, would divert energy from diesel-powered generators to land-based energy systems, which, as mandate by the RPS, will become increasingly more renewable in the coming years. Furthermore, the diversion of this energy would not result in the wasteful or inefficient use of energy as compared to existing conditions. Arguably, through the use of alternative fuels and an increasingly more renewable energy grid, implementation of the Proposed Regulation would improve the efficiency of energy usage associated with vessels at berth.

As such, implementation of the Proposed Regulation would not result in the wasteful or efficient use of energy. Thus, long-term operational-related energy impacts to vessels would be **less than significant.**

7. Geology and Soils

a) Land-Based Impacts

Impact 7.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts on Geology and Soils

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants

[50] CARB, Emissions Inventory, CEPAM: 2016 SIP - Standard Emission Tool, Accessed August 21, 2019, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php.

and lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Construction and modification of port facilities could occur as a result of project implementation. Although unlikely, dredging to accommodate capture and control systems would produce impacts to erosion within aquatic and coastal areas. Although it is reasonably foreseeable that dredging could possibly occur, there are a variety of factors that contribute to the severity of dredging impacts such as magnitude of the activity, method of dredging, channel size and depth, tidal range, seasonal variability, and others. California ports support various environmental conditions depending on location. Further, the types of equipment and magnitude of dredging to accommodate new infrastructure are unknown at this time and considered unlikely. Further, ground-disturbing activities such as pile driving cause erosion and for new facilities and infrastructure to be located in areas with a variety of seismic conditions.

Construction of new infrastructure and facilities to accommodate increased generation of alternative fuels (e.g., LNG) could cause adverse geologic impacts such as erosion from vegetation grubbing and grading; however, there is uncertainty as to the exact location of new facilities and, as a result, there is uncertainty as to geologic conditions at project sites. Furthermore, it is not known what kinds of modifications to existing facilities would occur and whether any ground disturbance would be needed. Nonetheless, it is probable construction activities for new facilities would require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect soil and geologic resources in construction areas.

Project implementation would not result in the addition of new sensitive receptors (e.g., housing, schools, hospitals) to seismic and geologic hazards. New and modified facilities and infrastructure associated with compliance responses under the Proposed

Regulation could be located in areas with a variety of seismic conditions. Building construction would not exacerbate seismicity due to the nature of construction activities (e.g., no groundwater injection is anticipated). As such, implementation of the Proposed Regulation would not exacerbate seismicity. The level of susceptibility to seismic related geologic hazards like erosion and landslides varies by location and geologic conditions. The specific design details, siting locations, and soil compaction details for manufacturing facilities are not known at this time. However, there is potential for these facilities to be sited in a seismically hazardous area due to the general seismic conditions in California.

Operation of infrastructure and facilities to manufacture and distribute alternative fuels and LNG would not be expected to result in the loss of top soils or increase the potential for a landslide or a seismic event to occur. Furthermore, it would be expected that facilities would be sited on lands capable of supporting wastewater generation. However, there is inherent uncertainty surrounding the location and magnitude of such facilities, which could be located outside of California. As such, it is conceivable that a facility could be located on soils incapable of supporting facility generated wastewater.

Implementation of the Proposed Regulation could result in increased demand for storage lithium-ion batteries, which could cause a surge in lithium-extraction activity within the United States as well as internationally. Hard rock lithium ion extraction, which would be expected to occur outside of the state and U.S. would have adverse effects to erosion from potential loss of forests and soil disturbance.[51]

Therefore, short-term construction-related and long-term operational impacts to geology and soils associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 7.A-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that provide protection of geology and soils. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local land use and/or permitting authority. New or modified facilities in California could qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to geology and soils include:

- Proponents of new or modified facilities constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek

[51] Kinhal, Vijayalazxi, “How Does Mining Affect the Environment,” n.d. (accessed July 11, 2019), https://greenliving.lovetoknow.com/How_Does_Mining_Affect_the_Environment.

entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant geology and soil impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Prior to the issuance of any development permits, proponents of new manufacturing plants and hydrogen fueling stations would prepare a geotechnical investigation/study, which would include an evaluation of the depth to the water table, liquefaction potential, physical properties of subsurface soils including shrink-swell potential (expansion), soil resistivity, slope stability, minerals resources and the presence of hazardous materials.

- Proponents of new manufacturing plants and hydrogen fueling stations would provide a complete site grading plan, and drainage, erosion, and sediment control plan with applications to applicable lead agencies. Proponents would avoid locating facilities on steep slopes, in alluvial fans and other areas prone to landslides or flash floods, or with gullies or washes, as much as possible.

The impacts to geology and soil resources could be reduced to a less-than-significant level by mitigation that can and should be implemented by federal, State, and local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than- significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related and long-term operational-related impacts to geology and soils associated with the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impact 7.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts on Geology and Soils

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g.., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

Implementation of modifications to vessels would not affect geology or soils because vessels do not support soils, nor would they cause or exacerbate seismic activity or hazards. There would be **no impact**.

8. Greenhouse Gas Emissions

Climate change impacts associated with the Proposed Regulation would overlap between ports, other land-based areas, and vessels. To more accurately assess short-term construction-related and long-term operational-related GHG impacts related to the Proposed Regulation, land- and vessel-based impacts are discussed together below. For more detail regarding quantified emissions reduction associated with the Proposed Regulation, see the staff report published concurrently with this ~~Draft~~ Final EA.

Impact 8.A-1: Short-Term Construction-Related Impacts on Greenhouse Gases

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells. Implementation of the Proposed Regulation could also result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

Although detailed construction information is not available at this programmatic stage, implementation and compliance responses to the Proposed Regulation could consist of modifying an existing port/terminal for shore power capabilities. This may include trenching to install new cable lines, installing new kV meters and circuit breaker main cabinets, all of which would be installed in the approximate vicinity of existing service areas. Shore power substations may require the construction of an enclosed concrete pad which houses equipment like transformers, power circuit breakers, and HVL break interrupters. Shore power outlet vaults can be located above or below ground at each berth and would measure approximately 12 by 2 by 4 feet. The shore power outlet connection equipment is generally placed in an underground vault to minimize impacts to terminal operations. [52]

Installation of land-based capture and control systems could potentially require minor trenching to install electrical infrastructure. Although detailed construction information is not available at this time, this could possibly include installation of components consisting of a hood, ductwork, and variable speed fan(s) to collect vessel emissions directing them to the NOx control unit and a SCR system to minimize NOx emissions.[53]

Similar to land-based capture and control systems, barge-based systems require installation of components consisting of a hooding, ductwork, and variable speed fan(s) to collect vessel emissions and directing them to the NOx control unit and a SCR

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[52] ICF International, "Port of San Diego Final Environmental Impact report Tenth Avenue Marine Terminal Redevelopment and Demolition and Initial Rail Component," Part 1 of 4 and Part 4 of 4, December 2016 (accessed July 11, 2019), https://www.portofsandiego.org/sites/default/files/media/resources/2018/03/pgp-tamt-feir-part-1-final-eir-2016-12-1.pdf, https://www.portofsandiego.org/public-records/all?keyword=tenth&topic=&location=&category=42&sort_by=search_api_relevance&sort_order=DESC&page=2

[53] POLB, "The Port of Long Beach Notice of Preparation and Initial Study, Mitsubishi Cement Terminal," August 26, 2011, (accessed July 11, 2019), http://www.polb.com/civica/filebank/blobdload.asp?BlobID=8645

system to minimize NOx emissions. Rather than having a system connected to grid-based power, barge-based systems run off of clean diesel generators. Barge-based systems may or may not be assembled at the port.

Construction of these compliance responses could result in temporary increases in GHG emissions associated with the transport of necessary equipment, trenching for piping, installation of new features and increased vehicle traffic. However, many air pollution control districts do not recommend or require the quantification of short-term construction-generated GHGs for typical construction projects because these only occur for a finite period of time (e.g., during periods of construction) that is typically much shorter than the operational phase. At the time of writing this ~~Draft~~ Final EA, only a few air districts (e.g., South Coast Air Quality Management District, Sacramento Metropolitan Air Quality Management District) recommend the quantification of construction emissions to be measured against an adopted threshold. With respect to the Sacramento Metropolitan Air Quality Management District, construction emissions are considered to be potentially significant if annual emissions exceed 1,100 metric tons of CO_2e. This threshold is typically applied to land use development projects that entail the prolonged use of heavy-duty equipment under multiple years.

Although Specific project GHG emissions cannot be quantified with precision, CARB staff has calculated construction air pollutant emissions for each of each of the reasonably foreseeable compliance responses for vessel categories included in the Proposed Regulation; shore power; land-based capture and control; have been calculated using CalEEMod version 2016.3.2 developed by CAPCOA and the Harborcraft, Dredge and Barge Emission Factor Calculator developed by the SMAQMD.

CalEEMod is a statewide land use emissions computer model designed to provide a reliable way to quantify potential criteria and GHG emissions associated with both construction and operations from a variety of land use projects. CalEEMod was developed in collaboration with California's air districts to account for local requirements and conditions. The Harbor craft, Dredge and Barge Emission Factor Calculator developed by SMAQMD is a tool that estimates air pollutant emission rates for harbor craft engines, which are based on CARB's emission estimation databases. These models are considered by CARB to be an accurate and comprehensive tool for quantifying air quality and GHG impacts from construction projects throughout California. Details of the modeling assumptions and emissions factors are provided in Attachment B of this ~~Draft~~ Final EA.

Construction air quality modeling include GHG emissions generated mobile sources (e.g., heavy truck and worker traffic), and construction activities that reflect the types and quantities of construction equipment that would be used in removing pavement from existing facilities, grading and excavating new sites, construction and building of shore-side equipment housing etc. The tables below show the estimated unmitigated construction air pollution emissions compared to local air districts significance thresholds.

Table D.4-5: Annual GHG Construction Emissions Comparison to Air District Thresholds – Representative Additional Vault Installation Example

Air District	Annual Construction GHG Emissions (Metric Tons per Year)	Significance Threshold	Exceed Significance Threshold (yes or no)?
BAAQMD[1]	62	1,100	No
VCAPCD[2]		10,000	No
NCUAQMD[3]		1,100	No
SCAQMD[4]		10,000	No
YSAQMD[5]		1,100	No
SDCAQMD[6]		10,000	No
SJVUAPCD[7]		1,100	No

1. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en
2. The VCAPCD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
3. The NCUAQMD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the BAAQMD's significances thresholds were used.
4. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf
5. The YSAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD's significance thresholds were used.
6. The SDCAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
7. The SJVUAPCD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD significance thresholds were used.

Table D.4-6: Annual GHG Construction Emissions Comparison to Air District Thresholds – Representative Landside System Example

Air District	Annual Construction GHG Emissions (Metric Tons Per year)	Significance Threshold	Exceed Significance Threshold (yes or no)?
BAAQMD[1]	89	1,100	No
VCAPCD[2]		10,000	No
NCUAQMD[3]		1,100	No
SCAQMD[4]		10,000	No
YSAQMD[5]		1,100	No
SDCAQMD[6]		10,000	No
SJVUAPCD[7]		1,100	No

1. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en
2. The VCAPCD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
3. The NCUAQMD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the BAAQMD's significances thresholds were used.
4. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf
5. The YSAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD's significance thresholds were used.
6. The SDCAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
7. The SJVUAPCD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD significance thresholds were used.

Table D.4-7: Annual GHG Construction Emissions Comparison to Air District Thresholds – Unmitigated Construction Air Pollutant Emissions - Tanker Landside Emissions Control System Example

Air District	Annual Construction GHG Emissions (Metric Tons Per year)	Significance Threshold	Exceed Significance Threshold (yes or no)?
BAAQMD[1]	447	1,100	No
VCAPCD[2]		10,000	No
NCUAQMD[3]		1,100	No
SCAQMD[4]		10,000	No
YSAQMD[5]		1,100	No
SDCAQMD[6]		10,000	No
SJVUAPCD[7]		1,100	No

1. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en
2. The VCAPCD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
3. The NCUAQMD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the BAAQMD's significances thresholds were used.
4. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf
5. The YSAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD's significance thresholds were used.
6. The SDCAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
7. The SJVUAPCD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD significance thresholds were used.

Table D.4-8: Annual GHG Construction Emissions Comparison to Air District Thresholds – Unmitigated Construction Air Pollutant Emissions - Tanker Dockside Emissions Control System Example

Air District	Annual Construction GHG Emissions (Metric Tons Per year)	Significance Threshold	Exceed Significance Threshold (yes or no)?
BAAQMD[1]	619	1,100	No
VCAPCD[2]		10,000	No
NCUAQMD[3]		1,100	No
SCAQMD[4]		10,000	No
YSAQMD[5]		1,100	No
SDCAQMD[6]		10,000	No
SJVUAPCD[7]		1,100	No

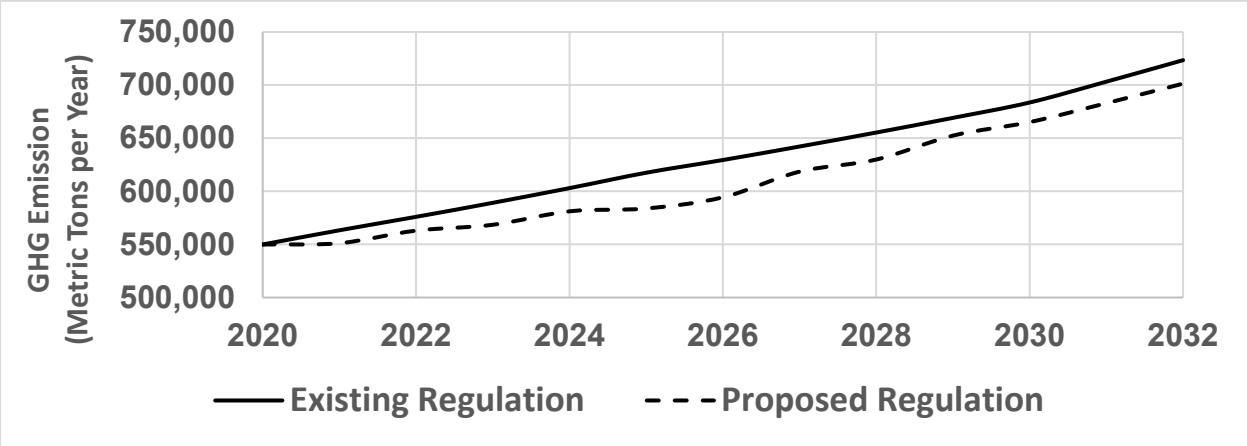
1. http://www.baaqmd.gov/~/media/files/planning-and-research/ceqa/ceqa_guidelines_may2017-pdf.pdf?la=en
2. The VCAPCD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
3. The NCUAQMD does not have any adopted significance thresholds for GHGs. To evaluate construction GHG impacts, the BAAQMD's significances thresholds were used.
4. http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf
5. The YSAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD's significance thresholds were used.
6. The SDCAQMD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the SCAQMD significance thresholds were used.
7. The SJVUAPCD does not have any adopted GHG significance thresholds. To evaluate construction GHG impacts, the BAAQMD significance thresholds were used.

CalEEMod calculates emissions from off-road equipment usage as well as on-road vehicle travel associated with haul, delivery and construction worker trips. GHG emissions during construction were forecasted based on estimated representative project schedules developed in coordination with industry experts. The calculations include emission generated from fugitive dust, mobile sources, and construction activities that reflect the types and quantities of construction equipment that would be used in removing pavement from existing facilities, grading and excavating new sites, construction and building of shore-side equipment housing etc.

The types of upgrades and modifications to terminals, and port facilities that could be required under the Proposed Regulation would be minimal, consisting of construction projects such as installation of piping, cables, and vaults, which would be expected to emit GHGs well below the aforementioned thresholds. Thus, short-term construction-related GHG impacts associated with Proposed Regulation would be **less than significant** and would be more than offset by the substantial GHG reduction benefits, achieved largely through shore power use, as a result of the Proposed Regulation.

Impact 8.A-2: Operational Impacts on Greenhouse Gases

Figure D-4: Forecasted Statewide GHG Emissions in Metric Tons per Year (MTY)[54]



As can be seen in Figure D-4, the Proposed Regulation achieves GHG benefits to the state of California. This is mainly achieved by reducing fuel consumption through the use of shore power. Figure D-4 shows California's GHG emissions from vessels with the Existing Regulation (baseline) and the forecasted emissions of the Existing Regulation. Starting in 2021 and over the following 10 years, GHG emissions on average are reduced by 8.5 to 10.5 percent a year by implementing the Proposed Regulation. Figure D-4 was forecasted using CARB's 2019 emissions inventory. When forecasting emissions reductions from the Proposed Regulation additional GHG emissions associated with the use of capture and control systems are deducted from the overall GHG emissions benefits. The forecasted GHG emissions reductions for the Proposed Regulation are the net benefit (GHG emissions reductions from shore power minus any increases from using capture and control systems).

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries to provide additional electricity to vessels with large electrical loads. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling

[54] CARB, Emissions Inventory, CEPAM: 2016 SIP - Standard Emission Tool, Accessed August 21, 2019, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php.

stations) to support the use of alternative fuels and fuel cells. Implementation of the Proposed Regulation could also result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

Use of land- and barge-based capture and control devices to reduce vessel emissions may result in net increase in GHG emissions for some vessel categories (e.g. ro-ro or tanker vessels). While using a capture and control device, auxiliary engines aboard a vessel are still servicing the vessel with the required energy it needs for operations. These auxiliary engines create GHG emissions. In addition to the auxiliary engines, the capture system's generators and the treatment unit's burner(s) are operating, or if powered by the grid, an increase energy consumption factor is applied to the vessel visit. To address additional GHG emissions from these devices, CARB requires the operation of these systems to be grid neutral, emitting no more GHG emissions than if the strategy were powered by the California grid as represented in the most recent eGRID Summary Table for State Output Emission Rates as the California CO2e emissions rate. An emission control strategy powered by the utility grid is by default grid neutral. Emission control strategies can also reduce their CO2e emission rate by using low carbon fuels like hydrogen or low carbon diesel. For example, consider a control strategy that operates a 135 kW rated diesel engine with a rated fuel usage of 10 gal/h. The emission rate for this engine would be: (22.28 lbs CO2 / gal diesel) * (10.6 gal diesel / 135 kwh) * (1000 kW / MW) = 1,750 lb CO2/MWh. The benchmark for the eGRID is 454.1 lb CO2E/MWh. The power to run the system has 3.85 times more carbon emissions than if the power came from the utility grid. Therefore, the carbon intensity of an acceptable fuel would need to be 3.85 times lower. Diesel has a carbon intensity of about 95 gCO2e/MJ, therefore alternative fuels with carbon intensities lower than 95/3.85 = 25 gCO2e/MJ would be considered grid neutral.

Post-combustion technologies such as SCR, diesel particulate filters, and diesel oxidation catalysts used in capture and control devices tend to slightly increase GHG emissions due to increased fuel or power use. However, diesel particulate filters and diesel oxidation catalysts remove black carbon, a component of DPM and short-lived climate pollutant.[55]

The Proposed Regulation would require labor for set up, operation and maintenance of control strategies. Shore power and capture and control systems may require specialized personnel to operate the equipment, on average two to three additional workers.[56] The GHG emissions associated with commutes related to operation, inspections, repairs, and/or replacements would not be substantial as many of the labor

[55] CARB, "Technical Support Document: Initial Statement of Reasons for the Proposed Rulemaking to Reduce Emissions from Diesel Auxiliary Engines on Ocean-Going Vessels while At-Berth at a California Port," October 2007 (accessed July 11, 2019), https://www.arb.ca.gov/regact/2007/shorepwr07/tsd.pdf.
[56] Rubin Garcia, "Re_ Tanker Industry Follow-up meeting to discuss AMECS-1" email dated April 3, 2019.

force is often already located at existing facilities or would be infrequent (e.g., when equipment malfunctions) in nature.

As previously described in the "Air Quality" section in Chapter 4 of this ~~Draft~~ Final EA, in addition to the GHG emissions from land- and barge-based systems' generators, barge-based systems are moved by tugboats, which contribute directly to overall emissions at a port. CARB staff estimates that the additional tugboat emissions would be minimal. Tugboat emissions are regulated by CARB and barge-based systems are regulated by CARB's Harbor Craft Rule.[57] At the time of this ~~Draft~~ Final EA, CARB staff is re-evaluating the feasibility of Tier 4 engine technology and advanced retrofit emission control devices in Commercial Harbor Craft applications, and exploring other operational control strategies for reducing emissions.

There is inherent uncertainty regarding the type and size of tug boat that would be available to assist the barge-based system; however, according to the Port of Long Beach's Air Emissions inventory - 2017[58], the average harbor tug boat has 1.94 main engines each running at 943 horsepower (hp) and an average of 1.5 auxiliary engines operating at 78 hp each. The Port of Long Beach Emission Inventory also indicates that on average, harbor tug boats have model year 2012 main and auxiliary engines. Emission factors and load factors were obtained from CARB's Emissions Estimation Methodology for Commercial Harbor Craft Operating. Load factors are 0.68 and 0.43 for main and auxiliary engines (emission factors were obtained for PM, NOx, and ROG in Appendix A).[59] Analysis assumed CO2 emission factors were 529 g CO2/bhp-hr for main engines, and 589 g CO2/bhp-hr for auxiliary engines, consistent with CARB's 2017 off-road emission inventory. The CO2e contribution from CH4 and N2O emissions was not considered because tug boats are diesel powered that are certified to either Marine Tier 2 or Tier 3 standards. CH4 emissions from diesel-powered engines is negligible, and Tier 2 and 3 marine engines do not use after treatment that is responsible for increasing the N2O fraction of the nitrogen species in the exhaust. If the contribution of N2O and CH4 were considered, CO2e would increase by a trivial amount.

CARB completed a berth-by-berth analysis for all vessel categories that would be required to reduce emissions, for the development of the Proposed Regulation and in response to the Administrative Procedure Act's economic impact analysis provisions

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[57] CARB "Airborne Toxic Control Measure for Commercial Harbor Craft," April 2006 (accessed July 11, 2019), https://govt.westlaw.com/calregs/Document/I0FD137A0A3C111E0BACCB30E82542E24?contextData=%28sc.Default%29&originationContext=documenttoc&transitionType=CategoryPageItem&viewType=FullText

[58] Port of Long Beach "Air Emissions Inventory - 2017," July 2018 (accessed July 11, 2019), http://www.polb.com/civica/filebank/blobdload.asp?BlobID=14652

[59] CARB, "Emissions Estimation Methodology for Commercial Harbor Craft Operating in California," 2012, (accessed July 11, 2019) https://www.arb.ca.gov/msei/chc-appendix-b-emission-estimates-ver02-27-2012.pdf

(Appendix E). For this analysis, CARB analyzed several different factors for each berth and determined a scenario that could reasonably occur under the Proposed Regulation. During this analysis, CARB estimated that throughout California approximately 600 vessel visits would utilize a barge-based capture and control system. While the berth-by-berth analysis was completed for development of the Proposed Regulation, a calculation of emissions for the scenarios based on this evaluation would be speculative under CEQA.[60] The CARB Staff Analysis is a scenario that could occur, but is not necessarily foreseeable under CEQA. Conducting a berth-by-berth emissions analysis for the hundreds of berths in California would provide information that could be misleading, should a different berth-by-berth scenario come to fruition. Therefore, this EA does not contain a berth-by-berth emissions analysis. Using the information in the CARB Staff Analysis, however, CARB has conducted larger-scale estimates for this analysis. CARB estimates that the additional tugboat emissions could be up 827 metric tons/year of CO2 throughout California. These estimates may be lower in future years due to full implementation of CARB's Existing Commercial Harbor Craft Regulation, and anticipated future requirements that may take effect beginning in 2023 for tug boats and other harbor craft.[61] Tug boat emissions attributed to the placement of barge-based capture and control systems is considerable lower than the overall emissions reductions achieved from the use of the system on a vessel.

Implementation of the Proposed Regulation could incent increased lithium mining activity as a result of elevated demand for storage lithium-ion batteries to support high electrical loads from large vessels at berth. Lithium mining activity would require the use of heavy-duty equipment, which would likely be powered by diesel fuel. Additionally, during hard-rock lithium mining activities, loss of carbon sequestering vegetation could occur. These activities could exacerbate the effects of climate change. However, lithium ore is commonly used to power batteries that offset the combustion of gasoline, diesel, and other fossil fuels, and lithium would be put to such use in some of the compliance responses under the Proposed Regulation, as well. As such, fossil fuel-based emissions, which greatly contribute to global climate change, are reduced.

There is inherent uncertainty regarding the exact number of vessels that would use capture and control systems as a result of implementation of the Proposed Regulation. As such, CARB staff's quantifiable comparison of the level of emissions generated from capture and control systems to the emissions reductions achieved from shore power under the Proposed Regulation, over time is a conservative best estimate.

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[60] CEQA Guidelines section 15145 states that, "[i]f, after thorough investigation, a Lead Agency finds that a particular impact is too speculative for evaluation, the agency should note its conclusion and terminate discussion of the impact.

[61] CARB "Airborne Toxic Control Measure for Commercial Harbor Craft," April 2006, (accessed July 11, 2019), https://govt.westlaw.com/calregs/Document/I0FD137A0A3C111E0BACCB30E82542E24?contextData=%28sc.Default%29&originationContext=documenttoc&transitionType=CategoryPageItem&viewType=FullText.

The Proposed Regulation marginally increases costs to California ports and terminals, and the vessels that visit them, which has resulted in some feedback from industry stakeholders that vessels may be directed elsewhere in an effort to avoid the increased costs at California ports and terminals. Cargo owners and international cargo transport delivery companies rely on sophisticated proprietary models and factors to guide decisions on where to ship goods. The factors include access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans-loading infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs, including compliance costs for all regulations. To date, the available data and research has been insufficient to quantify the Proposed Regulation's potential effects regarding cargo diversion. CARB staff directly engaged industry stakeholders for their experience or data and found that a company's decision to divert cargo from one port to another is complex and unique to individual businesses. CARB staff was unable to obtain information on business level responses to regulatory costs due to the highly competitive nature of the freight industry.

Quantifying the potential for the Proposed Regulation to cause cargo diversion requires a detailed understanding of how increased regulatory costs would impact each beneficial cargo owner's use of a specific port, such as from the perspective of a person making those decisions for a cargo owner. Alternatively, absent industry knowledge, assessing the potential for diversion would require making inferences about what changes in port uses were caused by cost changes, which requires an understanding of all factors that affect choice of port and, then, isolating the changes caused by port use cost. CARB staff did not find empirical research that focused on the impact of regulatory costs on cargo diversion. A number of studies have explored the relationship between general cost increases and the likelihood of cargo diversion. One case study on the potential impact of a container fee suggested that cargo diversion is unlikely for modest per TEU cost increases, up to $30 per TEU.[62] To put this into context, the Proposed Regulation would add additional costs of approximately $1.11 per TEU in 2030 for container and reefer vessels, far below the $30 level (Appendix C, SRIA Appendix D). However, studies also found that there is a very wide range of estimates for how increased costs may impact cargo volumes,[63,64,65] that the estimates are highly uncertain, and that these responses may change markedly in the span of only several years due to the dynamics of industry and global economics.

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[62] Corbett, James J., James J. Winebrake, and Erin Green, (2006) "Cargo on the Move through California: Evaluating Container Fee Impacts on Port Choice," Accessed July 23, 2019https://www.nrdc.org/sites/default/files/air_06081401a.pdf.

[63] Leachman, Robert C., (2005) "Final Report: Port and Modal Elasticity Study," http://www.freightworks.org/Documents/Port%20and%20Modal%20Elasticity%20Study.pdf.

[64] Leachman, Robert C., (2010) "Final Report: Port and Modal Elasticity Study, Phase II," http://www.freightworks.org/DocumentLibrary/Port%20and%20Modal%20Elasticity%20Study%20Phase%20II%20-%20Final%20Report.pdf.

[65] Corbett, James J., James J. Winebrake, and Erin Green, (2006) "Cargo on the Move through California: Evaluating Container Fee Impacts on Port Choice," Accessed July 23, 2019https://www.nrdc.org/sites/default/files/air_06081401a.pdf.

Furthermore, analyzing direct regulatory cost increases from a particular regulation is of limited use in determining the potential for diversion or leakage. Direct regulatory cost is also only one variable that can affect choices about shipping routes. Other variables include, but are not limited to: access to consumer markets and intermodal transportation networks; reliability and velocity of transport modes; port and trans-loading infrastructure; the overall efficiency of the supply chain as it is impacted by the availability of labor; congestion delays and other impediments; and costs generally, including compliance costs for all regulations. A 2018 study conducted by the Texas A&M Transportation Institute, *The Potential Impacts of the Panama Canal Expansion on Texas Ports*, found that intermodal routes throughout California are consistently more favorable for high-valued goods. Intermodal routes between East Asia, California, and Texas are faster than all water routes to Texas from East Asia, and research shows shippers prefer more expensive routes through West Coast ports, including California, because of the shorter travel time.[66]

In sum, it is difficult to predict how businesses may react to increased costs of using California ports in response to implementation of the Proposed Regulation. It is possible, though unlikely, that some may decide to change shipping mode or may divert to another port. In that case, the Proposed Regulation could result in additional emissions of greenhouse gases associated with mode shift and diversion. If California berths continue to be used as they would regardless of the Proposed Regulation, as is expected, long-term operational-related greenhouse gas emissions impacts would be beneficial. As discussed above, vessels that elect to supply their electrical load with shore-power would receive electricity from public utility companies that will become increasingly more renewable over the coming years to comply with the targets mandated by the RPS. Implementation of the Proposed Regulation would minimize emissions associated with operation of vessels at berth and would assist the State in meeting greenhouse gas emissions goals.

As shore power becomes more globally available, its use would be expected to increase. Further, as communities, including California, incorporate a greater percentage of renewable electricity to the energy grid, using shore power would result in a substantial reduction in emissions of GHGs as compared to those emitted by diesel-powered generators. It is anticipated that the reductions made from use of shore power would offset the emissions associated with powering land- and barge-based capture and control systems. Therefore, long-term operational-related GHG impacts associated with implementation of the Proposed Regulation would be **less than significant.**

[66] Prozzi, Overmyer, Texas A&M Transportation Institute "The Potential Impacts of the Panama Canal Expansion on Texas Ports," PRC 17-78, January 2018.

9. Hazards and Hazardous Materials

a) Land-Based Impacts

Impact 9.A-1: Short-Term Construction-Related Impacts to Hazards and Hazardous Materials

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Construction activities may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating fluids. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site as they are not designed for use on public roadways. Thus, such maintenance uses a service vehicle that mobilizes to the location of the construction equipment. It is during the transfer of fuel that the potential for an accidental release is most likely. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed, and such spills are typically minor and localized to the immediate area of the fueling (or

maintenance), the potential remains for a substantial release of hazardous materials into the environment.

Construction activities at ports would not take place in areas with substantial open space and vegetation that could be susceptible to wildfire; therefore, the Proposed Regulation would not exacerbate wildfire conditions.

Therefore, short-term construction-related impacts to hazards and hazardous materials associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 9.A-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies related to hazards and hazardous materials. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary local land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project approval authority. Recognized practices that are routinely required to avoid upset and accident-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant upset and accident-related hazard impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Handling of potentially hazardous materials/wastes shall be performed by or under the direction of a licensed professional with the necessary experience and knowledge to oversee the proper identification, characterization, handling and disposal or recycling of the materials generated as a result of the project. As wastes are generated, they shall be placed, at the direction of the licensed professional, in designated areas that offer secure, secondary containment and/or protection from storm water runoff. Other forms of containment may

include placing waste on plastic sheeting (and/or covering with same) or in steel bins or other suitable containers pending profiling and disposal or recycling.

- The temporary storage and handling of potentially hazardous materials/wastes shall be in areas away from sensitive receptors such as schools or residential areas. These areas shall be secured with chain-link fencing or similar barrier with controlled access to restrict casual contact from non-Project personnel. All project personnel that may encounter potentially hazardous materials/wastes shall have the appropriate health and safety training commensurate with the anticipated level of exposure.

The impacts to hazards and hazardous materials could be reduced to a less-than-significant level by mitigation that can and should be implemented by federal, State, and local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related impacts regarding hazards and hazardous materials associated with the Proposed Regulation would be **potentially significant and unavoidable**.

Impact 9.A-2: Long-Term Operational-Related Impacts to Hazards and Hazardous Materials

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference.

Although certain activities would be undertaken due to remediation funding, each District has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. California has many solutions for the recycling or proper disposal of batteries.[67] Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

The long-term operation of new infrastructure and facilities associated with capture and control systems and alternative fuels would result in the routine transport, use, and disposal of hazardous materials (i.e., fuels). Harmful substances can enter the environment in several ways throughout the entire cycle of fuel production, manufacturing, transportation, storage, distribution, and usage. Most commonly, they come out the tailpipes of vehicles as exhaust or unburned fuel. Fuel vapors escape directly from automobile engines and gas tanks. They can also escape into the air during refueling, or when liquid fuel evaporates from a spill. Fuels can enter lakes and reservoirs through accidental spills or from motorized boats and personal watercraft. Fuels spilled on the ground or leaking from fuel storage tanks can contaminate groundwater. Substances in airborne engine exhaust settle directly onto water, soil and vegetation, or they can be washed down onto these surfaces when it rains. Also, fuel components (e.g., natural gas) can be released into the environment during oil drilling, refining and transportation.

Compared to construction, use of hazardous materials during operations would be more likely to occur indoors in a contained area, limiting the potential effects of spills and accidents as activities involving the use of hazardous materials would occur within the confines of facilities. Where the release of hazardous material would be the likely would occur outdoors would be during the movement of raw goods to manufacturing facilities or the export of finished goods containing hazardous materials following the manufacturing process. The transport, use, and disposal of hazardous materials would be required to comply with all applicable federal, State, and local laws that would reduce the potential for accidents and require certain actions should a spill or release occur; however, the potential remains for the release of hazardous materials into the environment.

Capture and control systems use SCR for NOx reductions. These systems can use urea or ammonia. There are limited risks associated with the use and handling of ammonia, since the majority of ammonia formed is consumed in the SCR reaction

[67] See, e.g., https://www.calrecycle.ca.gov/reducewaste/batteries.

process. Although some of the ammonia will not react and will be emitted in the SCR exhaust, it is not anticipated to pose a significant adverse health risk. The Proposed Regulation requires emissions of ammonia be no greater than five parts per million on a dry volume basis (ppmdv), if selective catalytic reduction (SCR) is used for distributed generation and 10 ppmdv for other emissions control strategies.

Urea is not a hazardous material and transport, use, and storage are not covered by federal or California regulations that address the transport of hazardous materials. Therefore, the routine transport, use and storage of aqueous urea for capture and control systems or reasonably foreseeable upset or accident conditions do not create a significant hazard to the public or the environment.[68]

To address additional GHG emissions from these capture and control devices, CARB requires the operation of these systems to be grid neutral, emitting no more GHG emissions than if the strategy were powered by the California grid as represented in the most recent eGRID summary table for State Output Emission Rates as the California CO2e emissions rate. For example, an emission control strategy powered by the utility grid is by default grid neutral. Emission control strategies can also reduce their CO2e emission rate by using low carbon fuels like hydrogen or low carbon diesel. For example, consider a control strategy that operates a 135 kW rated diesel engine with a rated fuel usage of 10 gal/h. The emission rate for this engine would be: (22.28 lbs CO2 / gal diesel) * (10.6 gal diesel / 135 kWh) * (1000 kW / MW) = 1,750 lbs CO2/MWh. The benchmark for the eGRID is 454.1 lbs CO2e/MWh. The power to run the system has 3.85 times more carbon emissions than if the power came from the utility grid. Therefore, the carbon intensity of an acceptable fuel would need to be 3.85 times lower. Diesel has a carbon intensity of about 95 gCO2e/MJ, therefore alternative fuels with carbon intensities lower than 95/3.85 = 25 gCO2e/MJ would be considered grid neutral.

Implementation of the Proposed Regulation could increase demand for lithium mining. Lithium is currently sourced in two ways: from hardrock, and from the evaporation of salt brines. Lithium from rock sources is primarily produced from spodumene, a lithium/aluminum/silicate mineral. Salt brine sources include salt lakes, which are currently the main source of lithium, and geothermal brines and salt brines associated with oil deposits.

Lithium is the lightest solid metal. It can be absorbed into the body by inhalation of its aerosol and by ingestion and is corrosive to the eyes, the skin, and the respiratory tract. Lithium reacts violently with strong oxidants, acids, and many compounds (hydrocarbons, halogens, halons, concrete, sand and asbestos) causing a fire and explosion hazard. In addition, lithium reacts with water, forming highly flammable

[68] South Coast Air Quality Management District, "SOUTHERN CALIFORNIA EDISON PEBBLY BEACH GENERATING STATION SELECTIVE CATALYTIC REDUCTION (SCR) INSTALLATION PROJECT," April 2003.

hydrogen gas and corrosive fumes of lithium hydroxide. Lithium hydroxide represents a potentially substantial environmental hazard, particularly to water organisms.

However, lithium metal batteries contain potentially toxic metals, such as copper and nickel, and organic chemicals, like toxic and flammable electrolytes[69]. Improper management of lithium-ion batteries could pose an environmental hazard and be of concern to public safety. There have been some cases with consumer products containing lithium-ion batteries catching fire after or during transportation to disposal facilities. Once ignited, the resulting fires can be especially difficult to extinguish as temperatures can rapidly increase to up to 500 degrees Celsius (932 degrees Fahrenheit) as a result of interactions between a battery's cathodes and anodes, and water is an ineffective extinguisher.[70] The likelihood to overheat or ignite is increased if the batteries are poorly packaged, damaged or exposed to a fire or a heat source. However, when packaged and handled properly, lithium batteries pose no environmental hazard (79 Fed. Reg. 46011, 46032), and therefore no increased demand on public services related to emergency responders is anticipated. Further, these impacts are largely associated with the use and production of lithium-ion batteries used in consumer products as compared to lithium-ion storage batteries.

There are inherent risks associated with the installation and use of hydrogen fuel cells including fire and explosion, electric shock, and exposure to toxic materials. Hydrogen possesses several hazardous properties such as a very wide flammability range, very low ignition energy, low viscosity, high diffusivity, and is chemically lighter than air.[71] However, fuel cell manufacturers developed and extensively safety-tested carbon-fiber hydrogen tanks, which can withstand environmental and man-made damage, including crash testing and ballistics. Hydrogen tanks are designed with multiple safety enhancements to prevent leaks in both routine use and extreme circumstances. Should a leak and subsequent ignition happen, the low radiant heat of a hydrogen fire and high diffusivity of hydrogen would reduce any potential damage, especially when compared to a gasoline fire.

Hazardous materials that may be classified as flammable, corrosive, or reactive are often transported in ocean-going tanker vessels. Accidents (e.g., spills, fires, and explosions) ~~that~~ could occur during the transportation of these hazardous materials ~~could include things such as spills, fires, and explosions~~ that ~~could~~ involve terminal equipment or vessels at berth. As expressed in the 2014 Chevron Refinery Modernization Project, the transport and processing of oil involves acutely hazardous

[69] Zeng, Xianlai, Jinhui Li, and Lili Liu (2015). Solving Spent Lithium-ion Battery Problems in China: Opportunities and Challenges. Renewable and Sustainable Energy Reviews, 52, 1759-1767, August 4, 2015.
[70] Battery University, "BU-304a: Safety Concerns with Li-Ion," 2018 (accessed July 11, 2019) http://batteryuniversity.com/learn/article/safety_concerns_with_li_ion.
[71] Health and Safety Executive "Fuel Cells: Understand the Hazards, Control the Risks," First edition, 2004, https://cedrec.com/cedrec_images/upload/acop/hsg/hsg243.pdf

materials. Accidents could occur, resulting in public exposure to hazards or hazardous materials. Some of the hazards mentioned by Chevron include heat radiation from a fire, blast overpressure from an explosion, and airborne exposure to hazardous materials.[72]

As such, there is an inherent need for additional safety measures for all tanker vessels visiting California ports and marine terminals. As part of individual project-specific efforts to comply with the Proposed Regulation, it is anticipated that safety studies need to be performed for tanker terminals prior to implementation of specific compliance responses to ensure all safety considerations are met, given that the tanker vessels may carry flammable or explosive cargos.

The tanker industry has, since its inception, innovated to avoid and mitigate safety hazard risks. The tanker industry, at its core, is about moving potentially hazardous and flammable substances from place to place across the globe. Generally, a vessel arriving at an oil terminal will be moored and its position continuously controlled during the unloading/loading of cargo to reduce the potential for spills. Crude oil loading/discharging can only occur when the piping systems are properly aligned with the refinery or oil storage tanks, the terminal, and the vessel. As such, the vessel must be aligned and moored properly in order to reach and connect to pipelines. This process is not dissimilar to what would be needed for alignment with an emissions capture system. Once in place and in the correct position, in absence of a direct hose hookup, the vessel will be connected to the oil pipeline via marine loading arms. The loading arms can be found either on the vessel itself or dockside and consist of approximately 3 or 4 arms per vessel. The loading arms resemble and function comparably to the cranes and loading arms thought to be needed for the placement of capture and control technology on a vessel's stack.

Next, the pumping line is set by opening or closing a relevant line's valves to tanks or the refinery. After confirming readiness, loading or discharge of cargo can occur. Initially, the discharge/loading rates are relatively slow. Gravity starts the flow of cargo and the vessel's boiler operated pumps take over to sustain the desired flow rate. During loading/discharging, the operational parameters (e.g., pressure, temperature and flow rate) and infrastructural integrity are inspected on a regular basis. At the end of the cargo discharge, the remaining residue inside the tanker's cargo tank is typically removed through a crude oil washing (COW) process, which involves spraying heated crude oil back into the tanks to dislodge the remaining residue. Finally, the pumps stop, relevant valves are closed, and the loading arms are disconnected. These various steps require carefully heating, handling, and moving a hazardous and flammable substance, and demonstrate the tanker industry's ability to develop ways to perform these steps safely.

[72] Chevron Products Company – El Segundo Refinery Heavy Crude Project, Final EIR August 2006. (accessed June 24, 2020) http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2006/chevron/finaleir.pdf?sfvrsn=4

Spill-related hazards are dangerous and most often occur due to technical problems or human error during connecting the ship's manifold from the loading arm. Spills can also result from hydraulic impact due to a sudden valve closure on the ship or a valve closure at the terminal. Additionally, overflow can result from failure to stop loading onto the ship at the right time.[73]

Further, explosions can occur if proper precautions are not taken. For example, tanker vessels commonly have auxiliary marine boilers that can be used for heating residual fuel, production of hot water and space heating for passengers or crew, distillation of seawater to generate fresh water, and for crude oil tankers driving steam turbine pumps to offload crude oil or other petroleum products. For crude tanker vessels, these boilers burn fuel to produce the high-pressure steam used for off-loading cargo. Any malfunctioning boiler could lead to hazardous conditions, especially when the vessel contains flammable cargo. However, many safety precautions are in place to avoid hazardous conditions.

Additional explosion risk can occur during off-loading cargo. Crude oils usually found in tankers cannot burn in an atmosphere containing less than approximately 11 percent oxygen by volume. As cargo is pumped out of the vessel tanks the air volume increases furthering the amount of oxygen present and the potential for combustion. Thus, keeping oxygen levels below that in cargo tanks is an effective way to reduce explosion risk. Oxygen levels are often reduced via an inert gas system. The inert gas is pumped into each cargo tank reducing oxygen and in turn the flammability.[74]

While at berth, tanker vessels conduct numerous activities that could present a safety risk if not performed properly. Loading and unloading tanker cargo is a delicate balance of human safety measures, safety equipment and technological automation. However, despite the hazards, tanker vessel incidents and accidents have been increasingly rare.

Additionally, numerous laws have been enacted to regulate hazardous materials and wastes, including regulations specific to the oil and gas industry. California has the most stringent regulation and oversight of oil and gas operations in the U.S. To provide one example, a list of some of the regulatory statutes involving safety and hazards mentioned in connection with the 2014 Chevron Refinery Modernization Project,[75] are:

1. Emergency Planning and Community Right-to-Know Act. Facilities must notify their State Emergency Response Commission and Local Emergency Planning Committee of the presence of any extremely hazardous substances (EHS) (40

[73] Agnieszka Blokus-Roszkowska Bożena Kwiatuszewska-Sarnecka. Publications of the Hazard Project, Analysis of the Crude Oiler Transfer Process and Its Safety. Gdynia Maritime University, Gdynia, Poland. December 2017

[74] OCIMF. Inert gas systems – The use of inert gas for the carriage of flammable cargoes. First Edition 2017

[75] Chevron Products Company – El Segundo Refinery Heavy Crude Project, Final EIR August 2006. (accessed June 24, 2020) http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2006/chevron/finaleir.pdf?sfvrsn=4

CFR Part 355, Appendices A and B) if the EHS exceeds the threshold planning quantity. The facility must also appoint an emergency response coordinator.

2. The U.S. Environmental Protection Agency's (U.S. EPA) Risk Management Plan (RMP) Rule. This rule implements Clean Air Act Section 112(r). The RMP Rule established a nationwide emergency planning and response program and imposed reporting requirements for businesses that store, handle, or produce regulated substances in amounts over specified threshold quantities.

3. Occupational Safety and Health Act (Public Law 91-596), which mandates safety requirements in the workplace.

4. The Resource Conservation and Recovery Act (RCRA) Hazardous Waste Program (RCRA Subtitle C) (42 U.S.C. Section 6901 et seq.; 40 CFR Part 260) controls hazardous waste from "cradle to grave"—including generation, transportation, treatment, storage, and disposal.

5. The Oil Pollution Prevention Act (33 U.S.C. Section 2701 et seq.) of 1990 sets forth requirements for prevention of, preparedness for, and response to oil discharges at specific non-transportation-related facilities.

6. The CalARP Program (HSC Sections 25531 et seq.; 19 CCR Division 2, Chapter 4.5) includes the federal program for prevention of accidental releases of regulated substances adopted by the EPA pursuant to Clean Air Act Section 112(r).

7. The City of Richmond has an Industrial Safety Ordinance (RISO) that supplements the CalARP requirements described above by requiring additional measures to prevent and reduce the probability of accidental releases of regulated substances from industrial facilities.

8. The Interagency Working Group on Refinery Safety, composed of 13 agencies and departments and the Governor's office, released a report, "Improving Public and Worker Safety at Oil Refineries", outlining findings and making recommendations to improve public and worker safety at and near the state's oil refineries.[76]

In addition, Chevron also has created emergency response manuals for operations that describe the emergency response procedures that would be followed in the event of any dangerous scenarios and outlines the responsibilities for key response personnel. Additionally, Chevron also maintains its own emergency response capabilities, including on-site equipment and trained emergency response personnel who are available to respond to emergency situations anywhere within the refinery, which includes the

[76] Chevron Refinery Modernization Project Environmental Impact Report. Consolidated Version – Volume 1: Draft EIR. October 2015. pp. 4.13-1 – 4.13-45.

terminal. CARB staff believes the operations outlined here are similar to those routinely undertaken by other tanker terminal operators throughout California.[77]

In sum, tanker operators have successfully been able to manage operating boilers and electrical systems on their vessels for decades. Additionally, shore power has already been demonstrated successfully on tanker vessels at the Port of Long Beach.[78] Given these achievements by the tanker industry, CARB reasonably believes the industry will be able to handle alternative control technology and shore power connections on a broader scale.

Operations activities at ports would not take place in areas with substantial open space and vegetation that could be susceptible to wildfire; therefore, the Proposed Regulation would not exacerbate wildfire conditions.

Under the Proposed Regulation the same activities which occur at California ports and terminals would continue. The primary change would be the requirements to control at berth emissions. CARB staff believes the most likely control option for tanker vessels would be land-based ~~on~~ capture and control systems. Use of capture and control technology would require additional interfaces at ports, which requires safety management due to the transfer of flammable materials from vessels. Use of these interfaces would be similar to activities already occurring at California ports, where there are interfaces for other purposes. It is assumed that the same safety practices would continue to be used, but that use of capture and control technology would result in increased safety management efforts.

This technology would therefore ~~not~~ increase the risk of the release of hazardous materials. ~~Therefore, the requirements of the Proposed Regulation would not be expected pose significant risk for the public or the environment.~~ As such, long-term operational-related effects associated with the Proposed Project to hazards and hazardous materials could be potentially significant.

Mitigation Measure 9.A-2: Implement Mitigation Measure 9.A-1

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

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[77] Chevron Products Company – El Segundo Refinery Heavy Crude Project, Final EIR August 2006. (accessed June 24, 2020) http://www.aqmd.gov/docs/default-source/ceqa/documents/permit-projects/2006/chevron/finaleir.pdf?sfvrsn=4.

[78] Gamette, S., et al, Challenges Associated with Implementing Operations for the First Cold Ironing of Oil Tanker Vessels, Port of Long Beach Pier T Berth T121 BP Cold Ironing Project For Alaska Class Tanker, Published date unknown (presented at the 12th Triennial International Conference in Jacksonville, Florida, April 25-28, 2010) (accessed July 23, 2019).

Potential construction-related hazards and hazardous materials impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Consequently, while impacts could be reduced to a less-than- significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant ~~short-term construction-related~~ long-term operational[79] impacts regarding hazards and hazardous materials associated with the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impact 9.B-1: Short-Term Construction-Related Impacts to Hazards and Hazardous Materials

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

Modifications to existing vessels would be expected to occur while dry docked. Dry docks support a high level of hazardous equipment and materials. It would be expected that implementation of the modifications required to comply with the Proposed Regulation could be accomplished using heavy-duty equipment currently used at dry docks that would not appreciably change the risk of hazards and hazardous materials impacts. As such, short-term construction-related hazardous impacts to vessels would be **less than significant**.

Impact 9.B-2: Long-Term Operational-Related Impacts to Hazards and Hazardous Materials

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

Operation of Proposed Regulation-related infrastructure would entail the use of potentially hazardous equipment such as electrical cables and reel systems. However, vessels support an existing suite of hazardous infrastructure and comply with appropriate vessel safety procedures to minimize harmful exposure to hazardous equipment or materials. They also are able to transit through compact areas with little

[79] Edited to correct a scrivener's error, given that this section concerns long-term operational-related impacts.

space alongside the vessel, such as crowded ports and canals (including, for example, the Panama Canal).

Vessels based in the United States would be required to comply with standards established by the Occupational Safety and Health Administration (OSHA) and the U.S. Environmental Protection Agency (U.S. EPA). Existing regulations applicable in the shore power context include 29 C.F.R. 1915.83(c)(1), (c)(2), and (c)(3). These regulations require precautions before energizing vessel circuits. Additionally, OSHA has developed an entire suite of safety regulations for the longshoring industry.[80]

As stated in Section 2.B.3 of this EA, "[w]hile there are currently no on-board emission control strategies verified by CARB for ocean-going vessel applications, CARB believes such control strategies will be developed." As a result, it is not possible to determine what safety regulations would govern new vessel technologies, but it is reasonable to assume that safety regulations would address any previously unidentifiable safety hazards, particularly since the types of technologies used are not anticipated to be dramatically different from existing equipment, technologies, and systems currently used on vessels. Furthermore, CARB expects that vessel operators will undertake necessary safety precautions, as doing so is in their interest. As such, long-term operational-related hazardous impacts to vessels would be **less than significant**.

10. Hydrology and Water Quality

a) Land-Based Impacts

Impact 10.A-1: Short-Term Construction-Related Impacts to Hydrology and Water Quality

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries to provide additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and hydrogen fuel cells could result in increased mining and exports of lithium and platinum, and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. Implementation of the Proposed Regulation could also require substantial new and

[80] U.S. Department of Labor, "Longshoring Industry Booklet," 2001 (accessed January 15, 2020), https://www.osha.gov/Publications/OSHA2232/osha2232.html.

improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Although unlikely, implementation of the Proposed Regulation could entail dredging of navigable waters to support capture and control systems, which, depending on the environmental characteristics of the port, magnitude of activity, and equipment type used, could produce substantial hydrologic effects. These could include the upset of sedimentation leading to increased turbidity, a reduction in water quality, and alterations to coastal or estuary morphology. Further, the Proposed Regulation would include ground disturbing activities such as pile driving, which could result in erosion.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

New alternate fuel-related infrastructure and facilities could be located in locations with a range of hydrologic conditions. For example, some places may be vulnerable to flooding and mudflow. Construction of buildings may exacerbate hydrologic hazards. For example, grading for building construction may alter drainage in a way that would increase potential flood risk on and around the project site. Grading and vegetation removal could also increase erosion, which could result in sedimentation in nearby waterways. Site leveling may also require fill of regulated water bodies. Precise impacts cannot be determined because specific construction details, siting locations, and associated hydrology and water quality conditions are not known at this time.

Construction activities could require disturbance of undeveloped areas, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Specific construction projects would be required to comply with applicable erosion, water quality standards, and waste discharge requirements (e.g., NPDES, Stormwater Pollution Prevention Plan [SWPPP]).

Short-term construction-related effects to hydrologic resources associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 10.A-1
The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies in regard to hydrology and water quality. CARB does not have the authority to require implementation of mitigation related to new or modified infrastructure that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified infrastructure in California could qualify as a

"project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or mitigate hydrology and water quality-related impacts include:

- Proponents of new or modified infrastructure constructed as a compliance response to the Proposed Project would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant hydrology and water quality impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency. Implement Best Management Practices to reduce sedimentation and pollution of surface waters, such as installation of silt fencing around the perimeter of active construction areas.

- Train construction workers for proper response to hazardous materials spills as well as responsibilities for maintaining BMPs on site.

- Drainage plans for runoff shall be designed to contain adequate capacity for projected flows on site.

- Avoid filling of waters of the United States and waters of the State to the extent feasible. If activities require a waste discharge requirement or Section 401 Water Quality Certification, comply with all avoidance, reduction, and compensatory measures.

Potential construction-related hydrology and water quality impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than- significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related impacts related to hydrology and water quality associated with the Proposed Regulation would be **potentially significant and unavoidable**.

Impact 10.A-2: Long-Term Operational-Related Impacts to Hydrology and Water Quality

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries to provide additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries could result in increased mining and exports of lithium, and increased recycling, refurbishment, or disposal of lithium batteries. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

The operation of new facilities associated with the production and distribution of alternative fuels (e.g., LNG) would be required to comply with applicable erosion, water quality standards, and waste discharge requirements (e.g., NPDES, SWPPP). Operation of these facilities would not require additional ground disturbance beyond that already disturbed during construction. With respect to depleting groundwater supplies, new facilities are not being anticipated to result in substantial demands due to the nature of associated activities.

The increased demand for lithium-ion batteries would increase the demand for mined lithium. Mining of hard rock would require the use of conventional mining practices including the creation of underground mines and open pits, which would result in the removal of organic material (e.g., bedrock, vegetation). Additionally, lithium can be

collected from continental brines found in basins. Salty groundwater is pumped into lagoons where it undergoes evaporation producing salts containing lithium compounds. This process could result in groundwater overdraft as well as impacts to surface water should the concentrated water spill into adjacent areas.

Mineral extraction and mining activities within the United States would be required to comply with the provisions of the Clean Water Act and the natural resource protection and land reclamation requirements of the appropriate State and federal land managers. For instance, the U.S. Bureau of Land Management and U.S. Forest Service mining permit conditions contain protections for hydrologic resources and require mining reclamation standards. However, lithium is currently obtained from areas outside of the United States, where State and federal laws and regulations are not enforced. Thus, water quality impacts related to mining could occur because of implementation of the reasonable foreseeable compliance responses associated with the Proposed Regulation.

As discussed under Impact 9.A-2, “Long-Term Operational-Related Impacts to Hazards and Hazardous Materials,” fuel production, manufacturing, transportation, storage, distribution, and usage may also result in the accidental release of harmful substances to the environment. With respect to the Proposed Regulation, alternative fuels (e.g., ethanol, methanol) could enter estuaries and marine waters from accidental release during fueling activities, which could adversely affect water quality in those aquatic systems.

As such, long-term operational-related effects to hydrology and water quality could be potentially significant.

Mitigation Measure 10.A-2: Implement Mitigation Measure 10.A-1

This impact could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related impacts to hydrology and water quality under the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impact 10.B-1: Short-Term Construction-Related to Hydrology and Water Quality

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

Execution of the compliance responses would not result in the disturbance on undeveloped areas because modifications would occur entirely on the vessels. Activities associated with modifying existing vessels to accommodate on-board shore power use would likewise occur on the vessel and would not result in ground disturbance or any impacts to hydrology. When made at sea, modifications would occur within the confines of the vessel (e.g., on the vessel stack) and would not pollute ocean water. Modifications to vessels would not affect on-board stores of drinking water for vessel staff. As such, effects to hydrologic systems would not occur.

Modifications to vessels could require the use of electrical equipment, which would not have the potential to leak toxicants to water systems. Therefore, use of such equipment would not adversely affect water quality. Moreover, modifications to vessels would be expected to occur while dry docked. Dry docks support and industrial environment and would be subject to applicable laws and regulations aimed at reducing impacts to water quality from industrial activities. As such, short-term construction-related hydrology and water quality impacts associated with vessels would be **less than significant**.

Impact 10.B-1: Long-Term Operational-Related Impacts on Hydrology and Water Quality

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage.

The retrofits made to vessels to comply with the Proposed Regulation would not entail the use of infrastructure (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) that would affect on-board water resources. Vessels currently support similar infrastructure as compared to what would be required to comply with the Proposed Regulation. As such, operation of new infrastructure would not be expected to adversely affect on-board water resources as compared to existing conditions. Therefore, long-term operational-related hydrology and water quality impacts associated with vessels would be **less than significant.**

11. Land Use

a) Land-Based Impacts

Impact 11.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Land Use

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g. high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Implementation of the above compliance responses would likely occur within existing footprints or in areas with consistent zoning or would undergo the appropriate process for a variance or conditional use. Additionally, linear facilities such as interconnections would generally be located within port area and would be small enough that they would not require displacing existing dissimilar uses (e.g., housing). Thus, implementation of the Proposed Regulation would not be anticipated to divide an established community or conflict with a land use policy. There would be **no impact** related to land use conflicts.

Construction and operation of new or expanded alternative fuel-related facilities or opening of new lithium mining locations may require the conversion of non-industrial land uses to industrial land uses. Potential environmental effects associated with land

use change on agriculture and forestry, biology, geology and soils, and hydrology and their related mitigation measures are discussed in further detail under their respective impact discussions.

b) Vessel-Related Impacts

Impact 11.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Land Use

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. These retrofits would occur to a vessel and would not affect land use designations of parcels located on land or divide a community. There would be **no impact**.

12. Mineral Resources

a) Land-Based Impacts

Impact 12.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Mineral Resources

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations.

Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Shore power- and barge- and land-based capture and control system-related modifications would occur within the boundaries of existing port facilities, which would be appropriately zoned. As an existing port, it would not be expected that minerals resources of economic significance would be present or recoverable, nor would a port be a designated mineral resource recovery site. Shore power and capture and control system infrastructure would have a less-than-significant impact on mineral resources.

Long-term operational compliance responses associated with the Proposed Regulation include increased mining and processing of rare materials (e.g., lithium) used in lithium-ion batteries. Depending on the magnitude of required materials, implementation of the Proposed Regulation could affect the availability of known materials because it would involve mining lithium. In April 2018, the only two domestic lithium mines are in operation in the United States are brine operations in Nevada and rural California; however, in recent years, 6.9 million tons of new lithium resources have been identified in the United States in the form of continental brines, geothermal brines, hectorite, oilfield brines, and pegmatites. Two companies produced a large array of downstream lithium compounds in the United States from domestic or South American lithium carbonate, lithium chloride, and lithium hydroxide. Lithium consumption for batteries has increased substantially in recent years due to increased demand for rechargeable lithium batteries. Currently the United States imports most lithium from Chile (57 percent), Argentina (40 percent); China (2 percent); and others (1 percent).

Table D.4-9: Lithium Mine Production and Reserves[1]

Country	2015 (metric tons)	2016 (metric tons)	Reserves (metric tons)
United States	N/A[2]	N/A[2]	38,000
Argentina	3,600	5,700	2,000,000
Australia	14,100	14,300	1,600,000
Brazil	200	200	48,000
Chile	10,500	12,000	7,500,000
China	2,000	2,000	3,200,000
Portugal	20	200	60,000
Zimbabwe	1900	900	23,000
World total (rounded)	31,500	35,000	14,000,000

Note:

[1] Reserves data are dynamic. They may be considered a working inventory of mining companies' supply of an economically extractable mineral commodity. Inventory is limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined, and the demand for it.

[2] Metric tons of lithium ore from the United States is omitted to avoid disclosing company proprietary data.

Source: USGS 2017[81]

The magnitude of reserves, shown above, is necessarily limited by many considerations, including cost of drilling, taxes, price of the mineral commodity being mined and the associated demand. In addition to the reserves described above, deposits of mineral resources are also important to consider in assessing future supplies. Furthermore, owing to continuing exploration, identified lithium resources have increased substantially worldwide. For instance, lithium resources in the United States grew from 5.5 million metric tons in 2014 to 6.9 million metric tons in 2016. Worldwide, lithium resources are currently estimated to be approximately 40 million tons, including 9 million metric tons in Bolivia and Argentina, 7.5 million metric tons in Chile, 2 million metric tons in Australia, 7 million metric tons in China, and 2 million metric tons in Canada. In addition, Congo (Kinshasa), Russia, and Serbia have resources of approximately 1 million metric tons each. Further, due to steadily increasing demand for lithium, domestic recycling of lithium has also increased.[82]

Appendix G of the CEQA Guidelines considers an impact on mineral resources to be the loss of availability of a known mineral resource that would be of value to a local entity, a region, or a state. This type of impact could result from actions such as building a structure over an area that contains mineral resources, thereby prohibiting access to mining activities. Although unlikely because it is uncertain whether lithium-ion batteries will be used in compliance responses, implementation of the Proposed Regulation and associated compliance responses could result in an increased development where mining for lithium is feasible, which could conceivably affect the availability of these mineral resources if access to resources becomes impeded. Additionally, the Proposed Regulation may increase lithium mining, which would also contribute to the loss of availability of lithium as it is mined and consumed.

Thus, long-term operation-related mineral resources effects associated with the Proposed Regulation would be potentially significant.

Mitigation Measure 12.A-1

The Regulatory Setting in Attachment A includes applicable laws and regulations that provide protection of mineral resources. CARB does not have the authority to require implementation of mitigation related to new or modified infrastructure that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local or State land use approval and/or permitting authority. New or modified infrastructure in California would most likely qualify as a “project” under CEQA. The jurisdiction with primary approval authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation measures may be identified

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[81] U.S. Geological Survey, “Mineral Commodity Summaries 2017 Lithium,” n.d. (accessed July 11, 2019), https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf

[82] U.S. Geological Survey “Mineral Commodity Summaries 2017 Lithium,” n.d. (accessed July 11, 2019) https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf

during the environmental review by agencies with project-approval authority. Recognized practices that are routinely required to avoid and/or minimize impacts to mineral resources include:

- Proponents of construction activities implemented because of reasonably foreseeable compliance responses associated with the Proposed Regulation would coordinate with State or local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local or State land use agency or governing body must follow all applicable environmental regulations as part of approval of a project for development.

- Based on the results of the environmental review, proponents will implement all feasible mitigation to reduce or substantially lessen the potentially significant impacts on mineral resources associated with the project.

- Actions required to mitigate potentially significant mineral resource impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

    - Prior to the issuance of any development permits, proponents of new or modified infrastructure will prepare an investigation/study, which will include an evaluation of the development's impact on the availability of mineral resources valuable to the region and residents of the state or delineated on a local general plan, specific plan, or other land use plan.

    - Proponents of new or modified infrastructure will provide a complete site plan showing any overlapping areas between the proposed plan and locally important mineral resources delineated on a local general plan, specific plan, or other land use plan. Proponents will avoid locating infrastructure that would result in the loss of availability of locally important mineral resources, as much as possible.

Potential long-term operational mineral impacts could be reduced to a less than significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

Because the authority to determine project-level impacts and require project-level mitigation lies with the land use approval and/or permitting agency for individual projects, and this programmatic level of review does not allow project-specific details of mitigation, there is inherent uncertainty in the degree of mitigation ultimately implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for

CEQA compliance purposes, that long-term operational-related effects to mineral resources associated with the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impact 12.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Mineral Resources

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g. shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

The movement and operation of vessels does not affect the availability of a known mineral resource. As such, there would be **no impact**.

13. Noise

a) Land-Based Impacts

Impact 13.A-1: Short-Term Construction-Related Impacts to Noise and Vibration

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads. An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Construction and modification of port facilities could require the use of heavy-duty equipment that could generate substantial levels of noise (and vibration). However, these modifications would be consistent with typical port activities associated with port improvements and construction not relevant to the Proposed Regulation. According to the Caltrans Technical Supplemental, a doubling of noise would result in a 3 dB increase in sound. Also, a 3 dB increase in sound is considered a barely perceptible to the normal person (also see Caltrans Technical Supplement). If the Proposed Regulation is not going to double the intensity of off road construction equipment within the port, the Proposed Regulation would not result in a noise increase during

construction that would be perceptible to the nearest sensitive receptor.[83] Furthermore, ports do not support sensitive land uses such as residences, hospitals, day care facilities, and hotels that contain sensitive receptors. As such, construction of compliance response to ports would not likely produce adverse noise levels as compared to existing port conditions.

However, implementation of the Proposed Regulation could result in the construction of alternative fuel-related infrastructure, which would involve activities such as earth moving, grading, demolition, and building construction. Construction activities may occur during the day or night. These activities would generate noise through the use of heavy-duty equipment such as bulldozers, pile drivers, excavators, cranes, and vehicles. The effects of construction noise would depend on the type of construction activities occurring on any given day, noise levels generated by those activities, distances to noise sensitive receptors, and whether the equipment is mobile or stationary. Additionally, the perception of changes in noise would depend on the existing ambient noise environment, as exterior ambient noise levels typically decrease during the late evening and nighttime hours as traffic volumes and commercial activities decrease. Construction activities performed during these more noise-sensitive periods of the day can result in increased annoyance and potential sleep disruption for occupants of nearby residential uses.

The site preparation phase typically generates the most substantial noise levels because it requires the noisiest types of construction equipment. Although a detailed construction equipment list is not known because no final port-specific engineering has been completed for any compliance responses in response to the Proposed Regulation, it is expected that the primary sources of noise would include backhoes, bulldozers, and excavators based on the anticipated compliance responses. Noise levels from typical types of construction equipment can range from approximately 74 to 94 A-weighted decibels (dBA) at 50 feet. Based on this information and accounting for typical usage characteristics of individual pieces of equipment and activity types, on-site construction could result in hourly average noise levels of 87 dBA equivalent level measurements (L_{eq}) at 50 feet and maximum noise levels of 90 dBA maximum sound level (L_{max}) at 50 feet from the simultaneous operation of heavy-duty equipment. The noisiest sole activity would be pile driving; one study of waterfront infrastructure pile-driving (underwater) found airborne measurements ranging from 69 to 113 L_{max} dBA.[84] Based on these and general attenuation rates, exterior noise levels at noise-sensitive receptors located within thousands of feet from project sites could exceed typical local noise standards (e.g., 50/60 dBA L_{eq}/L_{max} during daytime hours and 40/50 dBA L_{eq}/L_{max} during

[83] Caltrans, "Technical Noise Supplement to the Traffic Noise Analysis Protocol" California Department of Transportation Division of Environmental Analysis Environmental Engineering Hazardous Waste, Air, Noise, Paleontology Office, September 2018~~3~~3

[84] Naval Facilities Engineering Command Atlantic, Pile-Driving Noise Measurements at Atlantic Fleet Naval Installations: 28 May 2013 – 28 April 2016, January 2017, https://www.navymarinespeciesmonitoring.us/files/4814/9089/8563/Pile-driving_Noise_Measurements_Final_Report_12Jan2017.pdf

nighttime hours) and could be considered a substantial increase in ambient noise. Construction may also take place outside of hours allowed for by local jurisdictions.

Additionally, construction activities may result in varying degrees of temporary groundborne noise and vibration, depending on the specific construction equipment used and activities involved. Groundborne noise and vibration levels caused by various types of construction equipment and activities (e.g., bulldozers, blasting) range from 58 to 109 vibration decibels (VdB) and from 0.003 to 0.089 inches per second (in/sec) peak particle velocity (PPV) at 25 feet.[85] Based on this project type, it is expected that the primary sources of groundborne vibration and noise would include bulldozers and trucks. According to the Federal Transit Administration (FTA), levels associated with the use of a large bulldozer and trucks are 0.089 and 0.076 in/sec PPV (87 and 86 VdB), respectively, at 25 feet. With respect to the prevention of structural damage in newer buildings, construction-related activities would not exceed FTA vibration damage criteria (e.g., 0.2 in/sec PPV for non-engineered timber and masonry buildings). However, based on FTA's recommended procedure for applying a propagation adjustment to these reference levels, bulldozing and truck activities could exceed recommended levels with respect to the prevention of human disturbance (e.g., 80 VdB) within 275 feet.

Thus, implementation of the Proposed Regulation could result in the generation of short-term construction noise levels in excess of applicable standards or that result in a substantial increase in ambient levels at nearby sensitive receptors, and exposure to excessive vibration levels. Short-term construction-related noise impacts (including vibration) associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 13.A-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified infrastructure that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or modified infrastructure in California could qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- Proponents of new or modified infrastructure constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all

[85] Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf

necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Ensure noise-generating construction activities (including truck deliveries, pile driving and blasting) are limited to the least noise-sensitive times of day (e.g., weekdays during the daytime hours) for projects near sensitive receptors.

- Consider use of noise barriers, such as berms, to limit ambient noise at property lines, especially where sensitive receptors may be present.

- Ensure all project equipment has sound-control devices no less effective than those provided on the original equipment.

- All construction equipment used would be adequately muffled and maintained.

- Ensure all stationary construction equipment (i.e., compressors and generators) is located as far as practicable from nearby sensitive receptors or shielded.

- Properly maintain mufflers, brakes and all loose items on construction and operational-related vehicles to minimize noise and ensure safe operations. Keep truck operations to the quietest operating speeds. Advise about downshifting and vehicle operations in sensitive communities to keep truck noise to a minimum.

- Use noise controls on standard construction equipment; shield impact tools.

- Consider use of flashing lights instead of audible back-up alarms on mobile equipment.

- Install mufflers on air coolers and exhaust stacks of all diesel and gas-driven engines.

Potential construction-related noise impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than- significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related noise impacts (including vibration) associated with the Proposed Regulation would be **potentially significant and unavoidable**.

Impact 13.A-2: Long-Term Operational-Related Impacts to Noise and Vibration

Implementation of the Proposed Regulation could result in new or infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

New sources of noise associated with implementation of Proposed Regulation could include operation of electrical infrastructure and shore- and barge-based capture and control systems at ports. It would be expected that, given the existing industrial character of and noise levels at ports, additional noise from operation of such equipment would not exacerbate existing noise levels.

Nonetheless, implementation of the Proposed Regulation could result in the operation of alternative fuel-related infrastructure (e.g., pipelines, compressor stations, export terminals) outside the boundaries of a port. Operation of these facilities could include on-site noise sources, including fuel-delivery and other hauling-related activities (e.g., truck unloading), fuel-handling and processing activities (e.g., conveyor system, wheeled loader, dozer), and mechanical equipment (e.g., boiler, turbine, fans, pumps). Depending on the proximity to existing noise-sensitive receptors, stationary source noise levels could exceed applicable noise standards and result in a substantial increase in ambient noise levels. Vibration may occur during maintenance activities that require jackhammering or use of heavy equipment, which could result in a substantial though likely short-term increase in vibration.

Therefore, long-term operational-related noise impacts (including vibration) associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 13.A-2

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies that pertain to noise. CARB does not have the authority to require implementation of mitigation related to new or modified infrastructure that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with local discretionary land use and/or permitting authority. New or infrastructure facilities in California could qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize noise include:

- Proponents of new or modified infrastructure constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA) The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions

required to mitigate potentially significant noise impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Equip all emergency pressure relief valves and steam blow-down lines with silencers to limit noise levels.
- Contain facilities within buildings or other types of effective noise enclosures.
- Employ engineering controls, including sound-insulated equipment and control rooms, to reduce the average noise level in normal work areas.

Potential long-term operational noise impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational noise impacts (including vibration) associated with the Proposed Regulation would be **potentially significant and unavoidable**

b) Vessel-Related Impacts

Impact 13.B-1: Short-Term Construction-Related Impacts to Noise and Vibration

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

Infrastructure modifications would typically occur while a vessel is dry docked. Implementation of new infrastructure (e.g. shore power connection cables, high voltage cables, and cable drums/reel systems) would require the use of heavy-duty equipment which would generate high volumes of short-term noise; however, dry docks support the use of other heavy-duty equipment (e.g., forklifts, cranes) of similar noise-generating characteristics. As such, use of equipment to install new cables and systems would be

consistent with the existing noise characteristics of a dry dock. Moreover, it would be expected that dry docks would not be located close to sensitive receptors.

In rare cases where modifications are completed while a vessel is on route to California, noise levels would increase within the area in close proximity of the vessel, which already experiences elevated ambient noise levels from the use of machinery (e.g., generators, pumps, compressors); propulsion (e.g., main engine, propeller); heating, ventilation, and air conditioning systems; piping systems; and environmental noise.[86] It is not anticipated that use of installation equipment would introduce noise levels such that adverse ambient noise impacts would occur.

As such, short-term construction-related noise impacts (including vibration) to vessels would be **less than significant**.

Impact 13.B-2: Long-Term Operational-Related Impacts to Noise and Vibration

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels accommodate increased on-board shore power usage.

Connection to shore power would eliminate a vessel's need to run an external generator at berth as electricity would be supplied by on land generated electricity provided by a local public utility. As such, generator-related stationary noise from vessels would be reduced. A typical noise level for a generators is 81 dBA at 50 feet from the source;[87] generators can be louder depending on size and installation. Sustained noise levels of 85 dBA can cause hearing damage.[88] Implementation of the Proposed Regulation would result in less generator-use in response to stronger connections to shore power.

Use of barge- and land-based capture and control systems would entail installation of a hood on existing generators to capture and control generator-related emissions of air pollutants. Such systems would not attenuate noise produced from generators; however, use of such systems would not exacerbate existing generator noise. Operation of barge-based systems could introduce new sources of noise within the vicinity of a vessel; however, it would not be expected that such levels would worsen ambient noise levels on vessels as compared to existing conditions. Vessels support a suite of high-noise generating equipment such as horns, cranes, and engines.

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[86] American Bureau of Shipping, Guidance Notes on Onboard Ship Noise Analysis," April 2019 (accessed August 28, 2019), https://ww2.eagle.org/content/dam/eagle/rules-and-guides/current/design_and_analysis/290-gn-onboardshipnoiseanalysis/onboard-noise-analysis-gn-apr19.pdf.

[87] Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/FTA_Noise_and_Vibration_Manual.pdf.

[88] Centers for Disease Control and Prevention, Loud Noise Can Cause Hearing Loss Quickly Over Time, June 25, 2019 (accessed August 26, 2019), https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html.

Additionally, land-based capture and control systems, which would not be supported by an engine as would power a barge-base system, would not affect ambient noise levels on a vessel.

Therefore, long-term operational-related noise impacts (including vibration) to vessels associated with implementation of the Proposed Regulation would be **less than significant**.

14. Population, Employment, and Housing

a) Land-Based Impacts

Impact 14.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Population, Employment, and Housing

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants and lithium-ion storage batteries to provide additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

An increase in demand for lithium-ion batteries and hydrogen fuel cells could result in increased mining and exports of lithium and platinum, and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Construction, modification, and maintenance activities occurring within ports would be expected to be served by construction workers currently serving existing ports. Alternative fuel-related infrastructure constructed and maintained as a compliance response to the Proposed Regulation would be anticipated to require relatively small crews and demand for crews would be temporary and short-term (e.g., 6 to 12 months per project). Therefore, a sufficient construction employment base would likely be available, and substantial construction worker migration would not be likely to occur.

Operation of new or modified infrastructure would generate varying levels of employment opportunities. The number of jobs produced would be directly related to the size, capacity, and demand for alternative fuels. There in inherent uncertainty surrounding the exact locations of the new infrastructure; however, it would be expected that locations would be selected in consideration of an appropriate employment base to support operation, or where local jurisdictions have planned for increased population and employment growth. As such, no additional housing would be required to implement the reasonably foreseeable compliance response to the Proposed Regulation.

Therefore, short-term construction-related and long-term operational-related impacts to population, employment, and housing would be **less than significant**.

b) Vessel-Related Impacts

Impact 14.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Population, Employment, and Housing

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

As stated previously, modification to vessels would typically occur during scheduled dry dock visits. The existing employment base at a dry dock is expected to be sufficient to implement the necessary vessel modifications to achieve compliance with the Proposed Regulation. It is conceivable that additional employment could be needed to execute such modifications; however, such a rise in employment opportunity would not be substantial enough to increase a community's population or require the construction of housing. Short-term construction-related and long-term operational-related impacts to population, employment, and housing to vessel operations would be **less than significant**.

15. Public Services

a) Land-Based Impacts

Impact 15.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Public Services

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g. high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses

set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Construction, modification, and maintenance activities occurring within ports would be expected to be served by construction workers currently serving existing ports. Alternative fuel-related infrastructure constructed and maintained as a compliance response to the Proposed Regulation could occur; however, there is uncertainty as to the exact location or character of any new facilities or modification of existing facilities. However, these would likely occur within footprints of existing facilities, or in areas with zoning that would permit the development of manufacturing or industrial uses. Construction activities would be anticipated to require relatively small crews, and demand for these crews would be temporary (e.g., 6 to 12 months per project). Therefore, it is anticipated that the need for a substantial amount of construction worker migration would not occur and that a sufficient local supply of construction workers would be available.

Increased population levels may result in greater demand on the provisions of public services. As discussed under Impact 14.A-1, "Short-Term Construction-Related and Long-Term Operational-Related Effects to Population, Employment, and Housing," operation and maintenance of new infrastructure would provide a range of employment opportunities depending on the size and capacity of such infrastructure. While implementation of the Proposed Regulation would produce long-term employment opportunities, it would be anticipated that a sufficiently sized employment base would exist where new facilities are constructed. Thus, the provisions of public services would

be sufficient because Proposed Regulation is not anticipated to result in unplanned increases in population levels.

As a result, short-term construction-related and long-term operational-related effects, associated with the Proposed Regulation on response time for fire protection, police protection, schools, parks, and other facilities would be **less than significant**.

b) Vessel-Related Impacts

Impact 15.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Public Services

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage and installment of alternative fuel-related infrastructure and barge-based capture and control systems. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

The existing infrastructure at a dry dock would be expected to be sufficient to implement the necessary vessel modifications to achieve compliance with the Proposed Regulation. Moreover, the public services serving dry docks (e.g., fire and police protection) would be adequate to implement these modifications because the operational activities would be similar to existing activities. Furthermore, dry docks and vessels would not affect the provisions of parks or school facilities. Short-term construction-related and long-term operational-related impacts to the provisions of public services associated with vessels would be **less than significant**.

16. Recreation

a) Land-Based Impacts

Impact 16.A-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Recreation

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Construction, modification, and maintenance activities occurring within ports would likely be served by construction workers currently serving existing ports. Alternative fuel-related infrastructure constructed and maintained as a compliance response to the Proposed Regulation could occur; however, given that the Proposed Regulation allows regulated entities to decide what method to use to most effectively and economically control emissions, there is uncertainty as to the exact location or character of any new facilities. These activities would likely occur within footprints of existing manufacturing facilities, or in areas with appropriate zoning. In addition, demand for these crews would be temporary (e.g., 6 to 12 months per project) and would not be anticipated to substantially increase regional population levels. Construction and operational activities associated with reasonably foreseeable compliance responses would not be anticipated to result in increased use of regional parks and other recreational facilities, such that existing neighborhood and regional parks or other recreational facilities would be substantially deteriorated.

As discussed under Impact 14.A-1, "Short-Term Construction-Related and Long-Term Operational-Related Effects to Population, Employment, and Housing," operation and maintenance of new infrastructure would provide a range of employment opportunities depending on the size and capacity of such infrastructure. While implementation of the Proposed Regulation would produce long-term employment opportunities, it would be anticipated that a sufficient employment base would exist where new facilities are constructed, such that employees would not need to move to a different community. Thus, the recreational resources would be sufficient because Proposed Regulation is not anticipated to result in unplanned increases in population levels.

As a result, short-term construction-related and long-term operational-related effects to regional parks or other recreational facilities associated with the Proposed Regulation would be **less than significant**.

b) Vessel-Related Impacts

Impact 16.B-1: Short-Term Construction-Related and Long-Term Operational-Related Impacts to Recreation

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage and installment of alternative fuel-related infrastructure and barge-based capture and control systems. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

As discussed in Chapter 2, "Project Description," most vessels accessing California ports do so for economic reasons. A small portion of vessels are classified as passenger or "cruise" ships. In 2017, 621 cruise ships accessed California ports comprising approximately 8 percent of total vessels accessing California ports. Modifications to vessels to comply with the Proposed Regulation would not introduce new populations to California above existing levels such that availability or degradation of recreational facilities would occur. As such, short-term construction-related and long-term operational-related recreational impacts to vessels would be **less than significant**.

17. Transportation and Traffic

a) Land-Based Impacts

Impact 17.A-1: Short-Term Construction-Related Impacts to Transportation and Traffic

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increase shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of

activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

Implementation of the Proposed Regulation could result in the construction of new port infrastructure to support capture and control systems as well alternative fuel-related infrastructure and facilities, which could occur beyond the boundaries of existing ports. Construction of new infrastructure and facilities would result in short-term construction traffic (primarily motorized) in the form of worker commute and material delivery trips. The amount of construction activity would fluctuate depending on the particular type, number, and duration of usage of equipment, as well as the phase of construction. These variations would affect the amount of project-generated traffic for both worker commute trips and material deliveries. Depending on the amount of trip generation and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips.

As such, short-term construction-related impacts to transportation and traffic associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 17.A-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant traffic impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Minimize the number and length of access, internal, service and maintenance roads and use existing roads when feasible.

- Provide for safe ingress and egress to/from the proposed project site. Utilize flaggers where necessary to control traffic at site entrances during construction.

- Prepare a Construction Traffic Control Plan and a Traffic Management Plan.

- Encourage carpooling to the site.

- Avoid materials deliveries during peak traffic periods.

Potential construction-related traffic and transportation impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than- significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that the potentially significant short-term construction-related transportation and traffic impacts associated with the Proposed Regulation could be **potentially significant and unavoidable**.

Impact 17.A-2: Long-Term Operational-Related Impacts to Transportation and Traffic

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals) to support the use of alternative fuels and fuel cells.

Implementation of the Proposed Regulation could require the construction and operation of new infrastructure and facilities to produce and distribute alternate fuels. Additionally, increased demand for lithium-ion storage batteries could include the construction and operation of new or modified lithium-ion battery recycling, disposal or refurbishment facilities, and expanded or new mining operations. With respect to operational activities, it is not anticipated that substantial amount of new personnel would be needed to operate new facilities because a sufficient employment base would be available. Such facilities would likely be sited in areas appropriately zoned to support industrial activities. As discussed under Impact 14.A.1, "Short-Term Construction-Related and Long-Term Operational-Related Impacts to Population, Employment, and Housing," operational of new or modified facilities would be located within areas of an appropriate population to serve these facilities. However, long-term operational-related activities associated with deliveries and distribution of good (e.g.,

alternative fuels) could result in the addition of new trips, which could affect roadway service levels.

The operation of new facilities would result in expanded supply of alternative fuels beyond existing baseline levels. For instance, workers and businesses associated with the operation of export stations could increase vehicle miles traveled (VMT) levels on nearby roadways from commute and commodity distribution. In addition, new or expanded mining operations, both within the United States and internationally, could generate additional VMT, or increase cargo ship activity, as lithium ore is traded and distributed on a global scale.

New facilities may result in additional egress/ingress points or increased traffic that would result in hazardous conditions on local roadways. Inadequate access may impede emergency vehicle access to new facilities. New facilities would require staff during operations, which would add trips to the new facilities. Pursuant to SB 375, CARB established GHG reduction targets for metropolitan planning organizations that range from 13 to 19 percent by 2035. These are based on land use patterns and transportation systems specified in Regional Transportation Plans and Sustainable Community Strategies. Locations of facilities cannot currently be known; therefore, the total change in VMT cannot be assessed. However, as stated previously, operation of new facilities, especially those located outside of California, could introduce new VMT from the delivery and distribution of good (e.g., alternative fuels). As such, adverse VMT impacts could occur as a result of project implementation.

As a result, long-term operational-related impacts associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 17.A-2

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies related to transportation. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be approved by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California could qualify as a “project” under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize construction traffic impacts include:

- Identify and implement road and intersection design requirements or improvements for any proposed or significantly impact roads and intersections.
- Consult with and implement recommendations from local fire protection services regarding emergency access requirements.

- Encourage alternative transportation and carpooling to the project site.

Potential operational-related traffic and transportation impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, that long-term operational-related effects to transportation and traffic associated with the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impact 17.B-1: Short-Term Construction-Related Impacts to Transportation and Traffic

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage and installment of alternative fuel-related infrastructure and barge-based capture and control systems. Vessel retrofitting is typically done while the vessel is on its regular dry dock schedule or in some rare cases while a vessel is in-transit to California.

As stated previously, such modifications would likely be implemented by an existing employment base using existing heavy-duty equipment and tools. As such, off-road diesel-powered vehicle and on-road worker-commute vehicles trips would not be expected to increase such that additional VMT would be introduced to areas surrounding dry docks. Therefore, short-term construction-related transportation and traffic impacts associated with vessels would be **less than significant.**

Impact 17.B-2: Long-Term Operational-Related Impacts to Transportation and Traffic

Implementation of the Proposed Regulation could result in infrastructure modifications (e.g., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage and installment of alternative fuel-related infrastructure and barge-based capture and control systems.

As discussed under Impact 3.A-2, "Long-Term Operational-Related Impacts to Air Quality," implementation of the Proposed Regulation could affect the movement of vessels traveling to California ports depending on the applied cost of compliance associated with the Proposed Regulation. As discussed in greater detail under Impact 3.A-2, "Long-Term Operational-Related Impacts to Air Quality," costs associated with diverting trips, or changes to existing vessel transportation routes, from California would likely be higher than the cost of complying with the Proposed Regulation. It is unlikely that some may decide to change shipping mode or may divert to another port. ~~As such, effects to the vessel transportation routes would likely be minimal; however, because vessel routing is ultimately a business decision, vessel rerouting may occur. This may result in increased miles traveled by vessels to alternate ports.~~ As a result, impacts would be **less than significant.**[89] ~~**significant and unavoidable**.~~

18. Utilities and Service Systems

Utilities and Service Systems impacts are inherently long-term and related to the operational facilities; thus, short-term construction-related impacts are not discussed for utilities and service systems.

a) Land-Based Impacts

Impact 18.A-1: Long-Term Operational-Related Impacts to Utilities and Service Systems

Implementation of the Proposed Regulation could result in new infrastructure or modifications to existing infrastructure (e.g., high voltage cable lines, power meters, and circuit breaker main cabinets) to accommodate increased shore power, as well as modifications to berths to provide shore-side capture and control devices and barge-based systems. For a complete discussion of the physical changes resulting from the Proposed Regulation, please see the full description of compliance responses set forth in section 2.0, above, which is incorporated herein by reference. Shore power and capture and control devices could require the construction of new pilings and surface area. Increased use of shore power could also require the use of peaker plants, lithium-ion storage batteries or fuel cells to provide alternative or additional electricity to vessels with large electrical loads.

Although certain activities would be undertaken due to remediation funding, each remediation fund administrator (e.g. Districts) has substantial discretion as to what those activities would be. As a result, CARB cannot identify specific reasonably foreseeable activities that would take place due to use of remediation funds and cannot identify impacts of the remediation funding. However, it is probable that the types of activities that may occur are similar to the compliance responses analyzed in this EA and that they would result in similar impacts.

[89] Edited to correct scrivener's error

An increase in demand for lithium-ion batteries and fuel cells could result in lithium and platinum mining and exports from source countries or other states and increased recycling, refurbishment, or disposal of lithium batteries and hydrogen fuel cells. However, any increased rates of disposal of lithium batteries and hydrogen fuel cells would need to comply with California law, including but not limited to California's Hazardous Waste Control Law and implementing regulations. Implementation of the Proposed Regulation could also require substantial new and improved infrastructure (e.g., pipelines, compressor stations, export terminals, fueling stations) to support the use of alternative fuels and fuel cells.

The electricity required to support shore power at existing ports would be supplied by local utility companies. It is not expected that increased usage of shore power would be large enough such that utility companies would have insufficient energy supply; however, in rare cases, vessels with a high electrical load during times of otherwise high electricity demand could trigger the use of peaker plants or lithium-ion based batteries to store excess electricity to meet this load. Use of shore power would divert energy demand from the direct burning of fossil fuels to the electricity grid. Pursuant to State law (i.e., SB 350, SB 100), public utilities much incrementally increase their portion of renewable energy to their energy portfolio. As discussed in greater detail under Impact 6.A-2, "Long-Term Operational-Related Impacts to Energy," public utilities are continually modifying their infrastructure and developing strategies to diversify the grid. This is due in large part to increasing demand for use of electric vehicles in an effort to reduce the State's GHG emissions. In cases where vessel electrical loads are high, use of peaker plants and/or lithium-ion based storage batteries may be required.

Shore-side and barge-based capture and control systems would generally be powered by clean diesel; barge based systems ~~and~~ are not anticipated to be connected to public utility infrastructure, but shore-side systems may be connected to public utilities with trenched gas and electrical lines and would use electricity as discussed for shore power, above. Additional natural gas consumption would be minimal. For barge-based systems, it is expected that existing production of clean diesel associated with the Low Carbon Fuel Standard would be sufficient to meet the energy needs of capture and control systems such that new or modifications to existing refineries or manufacturing facilities would not be required to increase their use under the Proposed Regulation.

New facilities associated with the production and distribution of alternative fuels, could substantially increase the demand for water, wastewater treatment, storm water drainage, energy, and solid waste services in their local areas. Additionally, depending on the location, new facilities may require new utility service lines and connections. At this time, the specific location, type, and number of new facilities that would be developed is not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, and environmental constraints. Therefore, the ultimate magnitude and location of demand for utilities such as water and wastewater cannot be known. However, common impacts to utilities and service systems could include exceedances in wastewater treatment requirements of the applicable Regional Water Quality Control Board, requiring the

construction of new wastewater treatment infrastructure and/or plants as well as new or expanded stormwater drainage facilities, producing water demand in exceedance of available water supplies, and generating levels of solid waste that exceeds an existing landfill's capacity. Thus, while the specific impacts from new manufacturing plants and recycling facilities on utility and service systems cannot be identified with any certainty, and individual plants could potentially result in significant environmental impacts related to procurement and delivery of utilities and service systems.

Reasonably foreseeable compliance responses to the Proposed Regulation could result in increased demand for lithium-ion storage batteries. Spent lithium-ion may be recycled, and due to increasing demand for other lithium-ion based batteries (e.g., zero-emissions vehicles and technologies), rates of lithium-ion battery recycling have increased.[90]

In California, disposal of lithium-ion batteries within the State would be required to comply with California's Universal Waste Rule (22 CCR Chapter 23) which contains regulations to prohibit the disposal of used batteries to landfills, which would ensure that lithium-ion batteries would be properly disposed of. However, lithium batteries may be sold out of state as turnover increases. In the United States overall, there are limited regulations for the disposal of lithium-ion batteries; however, due to value of rarer metals (e.g., cobalt) there is incentive to collect and recycle batteries. When applied, typical recycling procedures (i.e., hydrometallurgical recovery, high-temperature or pyrometallurgical, and direct recycling) recover an average of approximately 97 percent of the battery material, redirecting about 3 percent of battery waste to landfills.[91] Notably, these figures pertain to batteries subject to recycling, not of which all batteries are. As such, battery disposal occurring outside of California could be directed to a landfill.

Thus, long-term operational-related effects to utilities and services systems, associated with the Proposed Regulation could be potentially significant.

Mitigation Measure 18.A-1

The Regulatory Setting in Attachment A includes, but is not limited to, applicable laws, regulations, and policies related to utilities and service systems. CARB does not have the authority to require implementation of mitigation related to new or modified facilities that would be subject to approval by local jurisdictions. The ability to require such measures is under the purview of jurisdictions with discretionary land use and/or permitting authority. New or modified facilities in California could qualify as a "project" under CEQA. The jurisdiction with primary permitting authority over a proposed action is the Lead Agency, which is required to review the proposed action for compliance with

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[90] U.S. Geological Survey "Mineral Commodity Summaries 2017 Lithium," 2017, https://minerals.usgs.gov/minerals/pubs/commodity/lithium/mcs-2017-lithi.pdf

[91] U.S. Environmental Protection Agency, "Application of Life-Cycle Assessment to Nanoscale Technology: Lithium-Ion Batteries for Electric Vehicles," April 24, 2013 (accessed July 11, 0219) https://www.epa.gov/sites/production/files/2014-01/documents/lithium_batteries_lca.pdf

CEQA statutes. Project-specific impacts and mitigation may be identified during the environmental review by agencies with discretionary project-approval authority. Recognized practices that are routinely required to avoid and/or minimize utility and service-related impacts include:

- Proponents of new or modified facilities constructed as a compliance response to the Proposed Regulation would coordinate with local land use agencies to seek entitlements for development including the completion of all necessary environmental review requirements (e.g., CEQA). The local land use agency or governing body would certify that the environmental document was prepared in compliance with applicable regulations and would approve the project for development.

- Based on the results of the environmental review, proponents would implement all mitigation identified in the environmental document to reduce or substantially lessen the environmental impacts of the project. The definition of actions required to mitigate potentially significant utility or service-related impacts may include the following; however, any mitigation specifically required for a new or modified facility would be determined by the local lead agency.

- Comply with local plans and policies regarding the provision of water supply, wastewater treatment, and storm water drainage utilities, and solid waste services.

- Where an on-site wastewater system is proposed, submit a permit application to the appropriate local jurisdiction and include the application with applications to appropriate lead agencies.

- Where appropriate, prepare a Water Supply Assessment (WSA) consistent with the requirements of Section 21151.9 of the Public Resources Code/ Section 10910 et seq. of the Water Code. The WSA would be approved by the local water agency/purveyor prior construction of the project.

- Comply with local plans and policies regarding the provision of wastewater treatment services.

Potential long-term operational-related utilities and service systems impacts could be reduced to a less-than-significant level by mitigation that can and should be implemented by local lead agencies, but is beyond the authority of CARB and not within its purview.

The authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects, and the programmatic level of analysis associated with this ~~Draft~~ Final EA does not attempt to address project-specific details of mitigation. As such, there is inherent uncertainty in the degree

of mitigation that may ultimately by implemented to reduce potentially significant impacts.

Consequently, while impacts could be reduced to a less-than-significant level by land use and/or permitting agency conditions of approval, this ~~Draft~~ Final EA takes the conservative approach in its post-mitigation significance conclusion and discloses, for CEQA compliance purposes, long-term operational-related effect to utilities and service systems associated with the Proposed Regulation would be **potentially significant and unavoidable**.

b) Vessel-Related Impacts

Impact 18.B-1: Long-Term Operational-Related Impacts to Utilities and Service Systems

Implementation of the Proposed Regulation could result in infrastructure modifications (i.e., shore power connection cables, high voltage cables, and cable drums/reel systems) to existing vessels to accommodate increased on-board shore power usage and installment of alternative fuel-related infrastructure and barge-based capture and control systems.

The existing infrastructure at a dry dock would be expected to be sufficient to implement the necessary vessel modifications to achieve compliance with the Proposed Regulation. Because these modifications would not generate substantially more demand on for water, wastewater, or electricity as compared to baseline conditions, utilities and related facilities serving dry docks (e.g., water, wastewater, electricity) would be adequate to implement these modifications. As such, long-term operational-related impacts to the provisions of utilities and service systems associated with vessels would be **less than significant**.

5.0 CUMULATIVE AND GROWTH-INDUCING IMPACTS

A. Approach to Cumulative Analysis

This section satisfies requirements of the CEQA to discuss how the project being analyzed would contribute to cumulative impacts. The California Air Resources Board's (CARB or Board) certified regulatory program (17 California Code of Regulation [CCR] 60000-60008) does not provide specific direction on a cumulative impacts analysis, and while CARB, by its certified program, is exempt from Chapters 3 and 4 of CEQA and corresponding sections of the CEQA Guidelines, the Guidelines nevertheless contain useful information for preparation of a thorough and meaningful cumulative analysis. The CEQA Guidelines require a lead agency to discuss a cumulative impact if the project's incremental effect combined with the effects of other projects is "cumulatively considerable" (CEQA Guidelines 15130(a)). The discussion of cumulative impacts need not provide as much detail as the discussion of effects attributable to the project alone (CEQA Guidelines 15130). Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but must briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

In considering cumulative impacts, an agency may choose from among two approaches: it can prepare a list of past, present, and probable future projects that will produce related or cumulative impacts, or it can rely on a summary of projections contained in an adopted planning document or an adopted or certified environmental document for the planning document (CEQA Guidelines 15130(b)). Further, the CEQA Guidelines state that the pertinent discussion of cumulative impacts contained in one or more previously certified environmental impact reports (EIRs) may be incorporated by reference pursuant to provisions for tiering and program EIRs, and that no future cumulative analysis is required when the lead agency determines the regional and area wide impacts have already been addressed in the prior certified EIR for that plan (CEQA Guidelines 15130).

The CEQA Guidelines state that a previously approved plan for the reduction of greenhouse gas (GHG) emissions may be used in cumulative impacts analysis, and that the pertinent discussion of cumulative impacts contained in one or more previously certified EIRs may be incorporated by reference (14 CCR Section15130(d)). Furthermore, no further cumulative impacts analysis is required when a project is consistent with a general, specific, master or comparable programmatic plan where the lead agency determines that the regional or area wide cumulative impacts of the proposed project have already been adequately addressed, as defined in section 15152(f), in a certified EIR for that plan. (14 CCR Section 15130(d)). CEQA further directs that a tiered EIR focus on significant environmental effects that were not already analyzed in the previous environmental analysis. (Public Resources Code [PRC] Sections 21068.5; 21093; see also 21094(c).)

For purposes of this analysis, CARB is relying on the summary of projections contained in the Environmental Analysis (EA) prepared for the 2016 State Strategy for the State Implementation Plan (State SIP Strategy).[92]

The State SIP Strategy includes a combination of regulatory and programmatic actions that will reduce emissions of ozone precursors and fine particulate matter (PM2.5), pursuant to the federal Clean Air Act (CAA). The State SIP Strategy EA provided a program-level review of significant adverse impacts associated with the reasonably foreseeable compliance responses that appeared most likely to occur because of implementing the recommended measures. The impact discussion includes, where relevant, construction-related effects, operational effects of new or modified facilities, and influences of the recommended actions on GHG and air pollutant emissions. The State SIP Strategy EA considered cumulative impacts of a full range of reasonably foreseeable compliance responses to all the recommendations, including the Proposed Regulation and considered the cumulative effect of other "closely related" past, present, and future reasonably foreseeable activities undertaken to address air quality at the State level, as well other activities with "related impacts" (CEQA Guidelines 15355(b); 15130(a)(1)). CARB has determined that the cumulative effects of the Proposed Regulation have been examined at a sufficient level of detail in the State SIP Strategy. Therefore, CARB has determined that for a cumulative analysis of the Proposed Regulation, it is appropriate to rely on the cumulative analysis contained in the State SIP Strategy EA. The analysis of the State SIP Strategy EA is hereby incorporated by reference. The portions of the State SIP Strategy EA relevant to this discussion are also summarized below.

The analysis of cumulative impacts includes the following:

- A summary of the types of compliance responses associated with the State SIP Strategy.
- A discussion of the cumulative impacts found for each resource area in the State SIP Strategy EA (certified by the Board in March 2017).
- A significance conclusion that determines if the Proposed Regulation could result in a significant cumulative effect or a considerable contribution to an existing significant cumulative impact.

This approach to cumulative impacts analysis is "guided by the standards of practicality and reasonableness" (14 CCR Section 15130(b)) and serves the purpose of providing "a context for considering whether the incremental effects of the project at issue are considerable" when judged "against the backdrop of the environmental effects of other projects." (*CBE v. Cal. Res. Agency* (2002) 103 Cal.App.4th 98, 119).

[92] CARB, "Revised Proposed 2016 State Strategy for the State Implementation Plan" March 7, 2017 (accessed July 10, 2019), https://ww3.arb.ca.gov/planning/sip/2016sip/rev2016statesip.pdf

1. Summary of the State SIP Strategy and Reasonably Foreseeable Compliance Responses

The objectives of the State SIP Strategy are to:

1. Provide the necessary emission reductions for all of California's nonattainment areas to meet federal ambient air quality standards by the attainment dates specified by the U.S. Environmental Protection Agency (EPA);

2. Support the development and submittal of an approvable State Implementation Plan (SIP) to the EPA. To meet EPA requirements for approvable SIPs, the measures must include commitments to achieve emission reductions that are real, permanent, quantifiable, verifiable, and enforceable;

3. Complement existing programs and plans – to ensure, to the extent feasible, that activities undertaken pursuant to the measures complement, and do not interfere with, existing planning efforts to reduce GHG emissions, use of petroleum-based transportation fuels, and toxic air contaminant (TAC) emissions;

4. Incentivize and support emerging technology that will be needed to achieve CARB's SIP goals;

5. Establish requirements for cleaner technologies (both zero and near-zero emission technologies), coupled with cleaner renewable fuels to achieve CARB's SIP goals;

6. Introduce zero-emission technology in targeted applications to achieve CARB's SIP goals;

7. Ensure the in-use vehicle and engine fleets remain durable, and that in-use vehicles continue to operate at their cleanest possible level to achieve CARB's SIP goals; and

8. Incentivize early introduction of advanced clean technologies to achieve CARB's SIP goals.

The State SIP Strategy measures reduce emissions from six source categories: on-road light-duty vehicles, on-road heavy-duty vehicles (HVD), off-road federal and international sources, off-road equipment, fuels, and consumer products. A summary of the measures and their associated reasonably foreseeable compliance responses are provided below.

a) On-Road Light-Duty Vehicles

The on-road light-duty transportation sector consists of light-duty vehicles such as passenger cars, minivans, most sport utility vehicles and pickup trucks, and motorcycles. Measures include the Advanced Clean Cars 2, Lower In-Use Emission

Performance Assessment, and Further Deployment of Cleaner Technologies: On-Road Light Duty Vehicles. Reasonably foreseeable compliance responses could include:

- An increase in the demand for lithium ion batteries and an associated increase in manufacturing facilities, lithium mining and exports, and battery disposal and recycling activities;
- Development of new hydrogen refueling stations and electric vehicle charging stations; technical studies, new testing procedures, and minor facility modifications and new equipment for roadside testing; and
- Recycling or scrapping of old vehicles, or selling vehicles to areas outside of California.

b) On-Road Heavy-Duty Vehicles

The on-road HDV sector consists of heavy-duty gas and diesel trucks, urban and school buses, and motorhomes. Measures include the Lower In-Use Emission Performance Level, Low-oxides of nitrogen (NOx) Engine Standard, Medium and Heavy-Duty GHG Phase 2, Innovative Clean Transit, Last Mile Delivery, Innovative Technology Certification Flexibility, Zero-Emission Airport Shuttle Buses, Incentive Funding to Achieve Further Emission Reductions from On-Road HDV, and Further Deployment of Cleaner Technologies: On-Road Heavy-Duty.

Reasonably foreseeable compliance responses could include:

- New or modified testing centers to facilitate a new “smog check” program for heavy-duty trucks;
- Changes in engine manufacturing to include near-zero emission technology;
- Changes in design and manufacturing of heavy-duty trucks and tractor-trailers to improve engine and vehicle efficiency and aerodynamic performance;
- Recycling or scrapping of old vehicles, or selling vehicles to areas outside of California;
- An increase in manufacturing and associated facilities to supply zero emissions vehicles (i.e., buses, last mile delivery trucks, airport shuttle buses) along with construction of new hydrogen fueling stations, natural gas fueling stations, and electric vehicle charging stations;
- An increase in the demand for lithium ion batteries and an associated increase in manufacturing facilities, lithium mining and exports, and battery disposal and recycling activities;

- Increased advanced technology research as well as increased development and deployment of lower emitting medium and HDVs and engines;
- An increase in the rate of heavy-duty fleet or vehicle component turnover, which may result in recycling or scrapping of old vehicles; and
- Increased use of optionally certified low-NOx engines.

c) Off-Road Federal and International Sources

The off-road federal and international sources category consists of emissions associated with ships, locomotives, and aircraft. Measures include the More Stringent National Locomotive Emission Standards, Tier 4 Vessel Standards, Incentivize Low-Emission Efficient Ship Visits, amendments to the At-Berth Regulation, and Further Deployment of Cleaner Technologies: Off-Road Federal and International Sources.

Reasonably foreseeable compliance responses could include:

- New locomotive production facilities;
- Transportation and storage of renewable natural gas and hydrogen;
- An increase in the demand for lithium ion batteries and an associated increase in manufacturing facilities, lithium mining and exports, and battery disposal and recycling activities;
- Adoption of more stringent emissions standards for new vessels and vessel efficiency upgrades;
- The docking of cleaner, more efficient large ships (capacity greater than 14,000 twenty-foot equivalent units [TEU]) in California's ports; and
- Use of bonnet capture devices at ports, electric system upgrades to ships and terminals.

d) Off-Road Equipment

The off-road equipment category encompasses lawn and garden equipment, transport refrigeration units, vehicles and equipment used in construction and mining, forklifts, cargo handling equipment, commercial harbor craft, and other industrial equipment. Measures include the Zero-Emission Off-Road Forklift Regulation Phase 1, Zero-Emission Off-Road Emission Reduction Assessment, Zero-Emission Off-Road Worksite Emission Reduction Assessment, Zero-Emission Airport Ground Support Equipment, Small Off-Road Engines, Transport Refrigeration Units Used for Cold Storage, and Further Deployment of Cleaner Technologies: Off-Road Equipment.

Reasonably foreseeable compliance responses could include:

- Increase in manufacturing, production, and use of zero-emission technology in forklifts, airport ground support equipment, small off-road engines, transport refrigeration units;
- Construction or modification of manufacturing facilities, new hydrogen fueling stations, and electric vehicle and equipment charging stations;
- An increase in the demand for lithium ion batteries and an associated increase in manufacturing facilities, lithium mining and exports, and battery disposal and recycling activities; and
- An increase the turnover rate of engines and/or components for off-road equipment, which may result in recycling or scrapping of old engines or components.

e) Fuels

Measures include the Low-Emissions Diesel Requirement, which would reduce emissions from the portion of the heavy-duty fleet that will continue to operate on internal combustion engines, in order to reduce emissions as quickly as possible.

Reasonably foreseeable compliance responses could include:

- Increased demand for renewable diesel, biodiesel, or other Low-Emission Diesel fuel feedstocks, such as oil seeds or forest residues, and/or increased imports of tallow and used cooking oil into California for processing;
- Additional infrastructure to support the collection, processing, and distribution of biomethane may be required; and\
- Changes to fuel processing and transport.

f) Consumer Products

Chemically formulated consumer products such as automotive care products, household care products, and personal care products are the largest source category of reactive organic gases (ROG) emissions in the South Coast, and the fourth largest category Statewide. Measures include the Consumer Products Program, which would maintain the success of current consumer products regulations in light of population growth. Reasonably foreseeable compliance responses would include continuing CARB's commitment to reduce ROG emissions from consumer products.

2. Summary of the State SIP Strategy Environmental Impacts

The State SIP Strategy EA evaluated the environmental impacts related to the reasonably foreseeable compliance responses described above. Table D.5-1 provides a summary of the conclusions of these impacts.

Table D.5-1
Summary of the State SIP Strategy Environmental Analysis Impacts by Sector

Resource Areas and Impact Categories	Significance Determination
Aesthetics	
Construction-Related and Operational Impacts	PSU
Agriculture and Forest Resources	
Construction-Related and Operational Impacts	PSU
Air Quality	
Construction-Related Impacts	PSU
Operational Impacts	B
Biological Resources	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Cultural Resources	
Construction-Related and Operational Impacts	PSU
Energy Demand	
Construction-Related Impacts	LTS
Operational Impacts	B
Geology, Soils, and Minerals	
Construction-Related and Operational Impacts	PSU
Greenhouse Gas	
Construction-Related and Operational Impacts	B
Hazards and Hazardous Materials	
Construction-Related Impacts	PSU
Operational Impacts	LTS
Hydrology and Water Quality	
Construction-Related Impacts	PSU
Operational Impacts	PSU

Table D.5-1 Summary of the State SIP Strategy Environmental Analysis Impacts by Sector	
Resource Areas and Impact Categories	**Significance Determination**
Land Use and Planning	
Construction-Related and Operational Impacts	LTS
Mineral Resources	
Construction-Related Impacts	LTS
Operational Impacts	LTS
Noise	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Population and Housing	
Construction-Related and Operational Impacts	LTS
Public Services	
Construction-Related and Operational Impacts	LTS
Recreation	
Construction-Related and Operational Impacts	LTS
Transportation and Traffic	
Construction-Related Impacts	PSU
Operational Impacts	PSU
Utilities and Service Systems	
Operational Impacts	PSU

B. Significance Determinations and Mitigation

Implementation of the Proposed Regulation was determined to potentially result in cumulatively considerable contributions to significant cumulative impacts in certain resource areas, as discussed below. While suggested mitigation is provided for each potentially cumulatively considerable impact, the mitigation needs to be implemented by other agencies. Where impacts cannot be feasibly mitigated, the ~~Draft~~ Final EA recognizes the impact as significant and unavoidable. The Board will need to adopt Findings and a Statement of Overriding Considerations for any significant and unavoidable environmental effects of the project as part of the approval process.

C. Cumulative Impacts by Resource Area

1. Aesthetics

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact to aesthetic resources from construction and operational activities associated with new or modified facilities or infrastructure. As discussed in the State SIP Strategy EA, the exact location or character of these new facilities or the modification of existing facilities is uncertain. Development of new facilities, although expected to occur in areas appropriately zoned, could conceivably introduce or increase the presence of visible artificial elements (e.g., heavy-duty equipment, vegetation removal, new or expanded buildings) in areas of scenic importance, such as visibility from State scenic highways. The visual effects of such development would depend on several variables, including the type and size of facilities, distance and angle of view, visual prominence, and placement in the landscape. In addition, facility operation may introduce substantial sources of glare, exhaust plumes, and nighttime lighting for safety and security purposes. Additionally, increased demand for vehicles powered by lithium batteries could cause a rise in lithium extraction activities in brine and hard rock. Groundwater brine pumping could cause plains to sink and dry out and open pit mining could result in the removal of vegetation, soils, rocks, and other naturally occurring components of a landscape.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable due to the development of new facilities and infrastructure, nighttime lighting, and lithium mining which could affect the visual quality and character of a landscape or scenic vista. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on aesthetic resources.

2. Agriculture and Forest Resources

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact to agricultural and forest resources from construction and operational activities associated with new or modified facilities or infrastructure. As discussed in the State SIP Strategy EA, the exact location of these

new facilities or the modification of existing facilities is uncertain. New facilities could be located on Prime Farmland, Unique Farmland, Farmland of Statewide Importance, Williamson Act conservation contracts, forest land or timberland. In addition, increased low-emission diesel feedstock production could alter the location and extent of fuel-based agricultural feedstock cultivation and production. Demand for low-emission diesel feedstocks could displace food-based production on agricultural land currently used for row crops, orchards, and grazing. This increased demand could potentially result in indirect land use changes where food-based agriculture could shift to other areas; thereby, increasing pressure for conversion of rangeland, grassland, forests, and other uses to agriculture.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable due to an increased need for alternative fuels and lithium-ion batteries which could require the construction and operation of new or expanded infrastructure in areas currently zoned for or supporting agriculture and forest resources. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on agriculture and forest resources.

3. Air Quality

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact to air quality from use of heavy-duty equipment and worker vehicle trips during construction of new or modified facilities or infrastructure. Criteria air pollutants and toxic air contaminants could be generated from a variety of activities and emission sources. These emissions would be temporary and occur intermittently depending on the intensity of construction on a given day.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to air pollutant emissions caused by

heavy-duty equipment, worker commute, and truck trips during construction. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on air quality.

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, would result in beneficial long-term operational impacts related to air quality. Statewide, implementation of the State SIP Strategy is anticipated to result in emission reductions of 206 tons per day of NOx, 67 tons per day ROG and 2 tons per day of PM2.5. Therefore, the State SIP Strategy, which includes the Proposed Regulation, would not have a cumulatively considerable impact on operational air quality. This indicates that cumulative operational impacts would not be significant. Thus, the Proposed Regulation **would not contribute to a cumulative impact** on air quality.

4. Biological Resources

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact to biological resources from construction and operational activities associated with new or modified facilities or infrastructure. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. These activities would have the potential to adversely affect biological resources (e.g., species, habitat) that may reside or be present in those areas. Because there are biological species that occur, or even thrive, in developed settings, resources could also be adversely affected by construction and operations within disturbed areas at existing manufacturing facilities or at other sites in areas with zoning that would permit the development of manufacturing or industrial uses. Additionally, increased demand for biofuel feedstock production could result in expansion of agricultural lands into undeveloped areas, or areas that otherwise support biological resources.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to ground disturbance activities, lithium mining, and the construction and operation of new facilities or infrastructure in

undeveloped areas. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on biological resources.

5. Cultural Resources

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact to cultural resources from construction and operational activities associated with new or modified facilities or infrastructure. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction activities could require disturbance of undeveloped area, such as clearing of vegetation, earth movement and grading, trenching for utility lines, erection of new buildings, and paving of parking lots, delivery areas, and roadways. Demolition of existing structures may also occur before the construction of new buildings and structures. The cultural resources that could potentially be affected by ground disturbance activities could include, but are not limited to, prehistoric and historical archaeological sites, paleontological resources, historic buildings, structures, or archaeological sites associated with agriculture and mining, and heritage landscapes. Properties important to Native American communities and other ethnic groups, including tangible properties possessing intangible traditional cultural values, also may exist. Historic buildings and structures may also be adversely affected by demolition-related activities.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to ground disturbance activities and the potential for new facilities to be sited within a historic district. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on cultural resources.

6. Energy Conservation

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, would result in less-than-significant construction impacts related to energy and beneficial long-term operational impacts. Temporary increases in energy demand associated with new facilities would include fuels used during construction, and gas and electric operational demands. Typical earth-moving equipment that may be necessary for construction includes: graders, scrapers, backhoes, jackhammers, front-end loaders, generators, water trucks, and dump trucks. While energy would be required to complete construction for any new or modified facilities or infrastructure projects, it would be temporary and limited in magnitude such that a reasonable amount of energy would be expended. In the long term, the State SIP Strategy would increase the amount of renewable energy supplies because vehicular fuels would increase the use of electricity (50 percent of which would be renewable by 2030) and decrease the use of petroleum through increased use of plug-in hybrid electric vehicles (PHEVs), zero-emissions vehicles (ZEVs), and low-emission diesel fuels. Therefore, the State SIP Strategy, which includes the Proposed Regulation, would not have a cumulatively considerable impact on energy. This indicates that cumulative impacts would not be significant. Thus, the Proposed Regulation **would not contribute to a cumulative impact** on energy.

7. Geology, Soils, and Mineral Resources

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact related to geology and soils from construction and operational activities associated with new or modified facilities or infrastructure. New facilities and infrastructure, and expansion of agricultural lands to support low-emission diesel fuel feedstock, could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil compaction, soil erosion, and loss of topsoil during construction. The exact location of these new facilities or the modification of existing facilities is uncertain. Construction and operation could be located in a variety of relatively high-risk geologic and soil conditions that are considered to be potentially hazardous. For instance, the seismic conditions at the site of a new facility may have high to extremely high seismic-related fault rupture and ground shaking potential associated with earthquake activity. New facilities could also be subject to seismic-related ground failure, including liquefaction and landslides. Construction and operational activities could be located in a variety of geologic, soil, and slope conditions with varying amounts of vegetation that would be susceptible to soil erosion. Strong ground shaking could also trigger landslides in areas where the natural slope is naturally unstable or is over-steepened by the construction of access roads and structures. Construction and operation could also occur in locations that would expose facilities and structures to expansive soil conditions. Development of new facilities could be susceptible to the presence of expansive soils particularly in

areas of fine-grained sediment accumulation typically associated with playas, valley bottoms, and local low-lying areas.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable due to potential for ground disturbance activities, such as pile driving and dredging to cause erosion and for new facilities and infrastructure to be located in areas with a variety of seismic conditions. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on geology and soils.

8. Greenhouse Gases

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could include construction and operation of new manufacturing facilities to support increased market penetration of PHEVs, ZEVs, hydrogen fuel cell electric vehicles, and electric-powered equipment. In addition, increased low-emission diesel demand stimulated by implementation of a low-emission diesel standard is anticipated to increase cultivation or imports of low-emission diesel fuels or feedstocks. Increased low-emission diesel demand may increase processing of low-emission diesel fuels, and shipment of finished low-emission diesel fuels and/or their feedstocks. Infrastructure to support collection, processing, and distribution of low-emission diesel fuels, including biomethane, and associated feedstocks may also increase. Overall, the State SIP Strategy would result in substantial long-term GHG reductions, although certain aspects of the State SIP Strategy would cause comparatively small short-term GHG emission increases. When these short-term construction-related GHG emissions associated with construction activities undertaken in response to the State SIP Strategy are considered in relation to the overall long-term operational GHG benefits, they are not considered substantial. Therefore, the State SIP Strategy, which includes the Proposed Regulation, would not have a cumulatively considerable impact on GHG emissions. This indicates that cumulative impacts would not be significant. Thus, the Proposed Regulation **would not contribute to a cumulative impact** on GHG emissions.

9. Hazards and Hazardous Materials

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could

result in a significant cumulative impact regarding hazards and hazardous materials from construction associated with new or modified facilities or infrastructure. Construction activities may require the transport, use, and disposal of hazardous materials. Construction activities generally use heavy-duty equipment requiring periodic refueling and lubricating. Large pieces of construction equipment (e.g., backhoes, graders) are typically fueled and maintained at the construction site. There would be a potential risk of accidental release during fuel transfer activities. Although precautions would be taken to ensure that any spilled fuel is properly contained and disposed, and such spills are typically minor and localized to the immediate area of the fueling (or maintenance), the potential still remains for a substantial release of hazardous materials into the environment.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact during construction.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable due to potential for accidental release of hazardous materials into the environment during activities such as fuel transfer. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** regarding hazards and hazardous materials during construction.

The State SIP Strategy EA concludes that operational impacts would be less than significant, due to the Society of Automotive Engineer's performance-based requirements and standards for lithium batteries and hydrogen fueling stations. However, the risk of accidental release of hazardous materials still exists during the movement of raw goods to manufacturing facilities or the export of finished goods containing hazardous materials following the manufacturing process. Thus, this analysis takes the conservative approach that a significant cumulative impact regarding operational hazards and hazardous materials exists.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to potential for accidental release of hazardous materials into the environment during the movement of raw goods during the operational phase. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a**

significant cumulative impact regarding hazards and hazardous materials during operation.

10. Hydrology and Water Quality

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact regarding hydrology and water quality from construction and operational activities associated with new or modified facilities or infrastructure. Specific construction projects would be required to comply with applicable erosion, water quality standards, and waste discharge requirements. Depending on the location of construction activities, there could be adverse effects on drainage patterns and exposure of people or structures to areas susceptible to flood, seiche, tsunami, or mudflow. In addition, increased demand for low-emission diesel feedstocks, such as oilseed crops or tallow, could result in adverse effects on water quality from farming practices result from polluted runoff that contains sediment, nutrients, pathogens, pesticides, metals, and salts.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to a possibility for pile driving and dredging to occur, the potential location of new facilities and infrastructure in locations subject to mudflow or flooding, the potential for erosion and sedimentation during construction, lithium mining, and the potential for accidental release during fueling activities. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on hydrology and water quality.

11. Land Use and Planning

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, would result in the construction and operation of new or modified facilities or infrastructure (i.e., natural gas and hydrogen refueling stations, lithium battery manufacturing facilities, lithium mines, battery recycling and disposal centers, vehicle emission testing centers, near-zero and zero-emission technology manufacturing facilities, infrastructure associated with low-emission diesel production). Planning efforts associated with the implementation of compliance responses associated with the State SIP Strategy would

be made in coordination with local, State, or federal jurisdictions. Thus, reasonably foreseeable compliance responses would not be anticipated to divide an established community or conflict with a land use or conservation plan. Therefore, the State SIP Strategy, which includes the Proposed Regulation, would not have a cumulatively considerable impact on land use and planning. This indicates that cumulative impacts would not be significant. Thus, the Proposed Regulation **would not contribute to a cumulative impact** on land use and planning.

12. Mineral Resources

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, would result in the construction and operation of new or modified facilities or infrastructure. Reasonably foreseeable compliance responses would likely occur within existing footprints or in areas with consistent zoning where original permitting and analyses considered the availability of mineral resources within specific project sites. In addition, increased manufacturing and use of PHEVs, ZEVs, and other electric-powered equipment would require increased battery production and increased lithium mining. In the case that new lithium mines are required, they would go through independent environmental review at the appropriate federal, state, or local level, and it is assumed that any new mines would be located in areas with appropriate zoning, and subject to Federal, State, and/or local requirements. Worldwide demand of global lithium is estimated to be below 20 million metric tons for the period of 2010 through 2100, which is well-below the estimated worldwide reserves and resources currently known to exist worldwide. In addition, lithium battery recycling potential could supplement future increased demands. Appendix G of the CEQA Guidelines considers an impact on mineral resources to be the result in the loss of availability of a known mineral resource that would be of value to a local entity, a region, or the state. This type of impact could result from actions such as building a structure over an area that contains mineral resources, thereby prohibiting access to mining activities. While implementation of the State SIP Strategy could result in an increased demand in lithium, it would not substantially affect the availability of a mineral resource. Thus, the State SIP Strategy, which includes the Proposed Regulation, concludes that impacts to mineral resources would be less than significant.

However, this analysis takes the conservative approach that increased demand for lithium could lead to increased development where mining for lithium is feasible, which could conceivably affect the availability of these mineral resources if access to resources becomes impeded. Additionally, increased lithium mining itself would contribute to the loss of availability of lithium as it is mined and consumed. This would be a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to increased demand for lithium and the potential for increased development where mining for lithium is feasible. Implementation of the project-level mitigation identified in Chapter 4 could effectively

reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on mineral resources.

13. Noise

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative noise impact from construction and operational activities associated with new or modified facilities or infrastructure. Implementation of reasonably foreseeable compliance responses could result in the generation of short-term construction noise from use of heavy-duty equipment and vehicle trips. New long-term operational sources of noise could be associated with low-emission diesel feedstock processing facilities, manufacturing plants, and mining activities. Depending on the proximity to existing noise-sensitive receptors, construction and operational noise levels could exceed applicable noise standards and result in a substantial increase in ambient noise levels.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to use of heavy-duty equipment that could generate substantial levels of noise and vibration, and the operation of new or modified facilities or infrastructure. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on noise.

14. Population and Housing

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, would result in the construction and operation of new or modified facilities or infrastructure (i.e., natural gas and hydrogen refueling stations, lithium battery manufacturing facilities, lithium mines, battery recycling and disposal centers, vehicle emission testing centers, near-zero and zero-emission technology manufacturing facilities, infrastructure associated with low-emission diesel production). There is uncertainty as to the specific location of new facilities or the modification of existing facilities. Construction and

operation of these facilities could result in increased job opportunities in the communities surrounding a project site. However, it would be expected that locations of these facilities would be selected such that an appropriate employment base existed to support construction and operation or where local jurisdictions have planned for increased population and employment growth. Therefore, the State SIP Strategy, which includes the Proposed Regulation, would not have a cumulatively considerable impact on population and housing. This indicates that cumulative impacts would not be significant. Thus, the Proposed Regulation **would not contribute to a cumulative impact** on population and housing.

15. Public Services

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, would result in the construction and operation of new or modified facilities or infrastructure (i.e., natural gas and hydrogen refueling stations, lithium battery manufacturing facilities, lithium mines, battery recycling and disposal centers, vehicle emission testing centers, near-zero and zero-emission technology manufacturing facilities, infrastructure associated with low-emission diesel production). There is uncertainty as to the specific location of new facilities or the modification of existing facilities. Construction and operation of the reasonably foreseeable compliance responses would not require a substantial amount of new additional housing to accommodate new populations or generate changes in land use and, therefore, would not be expected to increase population levels such that the provisions of public services would be substantially affected. Therefore, the State SIP Strategy, which includes the Proposed Regulation, would not have a cumulatively considerable impact on public services. This indicates that cumulative impacts would not be significant. Thus, the Proposed Regulation **would not contribute to a cumulative impact** on public services.

16. Recreation

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, would result in the construction and operation of new or modified facilities or infrastructure (i.e., natural gas and hydrogen refueling stations, lithium battery manufacturing facilities, lithium mines, battery recycling and disposal centers, vehicle emission testing centers, near-zero and zero-emission technology manufacturing facilities, infrastructure associated with low-emission diesel production). There is uncertainty as to the specific location of new facilities or the modification of existing facilities. While implementation of State SIP Strategy would produce long-term employment, it would be anticipated that a sufficient employment base would be available. The minimal increase in employment opportunity would not create an increased demand on recreational facilities within communities containing new plants and facilities. Therefore, the State SIP Strategy, which includes the Proposed Regulation, would not have a cumulatively considerable impact on recreation. This indicates that cumulative impacts would not be significant.

Thus, the Proposed Regulation **would not contribute to a cumulative impact** on recreation.

17. Transportation and Traffic

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative traffic impact from construction and operational activities associated with new or modified facilities or infrastructure. Although detailed information about potential specific construction activities is not currently available, it would be anticipated to result in short-term construction traffic (primarily motorized) from worker commute- and material delivery-related trips. Implementation of the State SIP Strategy could result in increased demand for Low-Emission Diesel fuels such as renewable diesel or biomethane, and increased demand for feedstocks and inputs used to produce Low-Emission Diesel. While the total volume of fuel demanded in California is not anticipated to be affected by the proposed Low-Emission Diesel measure, it is anticipated to change the types of fuels consumed, which could result in substantial long-term effects on local routes' traffic patterns due to differences in where feedstocks are sourced, and how the finished fuels are transported. In addition, transportation patterns may change in relation to the location and operational shipping needs of new facilities. Depending on the amount of trips generated and the location of new facilities, implementation could conflict with applicable programs, plans, ordinances, or policies (e.g., performance standards, congestion management); and/or result in hazardous design features and emergency access issues from road closures, detours, and obstruction of emergency vehicle movement, especially due to project-generated heavy-duty truck trips.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to short-term construction traffic, temporary road closures or detours, and long-term changes to local roadways (i.e., increased VMT on local roadways, additional egress/ingress points). Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on transportation and traffic.

18. Utilities and Service System

The State SIP Strategy EA found that implementation of the recommended measures within the various source categories, which includes the Proposed Regulation, could result in a significant cumulative impact to utilities and service systems from construction and operational activities associated with new or modified facilities or infrastructure (i.e., natural gas and hydrogen refueling stations, lithium battery manufacturing facilities, lithium mines, battery recycling and disposal centers, vehicle emission testing centers, near-zero and zero-emission technology manufacturing facilities, infrastructure associated with low-emission diesel production). Projects associated with the State SIP Strategy could result in new demand for water, wastewater, electricity, and gas services for new manufacturing facilities. Changes in land use, associated with biofuel feedstock production are likely to change water demand to support new crop types, depending on the size, location, and existing uses. This could result in an increase or decrease in water demand and would be subject to availability and regulatory requirements. The specific location and type of construction needs is not known and would be dependent upon a variety of market factors that are not within the control of CARB including: economic costs, product demands, environmental constraints, and other market constraints. Thus, the specific impacts from construction on utility and service systems cannot be identified with any certainty, and individual compliance responses could potentially result in significant environmental impacts.

Implementation of mitigation measures would not reduce these impacts to a less-than-significant level because the authority to determine project-level impacts and require project-level mitigation lies with land use and/or permitting agencies for individual projects. Thus, implementation of the State SIP Strategy EA, which includes the Proposed Regulation, could result in a significant cumulative impact.

The Proposed Regulation's contribution to this significant impact would be cumulatively considerable, as concluded in Chapter 4, due to new facilities associated with the production and distribution of alternative fuels and an increased need for lithium battery recycling and disposal. Implementation of the project-level mitigation identified in Chapter 4 could effectively reduce the incremental contribution from the Proposed Project to a less-than-considerable level, but authority to require that mitigation will rest with other agencies that will be authorizing site-specific projects, and not with CARB. Thus, the Proposed Regulation could result in a **cumulatively considerable contribution to a significant cumulative impact** on utilities and service systems.

D. Growth-Inducing Impacts

A project would be considered growth-inducing if it removes an obstacle to growth, includes construction of new housing, or establishes major new employment opportunities. The reasonably foreseeable compliance responses associated with the Proposed Regulation would not directly result in any growth in population or housing, as the Proposed Regulation is meant to spur emissions-reducing changes in the existing

fleet of vessels and at existing ports, which would not require substantial relocation of employees.

6.0 MANDATORY FINDINGS OF SIGNIFICANCE

Consistent with the requirements of the California Environmental Quality Act (CEQA) Guidelines Section 15065 and Section 18 of the Environmental Checklist, this Draft Environmental Analysis (~~Draft~~ Final EA) addresses the mandatory findings of significance for the Proposed Regulation.

1) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat for a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

A finding of significance is required if a project "has the potential to substantially degrade the quality of the environment (14 California Code of Regulations [CCR] Section 15065(a))." In practice, this is the same standard as a significant effect on the environment, which is defined as "a substantial or potentially substantial adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance (14 CCR Section 15382.)." As with all of the environmental effects and issue areas, the precise nature and magnitude of impacts would depend on the types of projects authorized, their locations, their aerial extent, and a variety of site-specific factors that are not known at this time but that would be addressed by environmental reviews at the project-specific level. For projects within California, all of these issues would be addressed through project-specific environmental reviews that would be conducted by local land use agencies or other regulatory bodies at such time the projects are proposed for implementation. Outside of California, other state and local agencies would consider the proposed projects in accordance with their laws and regulations. The California Air Resources Board (CARB or Board) would not be the agency responsible for conducting the project-specific environmental or approval reviews because it is not the agency with authority for making land use or project implementation decisions.

This ~~Draft~~ Final EA addresses and discloses potential environmental effects associated with implementation of the Proposed Regulation, including direct, indirect, and cumulative impacts. As described in Chapter 4, this ~~Draft~~ Final EA discloses potential environmental impacts, the level of significance prior to mitigation, mitigation measures, and the level of significance after the incorporation of mitigation measures.

2) Does the project have impacts that are individually limited, but cumulatively considerable?

A lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has potential environmental effects that are individually limited, but cumulatively considerable (14 CCR Section 15065).

Cumulatively considerable means "that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (14 CCR Section 15065(a)(3))." Cumulative impacts are discussed in Chapter 5 in the ~~Draft~~ Final EA.

3) Does the project have environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly?

A lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to cause substantial adverse effects on human beings, either directly or indirectly (14 CCR Section 15065(a)(4)). Under this standard, a change to the physical environment that might otherwise be minor must be treated as significant if people would be significantly affected. This factor relates to adverse changes to the environment of human beings generally, and not to effects on particular individuals. While changes to the environment that could indirectly affect human beings would be represented by all of the designated CEQA issue areas, those that could directly affect human beings include air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, population and housing, public services, transportation/traffic, and utilities, which are all addressed in Chapter 4, "Impact Analysis" of this ~~Draft~~ Final EA.

7.0 ALTERNATIVES ANALYSIS

This chapter of the ~~Draft~~ Final EA provides an overview of the regulatory requirements and guidance for alternatives analyses under the CEQA; a description of each of the alternatives to the Proposed Regulation; a discussion of whether and how each alternative meets the objectives of the Proposed Regulation, and an analysis of each alternative's environmental impacts.

A. Approach to Alternatives Analysis

The California Air Resources Board's (CARB or Board) certified regulatory program (17 California Code of Regulations [CCR] Sections 60000 – 60008) requires that, where a contemplated action may have a significant effect on the environment, a staff report shall be prepared in a manner consistent with the environmental protection purposes of CARB's regulatory program and with the goals and policies of CEQA. Among other things, the staff reports must address feasible alternatives to the proposed action that would substantially reduce any significant adverse impact identified.

The certified regulatory program provides general guidance that any action or proposal for which significant adverse environmental impacts have been identified during the review process shall not be approved or adopted as proposed if there are feasible mitigation measures or feasible alternatives available which would substantially reduce such an adverse impact. For purposes of this section, "feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors, and consistent with the state Board's legislatively mandated responsibilities and duties (14 CCR Section 15364).

While CARB, by virtue of its certified program, is exempt from Chapters 3 and 4 of CEQA and corresponding sections of the State CEQA Guidelines, the Guidelines nevertheless contain useful information for preparation of a thorough and meaningful alternatives analysis. CEQA Guidelines section 15126.6(a) speaks to evaluation of "a range of reasonable alternatives to the project, or the location of the project, which would feasibly attain most of the basic project objectives but would avoid or substantially lessen any of the significant effects, and evaluate the comparative merits of the alternatives." The purpose of the alternatives analysis is to determine whether different approaches to, or variations of, the project would reduce or eliminate significant project impacts, within the basic framework of the objectives, a principle that is consistent with CARB's regulatory requirements.

Alternatives considered in an environmental document should be potentially feasible and should attain most of the basic project objectives. It is, therefore, critical that the alternatives analysis define the project's objectives. The project objectives are listed below in Section C of this Chapter.

The range of alternatives is governed by the "rule of reason," which requires evaluation of only those alternatives "necessary to permit a reasoned choice" (14 CCR Section 15126.6(f)). Further, an agency "need not consider an alternative whose effect cannot be reasonably ascertained and whose implementation is remote and speculative" (14 CCR Section 15126.6(f)(3)). The analysis should focus on alternatives that are feasible and that take economic, environmental, social, and technological factors into account. Alternatives that are remote or speculative need not be discussed. Furthermore, the alternatives analyzed for a project should focus on reducing or avoiding significant environmental impacts associated with the project as proposed.

B. Selection of Range of Alternatives

This chapter evaluates a range of alternatives to the Proposed Regulation that could reduce or eliminate significant effects on the environment, while still meeting basic project objectives (14 CCR Section 15126.6(a)). Pursuant to CARB's certified regulatory program, this chapter also contains an analysis of each alternative's feasibility and the likelihood that it would substantially reduce any significant adverse environmental impacts identified in the impact analysis contained in Chapter 4 of this ~~Draft~~ Final EA (17 CCR section 60004.2(a)(5)).

As described earlier, the purpose of the Proposed Regulation is to reduce NOx, ROG, PM2.5, DPM, GHG and black carbon emissions from the operation of auxiliary engines and selected types of tanker boilers on ocean-going vessels while docked at berth at a California port.

Many California ports are situated in and around at-risk communities. The Proposed Regulation reduce emissions in at-risk communities by requiring reductions on vessels through use of shore power or a CARB approved alternative method. Vessel operators, terminals, ports, and technology providers all have responsibilities to ensure proper emission reductions are achieved. In addition, the Proposed Regulation will address certain operational fixes where CARB staff has determined widespread compliance with the Existing Regulation, as written, could be challenging.

CARB has identified six alternatives that allow the public and Board to contemplate the differences between different approaches. CARB has made a good faith effort to identify potentially feasible project alternatives. This included examining comments received by industry and from the public during the Scoping Meetings held in September 2018. The final version of this document will contain comments received at the Board Hearing, scheduled for December 5, 2019, to determine if any commenters suggested other potentially feasible alternatives.

For the purposes of this analysis, six alternatives are considered:

1. No-Project Alternative;

2. Implementation Fixes Through an Amendment of the Existing Regulation Only;

3. Require Barge-based Capture and Control Only Compliance Pathway for Tanker, Ro-Ro, Newly Regulated Reefer, and Container Vessels and Shore Power Only Compliance Pathway for Cruise Vessels (Apply the Same Thresholds as the Proposed Regulation* and Maintain Existing Shore Power Infrastructure);

4. Shore Power Only Compliance Pathway For All Vessel Types (Apply the Same Thresholds as the Proposed Regulation*);

5. Proposed At Berth Regulation Without the Inclusion of Ro-Ro Vessels (Apply the Same Thresholds as the Proposed Regulation*); and

6. Proposed At Berth Regulation Without the Inclusion Tanker Vessels (Apply the Same Thresholds as the Proposed Regulation*).

* The Proposed Regulation threshold is 20 or more visits from container, reefer, cruise, ro-ro, or tankers for additional information please refer to the ISOR Chapter III).

Descriptions of these alternatives, their ability to meet the project objectives, and a brief consideration of their environmental impacts, compared to the Proposed Regulation, are described below.

C. Objectives

The primary objectives of the Proposed Regulation include the following:

1. Achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution;

2. Reduce at berth emissions at additional ports and terminals beyond those covered under the Existing Regulation;

3. Expand the existing emissions reductions requirements to include the additional categories of ro-ro vessels, and tankers;

4. Achieve reductions from small fleets, in addition to large fleets;

5. Reduce emissions from auxiliary engines that operate on liquefied natural gas (LNG) engines or other alternative fuels;

6. Allow ports and marine terminals the flexibility to select CARB approved technologies that are the most cost effective and feasible for their specific site and operations;

7. Reduce emissions from tankers operating boiler steam powered pumps (for off-loading crude) by requiring them to control their boiler emissions;

8. Implement a regulatory structure that is based on individual vessel visits;

9. Ensure all emission control technologies do not present any safety issues that cannot be addressed with a safety exemption provision;

10. Ensure that all parties necessary to achieving emissions reductions from individual vessel visits (including ports and terminals) undertake necessary actions to successfully reduce emissions from vessel visits; and

11. Assist in achieving CARB's proposed strategy to attain health-based federal air quality standards over the next fifteen years as part of nonattainment area ~~Strategy~~ State Implementation Plans.

D. Description of Alternatives

Detailed descriptions of each alternative are presented below. The analysis that follows the descriptions of the alternatives includes a discussion of the degree to which each alternative meets the basic project objectives, the degree to which each alternative avoids potentially significant impacts identified in Chapter 4, and any environmental impacts that may result from the alternative.

1. Alternative 1: No-Project Alternative

a) Alternative 1 Description

Alternative 1, the "No-Project Alternative," is included by CARB to provide a good faith effort to disclose environmental information that is important for considering the Proposed Regulation.

The No-Project Alternative has also been included by CARB to assist in the analysis and consideration of the Proposed Regulation. As noted in CEQA, "the purpose of describing and analyzing a no-project alternative is to allow decision-makers to compare the impacts of approving the proposed project with the impacts of not approving the proposed project" (14 CCR Section 15126.6(e)(1)). The No-Project Alternative provides an important point of comparison to understand the potential environmental benefits and impacts of other alternatives.

Under Alternative 1, vessels, ports and terminals subject to the Existing Regulation would maintain their operations, business as usual, without addressing specific implementation fixes for the vessel fleets. No additional set of actions would be required to reduce emissions from vessels while at berth at a California Port. There would be no requirements for additional vessel categories to reduce emissions or requirements for ports and terminals to install or have emission control equipment available for vessels visiting their facilities.

b) Alternative 1 Impact Discussion

i. Objectives

Under the No-Project Alternative, no additional vessels, ports, or terminals would be covered under the regulation. Alternative 1 would not expand the Existing Regulation to achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution (objective 1 and 11). It would not reduce emissions from additional vessels (e.g. small vessel fleets, ro-ro, or tankers) or additional ports and terminals, nor would it reduce emissions from the boilers of tanker vessels using steam-driven pumps to off-load cargo (objectives 2, 3, 4, and 8). Emissions from auxiliary engines running on LNG and other alternative fuels would not be captured (objective 5). Overall, the No-Project Alternative would not meet most of the basic project objectives.

ii. Environmental Impacts

There would be no new environmental impacts under the No Project Alternative compared to baseline because compliance responses would be the same as under the existing regulatory environment. Thus, implementation of the No-Project Alternative would avoid all of the additional environmental impacts described in Chapter 4 of this ~~Draft~~ Final EA, which are primarily associated with construction and operation of new or modified facilities or infrastructure or additional barge-based systems. Given the assumption that compliance responses associated with the Proposed Regulation would not occur under the No-Project Alternative, the environmental impacts relevant to implementation of the Proposed Regulation would also not occur.

Without implementation of the Proposed Regulation, the beneficial environmental impacts of reduced long-term air pollution in pollution-burdened communities would not be realized obstructing California from achieving its TAC, criteria and GHG emission reductions goals. The State's ability to further combat the adverse health effects and environmental impacts related to air quality and climate change would be limited to benefits achieved from other programs. Therefore, as described above, this alternative would fail to meet most of the basic project objectives.

2. Alternative 2: Implementation Fixes Through an Amendment of the Existing Regulation Only

a) Alternative 2 Description

Alternative 2 was proposed by industry stakeholders. This Alternative would remove many of the substantive expansions in the Proposed Regulation, including those pertaining to ro-ro and tanker vessels, additional ports, terminals and additional vessel visits not covered under the Existing Regulation. The implementation fixes of the Existing Regulation would remain in the proposal. These fixes include:

- Redefine vessel "visit," from the "time period that begins when a vessel initially ties to a berth (the beginning of the visit) and ends when it casts off

the lines (the end of the visit) at a berth in a California port" to "means the time period when the vessel is "Ready to Work". The visit begins once the vessel is tied to the berth with gangway down and netting secured and has been cleared by U.S. Customs and Border Protection. The visit ends when "Pilot on Board".

- Eliminate the three-hour rule, which requires vessels to only use auxiliary engines a maximum of three hours during a "visit." By changing the definition of a vessel "visit" this addresses any time constraints not within a vessel operator's control.
- Prescribe responsibilities to terminals, ports, and vessel operator's so burden is clearly appointed to a responsible party to help execute appropriate enforcement actions.
- Allow for vessel commissioning exemptions. Under the Existing Regulation commissioning visits, which are required for shore power are not excluded from the vessel in-use operational requirements.
- Change compliance from quarterly to annually to allow fleets more flexibility if one vessel visit unexpectedly cannot achieve emissions reductions.
- Allow all vessels to use approved alternative emissions control technology.
- Revise and update default power requirements.

In 2013, 2015, and 2017 advisories were issued to inform affected vessel fleets and terminal operators as to how CARB would proceed with enforcement of the Existing Regulation. Under these advisories, fleets could apply on a case-by-case basis for scenario relief, with the objective of providing flexibility to fleets that have equipped their vessels to use shore power or contracted to use an alternative control technology. All implementation fixes associated with Alternative 2 would help address the challenges and a fleet's ability to comply with the Existing Regulation that is currently accomplished with the advisory scenarios. No additional physical modifications would be anticipated for vessels, ports, or terminals under this Alternative.

b) Alternative 2 Impact Discussion

i. Objectives

Alternative 2 could be expected to generate better compliance rates with the Existing Regulation, by allowing for some exceptions to the emission reduction requirements that are considered as noncompliant under the Existing Regulation. However, Alternative 2 would likely not result in any additional emissions benefits.

Alternative 2 would not expand the Existing Regulation to achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution (objective 1). By only implementing regulatory fixes, this alternative would not expand on the Existing Regulation and would not achieve emissions reductions from other vessel types (ro-ro and tanker), small vessel fleets, nor would it cover tanker boilers used for off-loading (e.g. crude tankers) (objectives 2, 3, 4, and 7).

The Existing Regulation exempts auxiliary engines operating on LNG or compressed natural gas. This Alternative 2 would continue to allow these fuels to be exempt (objective 5). Available research indicates that LNG could significantly reduce SOx, NOx, CO2, and PM emissions, although methane slip (when methane is introduced into the atmosphere when it fails to burn completely or is leaked while bunkering) and an increase in GHG emissions can vary depending on the engine type (see ISOR Chapter I). However, there is minimal emissions data available for marine engines running on LNG.

By only addressing implementation fixes, this alternative fails to achieve the objective of ensuring ports and terminals take the necessary actions to achieve emissions reductions and allowing ports and terminals the flexibility to select with CARB approved technologies that are the most cost effective for their specific operations (objectives 6 and 8, 10 and 11). Alternative 2 would fail to meet most of the basic project objectives.

ii. Environmental Impacts

Alternative 2 would result in no impacts from the installation of additional shore power or land-based capture and control infrastructure at the port or from additional modifications to vessels or the construction and operation of barge-based capture and control systems. Therefore, implementation of Alternative 2 would avoid all the additional environmental impacts described in Chapter 4 of this ~~Draft~~ Final EA that are associated with construction and operation of new or modified facilities related to the implementation of Proposed Regulation. Given the assumption that compliance responses associated with the Proposed Regulation would not occur, the environmental impacts relevant to implementation of the Proposed Regulation would also not occur.

Although this Alternative reduces many of the potentially significant environmental impacts from infrastructure construction and equipment operations of the Proposed

Regulation, the beneficial impact of reduced long-term air pollution in pollution-burdened communities would not be realized. In addition, the State's ability to further combat the adverse health effects and environmental impacts related to air quality and climate change would be limited to benefits achieved from other programs. Therefore, as described above, this alternative would fail to meet most of the basic project objectives.

3. Alternative 3: Require Barge-based Capture and Control Only Compliance Pathway for Tanker, Ro-Ro, Newly Regulated Reefer, and Container Vessels and Shore Power Only Compliance Pathway for Cruise Vessels (Apply the Same Thresholds as the Proposed Regulation and Maintain Existing Shore Power Infrastructure)

a) Alternative 3 Description

CARB included Alternative 3, "Require Barge-based Capture and Control Only Compliance Pathway for Tanker, Ro-Ro, Newly Regulated Reefer, and Container Vessels and Shore Power Only Compliance Pathway for Cruise Vessels," to reduce or eliminate the environmental impacts associated with the construction of new shore power or land-based capture and control systems.

b) Alternative 3 Impact Discussion

i. Objectives

Alternative 3 would result in substantial reductions of NOx, ROG, PM2.5, and DPM emissions from vessels at berth similar to the Proposed Regulation. Alternative 3 would expand the Existing Regulation to achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution (objective 1). Alternative 3 would broaden the Existing Regulation to include ro-ro and tanker vessels (including boilers on tankers that use steam driven pumps for off-loading), small fleets, auxiliary engines operating on LNG or alternative fuels and include additional ports and marine terminals (objectives 2, 3, 4, and 5). However, this Alternative would not reduce GHG and black carbon emissions further than the Existing Regulation, nor would it allow for the flexibility or ports or marine terminals to select a CARB approved technology that is most cost effective and feasible for their specific site operations (objective 6).

Some ports and terminals in California are accessed through shipping channels, or canals, originating from larger bodies of water, such as at the Port of Stockton. As part of the Title 33 - Navigation and Navigable Waters, Inland Waterways Navigation Regulations, (33 CFR § 162.205)[93] these channels may have size, speed and other navigational restrictions, including width restrictions, meaning, there are requirements

[93] Code of Federal Regulations, "33 CFR 162 Inland Waterways and Navigation Regulations" Volumes 1-3, January 1, 2009 (accessed July 12, 2019), https://www.govinfo.gov/app/details/CFR-2009-title33-vol2/CFR-2009-title33-vol2-part162/context

for how wide a vessel's footprint can be within a channel. While barge-based capture and control systems have been proven to be safe and effective alternatives to shore power in some ports in California (i.e. POLA, POLB), for ports and terminals with channels and width restrictions, this Alternative could potentially create congestion in waterways where barge-based capture and control systems are operated or stored. This could not only be a burden to other vessels trying to navigate around the channel, but could be a safety concern when access to the waterway is blocked. Therefore, due to potential geographical constraints in some ports or terminals this Alternative would not ensure all emission control technologies do not present any safety issues (objective 9).

By removing shore power as a compliance option, the following positive benefits may not occur. Shore power capable vessels and shore power equipped terminals may positively benefit from the growing interest in the use of shore power in other ports in the U.S. (Tacoma, Seattle, Juneau), and globally such as in Asia, South Pacific, and Europe. The utilization of shore power beyond California may not only help the cost impact for a given ocean carrier, because they could shore power in multiple ports saving fuel, but could also contribute to added health benefits for port communities in California and outside California, including foreign ports. This is mainly due to shore powers ability to reduce auxiliary engine emissions by 100 percent while a vessel is plugged in.

Barge-based systems are approved for at least an 80 percent emissions capture rate for PM2.5, and NOx while in use.[94] These systems control less emission than shore power mainly because, 1) while in use, a vessel's auxiliary engines and the barge-based systems generators are operating, and 2) shore power has the ability to reduce emissions by 100 percent while a vessel is plugged in and is why shore power has been considered the "gold standard" for at berth emissions reductions. The more vessels using this compliance strategy the more emissions reductions and associate benefits are realized in California. The barge-based emission systems would not achieve the air emissions benefits to the extent of the Proposed Regulation. For vessels already utilizing shore power it is assumed less reductions would be achieved from a switch from shore power to barge-based capture and control.

This Alternative would require all cruise vessels to comply using shore power and all port, terminals and vessels currently using shore power to comply with the Existing Regulation would continue to do so. For this Alternative the assumption of shore power as the only anticipated compliance pathway for cruise vessels is primarily due to passenger safety and because barge-based control systems are industrial in nature and is not visibly appealing to a paying passenger.

[94] CARB At-Berth Regulation Executive Orders, 2015 (accessed July 08, 2019), Clean Air Engineering-Maritime, Inc. Marine Exhaust Treatment System-1, EO AB-15-01, and Advanced Cleanup Technologies, Inc. Advanced Marine Emissions Control System EO AB-15-02, https://ww3.arb.ca.gov/ports/shorepower/eo/eo.htm

ii. Environmental Impacts

Alternative 3 would result in no impacts from installation of additional infrastructure needed for shore power systems or vessel shore power retrofits. This Alternative would therefore reduce the construction and earth-moving activities that would result from the Proposed Regulation. This means this alternative would avoid many of the compliance responses involving installation of new shore power vaults and associated electrical and physical infrastructure, and it would also avoid compliance responses involving installation of new shore-side emissions capture and control infrastructure. This would avoid many, but not all, of the construction-related activities that would result from the Proposed Regulation, including many of the activities involving grading, trenching, pile-driving, and materials transport associated with installing shore power vaults and shore-side emissions capture and control equipment. The short-term construction and long-term operational related impacts for agricultural and forest resources, biological resources, cultural resources, energy demand, geology and soils, noise and vibration and transportation and traffic associated with the Proposed Regulation would therefore be reduced. Impacts associated with the remaining resources topics (i.e., topics other than biological resources, cultural resources, geology and soils, and transportation and traffic) would be similar to those discussed for the Proposed Regulation.

Because this alternative would avoid the most construction-related activity among all the alternatives, this alternative is considered to be the environmentally superior alternative, in terms of avoiding impacts from the Proposed Regulation.

E. Alternatives Considered but Rejected

Additional alternatives were considered during development of the alternatives to the Proposed Regulation. The CEQA Guidelines Section 15126.6(c) includes three factors that may be used to eliminate alternatives from detailed consideration in an EIR: "i. failure to meet most of the basic project objectives; ii. Infeasibility, or iii. Inability to avoid significant environmental impact."

1. Alternative 4: Shore Power Only Compliance Pathway For All Vessel Types (Apply the Same Thresholds as the Proposed Regulation)

a) Alternative 4 Description

Alternative 4, "Shore Power Only Compliance Pathway For All Vessel Types" would include container, reefer, and cruise vessels and the addition of ro-ro and tanker vessels. It would also add newly regulated ports and terminals in California the same as the Proposed Regulation, but has only one pathway for compliance; shore power.

b) Alternative 4 Impact Discussion

i. Objectives

Similar to the Proposed Regulation, Alternative 4 would expand the Existing Regulation to achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions

above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution (objective 1).

Alternative 4 would reduce emissions from ro-ro vessels, vessels in small fleets, and tankers at additional ports and marine terminals throughout California (objectives 2, 3 and 4). LNG vessels and vessels operating on other alternative fuels would be included in emissions reduction requirements (objective 5). However, by only allowing shore power as a pathway for compliance, Alternative 4 removes the flexibility for ports or marine terminals to select technologies that are the most cost effective and feasible for their specific site and the ability to capture emissions from any boilers (objectives 6 and 7).

Barge- and land-based systems control fewer emissions than shore power mainly because, 1) while in use, a vessel's auxiliary engines and the barge-based systems generators are operating, and 2) shore power has the ability to reduce emissions by 100 percent while a vessel is plugged in.

ii. Environmental Impacts

Alternative 4 would result in new or modified infrastructure at terminals throughout California as well as modifications to any vessels that call to California ports not currently capable of using shore power. The increased infrastructure and vessel modifications would result in construction and operational environmental impacts, similar in type to those described in Chapters 2 and 4 of this ~~Draft~~ Final EA. A greater amount of shore power vaults and associated infrastructure (at 52 berths) would be needed, requiring construction activities at terminals across the state that include grading, pile driving, trenching, construction of physical improvements (including pads, vaults, electrical distribution and substation infrastructure), and transportation of building materials to the build sites. This Alternative would also increase statewide electrical demand, though likely not by a significant amount, given the relatively low shore power related load compared with statewide electrical generation (see Chapter 4 for more information on electrical load). Implementation of Alternative 4 would not significantly reduce or avoid the environmental impacts described in Chapter 4 of this ~~Draft~~ Final EA that are associated with construction and operation of new or modified facilities related to the implementation of Proposed Regulation.

The figures D-5 though D-9[95] below show the emissions benefits from Alternative 4 compared to the Proposed Regulation and the Existing Regulation. Alternative 4 would be expected to result in greater DPM, ROG, and GHG reductions compared to the Proposed Regulation and the Existing Regulation. This Alternative would have similar NOx emission reductions as the Proposed Regulation, but would have fewer PM2.5 emission reductions due to the inability to capture boiler emissions from tankers (currently only capture and control systems are able to do this) because auxiliary

[95] CARB, Emissions Inventory, CEPAM: 2016 SIP - Standard Emission Tool, Accessed August 21, 2019, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php.

boilers cannot operate on shore power. Boilers are a large emission source, particularly in crude oil tankers that use large boilers to off-load their product. Alternative 4 supports CARB's NOx, DPM, ROG, and GHG emission reduction objectives.

Figure D-5: Alternative 4 - NOx Emissions Estimates

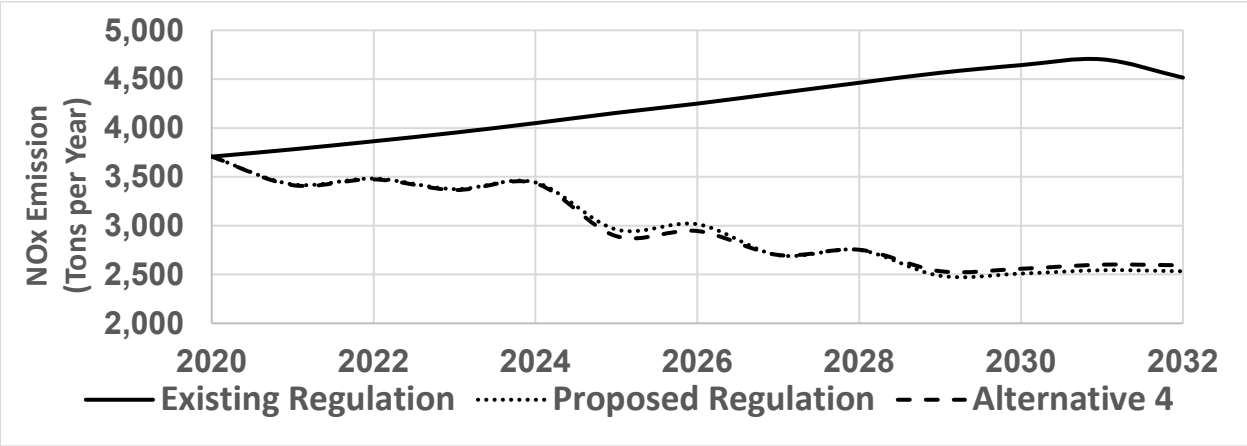


Figure D-6: Alternative 4 - DPM Emissions Estimates

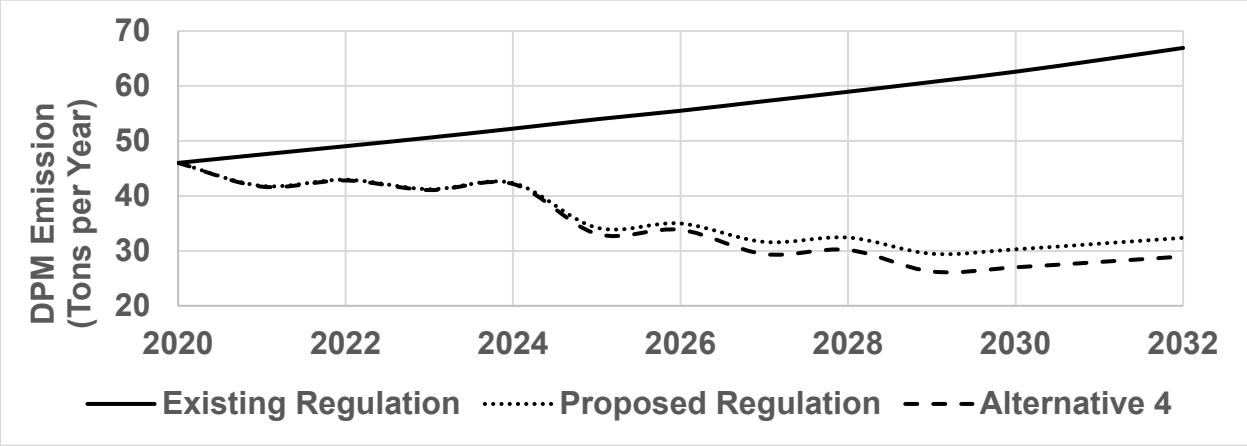


Figure D-7: Alternative 4 - GHG Emissions Estimates

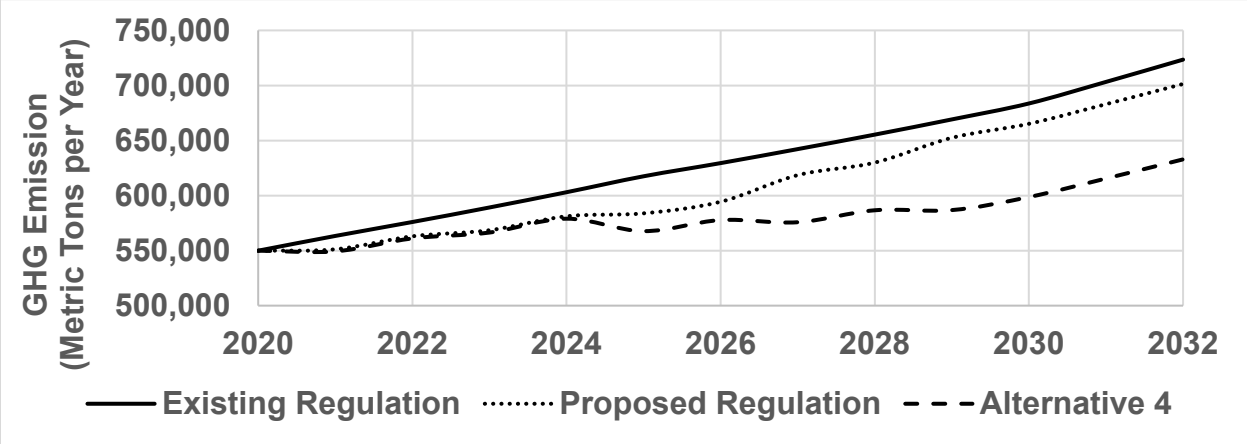


Figure D-8: Alternative 4 - ROG Emissions Estimates

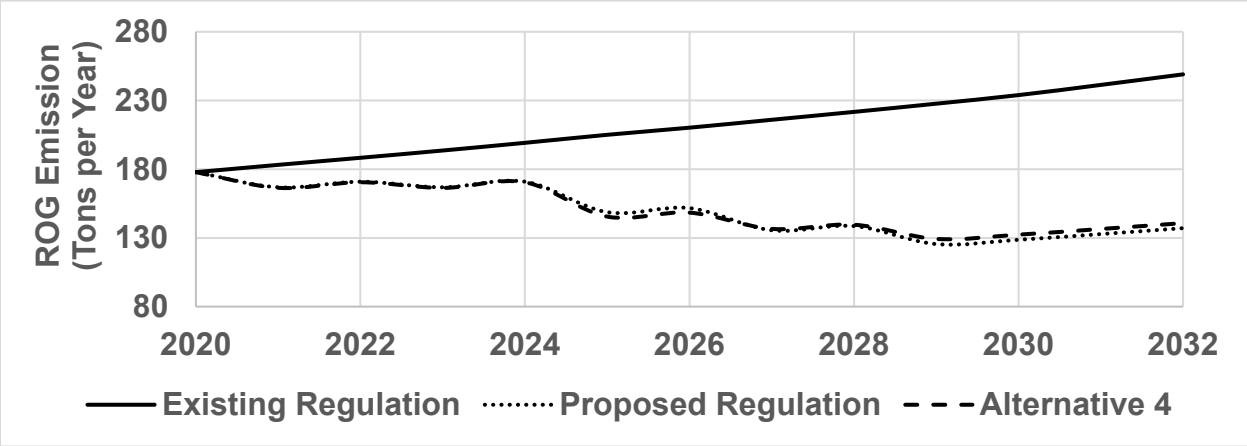
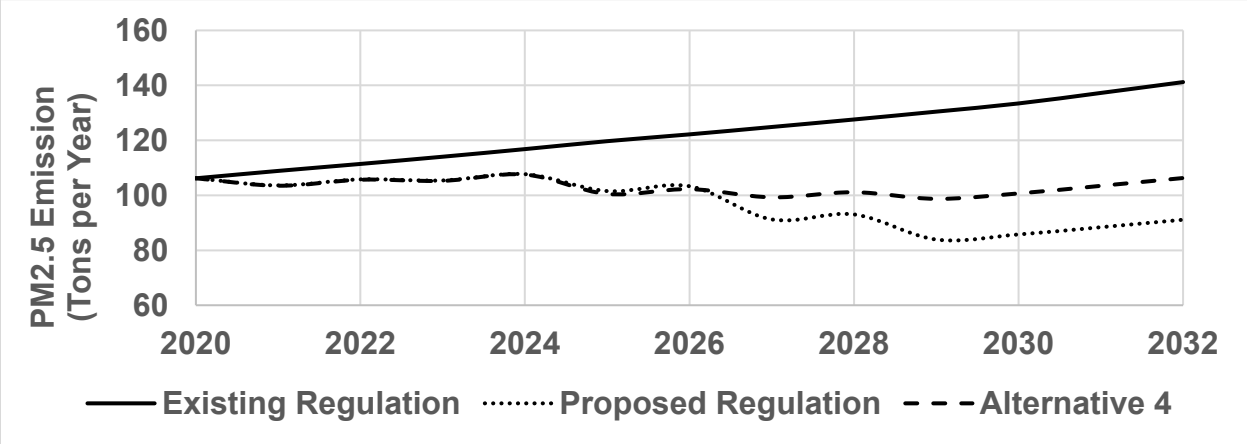


Figure D-9: Alternative 4 - PM2.5 Emissions Estimates



As discussed in more detail in the accompanying SRIA (Appendix C), Alternative 4 would be less cost effective to implement than the Proposed Regulation, and provides less flexibility than allowing site-specific selection of most the feasible and cost effective strategies. For vessels that visit California terminals infrequently requiring vessel modifications would most likely not be economical. Installing shore power systems at berths or terminals where shore power vessels would visit sparingly would be costly and achieve minimal additional emission reductions. Alternative 4 allows only one compliance pathway and provides no flexibility for a terminal to select the best control option for their unique operations (objective 7). While, Alternative 4 may get more emissions reductions, but CARB staff believes is not appropriate for all terminals or vessels.

In addition to being costly, tanker vessel operators have raised concerns to CARB staff regarding the safety, and operational feasibility of installing shore power infrastructure and utilizing shore power for vessels on- and off-loading petroleum products (objective 9). Therefore, this alternative has been rejected for not reducing or avoiding the Proposed Regulation's significant impacts, and therefore for not meeting a fundamental requirement of a CEQA alternative.

2. Alternative 5: Proposed At Berth Regulation Without the Inclusion of Ro-Ro Vessels (Apply the Same Thresholds as the Proposed Regulation)

a) Alternative 5 Description

Alternative 5 "Proposed At Berth Regulation Without the Inclusion of Ro-Ro Vessels" would exclude ro-ro vessels and the ports and terminals which they visit exclusively. Alternative 5 would require all tanker, cruise, container and reefer vessels visiting a California port or terminal (over the appropriate thresholds) to reduce emissions via a CARB approved emission control strategy while at berth.

b) Alternative 5 Impact Discussion

i. Objectives

Similar to the Proposed Regulation, Alternative 5 would expand the Existing Regulation to achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution (objective 1). Alternative 5 would reduce emissions from vessels in small fleets, and tanker vessels (and some tanker boilers) at additional ports and marine terminals throughout California (objectives 2, 4, and 7). LNG vessels and vessels operating on other alternative fuels would be included in emissions reduction requirements (objective 5). However, this Alternative would not meet the objective to expand the regulation to include ro-ro vessels (objective 3).

ii. Environmental Impacts

As discussed in Chapter 4, the Proposed Regulation would result in new or modified facilities or infrastructure throughout California, as well as the possibility of modifications to vessels, resulting in construction and operational impacts. These environmental impacts could be reduced in severity from those detailed in Chapter 4 of this ~~Draft~~ Final EA, because Alternative 5 not only reduces the number of vessels required to comply but would also reduces the number of ports and terminals that would need to add infrastructure to comply. For example, Alternative 5 would remove emissions reduction requirements from approximately 1,000 ro-ro visits a year (around 10 percent of all vessel visits to California) and roughly 11 out of 33 terminals included in the Proposed Regulation would not need control equipment (Appendix E). This would avoid the need to install shore power (involving construction of new vaults and electrical infrastructure) or alternative control technologies (involving shore or vessel based emission control equipment) for the ro-ro category of vessels only. The impacts reduced or avoided by this alternative would therefore be moderate. By excluding vessel visits, emission reductions and GHG benefits will be less compared to the Proposed Regulation. As described above, this Alternative would fail to meet most of the basic project objectives.

3. Alternative 6: Proposed At Berth Regulation Without the Inclusion of Tanker Vessels (Applying the Same Terminal Threshold as the Proposed Regulation)

a) Alternative 6 Description

Alternative 6, “Proposed At Berth Regulation Without the Inclusion of Tanker Vessels” would exclude tanker vessels and the ports and terminals which they visit exclusively. This Alternative would require all cruise, ro-ro, container and reefer vessels visiting a California port or terminal (over the appropriate thresholds) to reduce emissions via a CARB approved emission control strategy while at berth.

b) Alternative 6 Impact Discussion

i. Objectives

Similar to the Proposed Regulation, Alternative 6 would expand the Existing Regulation to achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution (objective 1). This Alternative would expand the Existing Regulation to every vessel visit including those from ro-ro vessels and vessels in large and small fleets (container, reefer, or cruise) at additional ports and terminals beyond those currently covered under the Existing Regulation (objectives 2, and 4). Any vessel using LNG or an alternative fuel in their auxiliary engines (other than a tanker vessel) would be required to reduce emissions while at berth (objective 5).

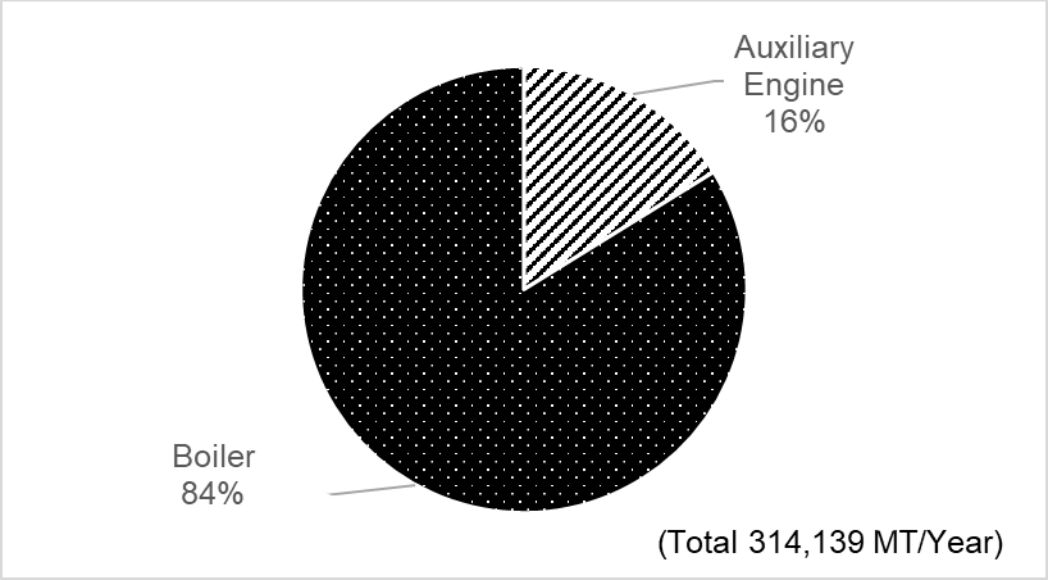
Expanding the Existing Regulation to reduce emissions from additional ports, marine terminals, ro-ro, container, cruise and reefer vessels would be impactful, however, tanker vessels represent the second highest number of vessel visits to California and by excluding tankers from the Proposed Regulation, nearly 1,400 tanker vessel visits would go uncontrolled each year. Tanker vessels using auxiliary boilers to power steam-driven pumps for off-loading cargo account for a large portion of emissions at berth. These large boilers used for offloading crude can use as much as 6 MW of power when off-loading (Appendix H of ISOR). The Proposed Regulation requires all tanker vessels using on-board boilers to generate steam to power pumps for offloading cargo to reduce emissions from both their auxiliary engines and boilers unless the vessel is using shore power. Tanker vessels using diesel-electric engines to power pumps for offloading cargo would only be required to reduce emissions from auxiliary engines, as the boiler load is significantly smaller due to no pumping demand. As can be seen in the Figure D-10, only controlling auxiliary engine emissions from tankers would leave a considerable amount of PM2.5 emissions uncontrolled.

Most vessels (cruise, ro-ro, container, reefer) use auxiliary boilers to produce steam for uses such as heating of residual fuel and liquid cargo, heating of water for crew and passengers, freshwater generation, and space heating of cabins. These on-board auxiliary boilers are typically small, ranging in power from 300 kW to 1.1 MWs on average. These small boilers do not significantly contribute to the emissions profile of and ocean-going vessel at berth. However, tanker vessels using auxiliary boilers to power steam-driven pumps for off-loading cargo account for a large portion of emissions at berth. These large boilers used for off-loading crude can use as much as 6 MW of power when off-loading (Appendix H of ISOR).

The Proposed Regulation requires all tanker vessels using on-board boilers to generate steam to power pumps for off-loading cargo to reduce emissions from both their auxiliary engines and boilers unless the vessel is using shore power. Tanker vessels using diesel-electric engines to power pumps for off-loading cargo would only be required to reduce emissions from auxiliary engines, as the boiler load is significantly

smaller due to no pumping demand. As can be seen in the Figure D-10[96], only controlling auxiliary engine emissions from tankers would leave a considerable amount of PM2.5 emissions uncontrolled.

Figure D-10: 2021 Projected Statewide Tanker Vessel PM2.5 Emissions – Auxiliary Engines vs Boilers (Appendix H of ISOR)



California's main ports and marine terminals where tankers visit are Benicia, Carquinez, El Segundo, POLA/POLB, Martinez, and Richmond. Most of these vessel visits support the operation of California's oil and gas refineries. Several tanker terminals throughout California are located near disadvantaged communities and as previously mentioned, the State of California has placed additional emphasis on protecting those local communities from harmful effects of air pollution though the passage of AB 617. Figures D-11 through D-15[97] below were created using CARB's 2019 emissions inventory. These figures show the emissions breakdown at berth for all vessel types. As can be seen in these figures, tanker vessels are one of the largest contributors to NOx, PM2.5, DPM, ROG, and GHG emissions at berth.

[96] CARB, Emissions Inventory, CEPAM: 2016 SIP - Standard Emission Tool, Accessed August 21, 2019, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php.
[97] CARB, Emissions Inventory, CEPAM: 2016 SIP - Standard Emission Tool, Accessed August 21, 2019, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php.

Figure D-11: 2021 Projected Statewide At Berth NOx Emissions – Auxiliary Engines and Boilers

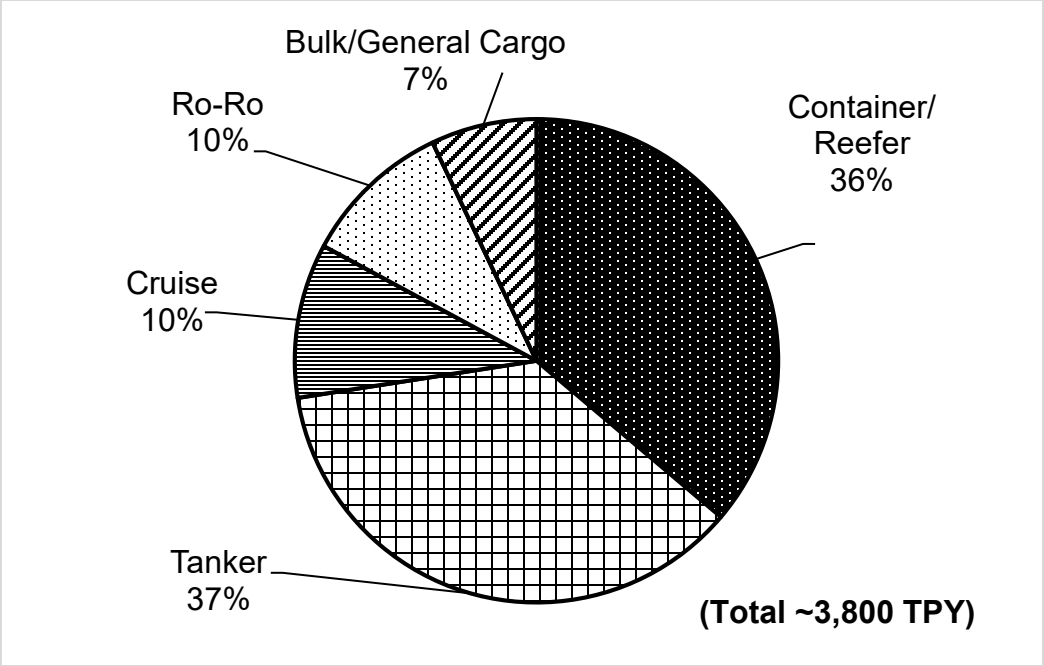


Figure D-12: 2021 Projected Statewide At Berth PM2.5 Emissions for Auxiliary Engines and Boilers

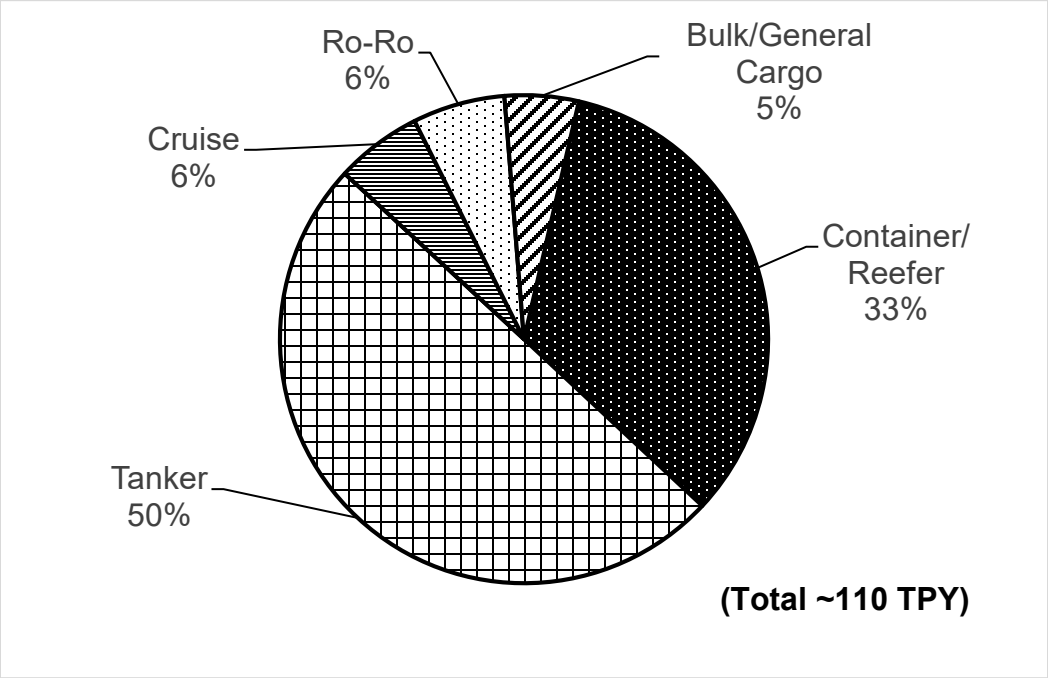


Figure D-13: 2021 Projected Statewide At Berth Diesel PM Emissions for Auxiliary Engines

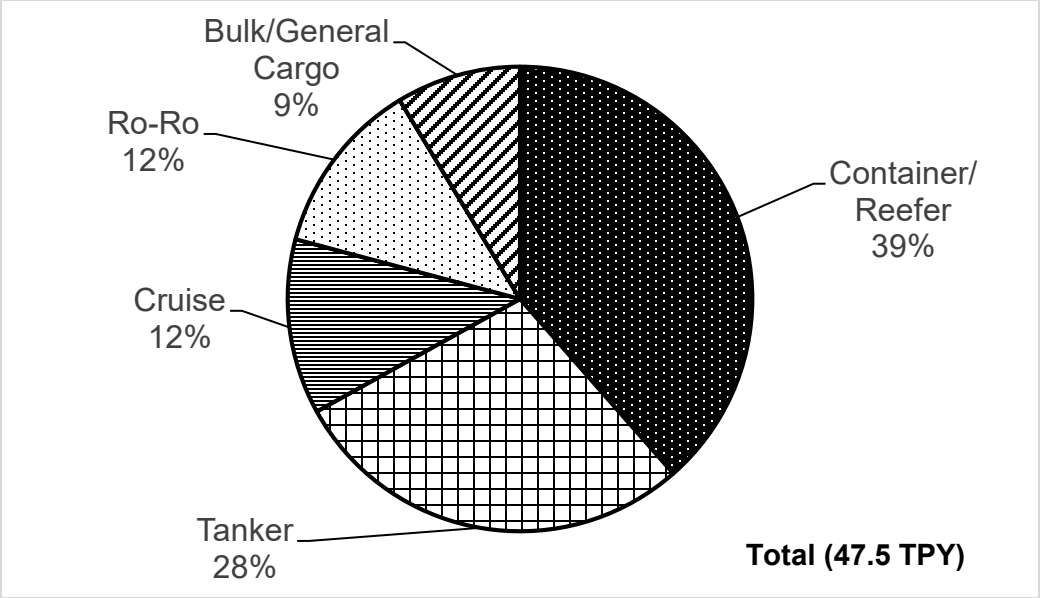


Figure D-14: 2021 Projected Statewide At Berth ROG Emissions for Auxiliary Engines and Boilers

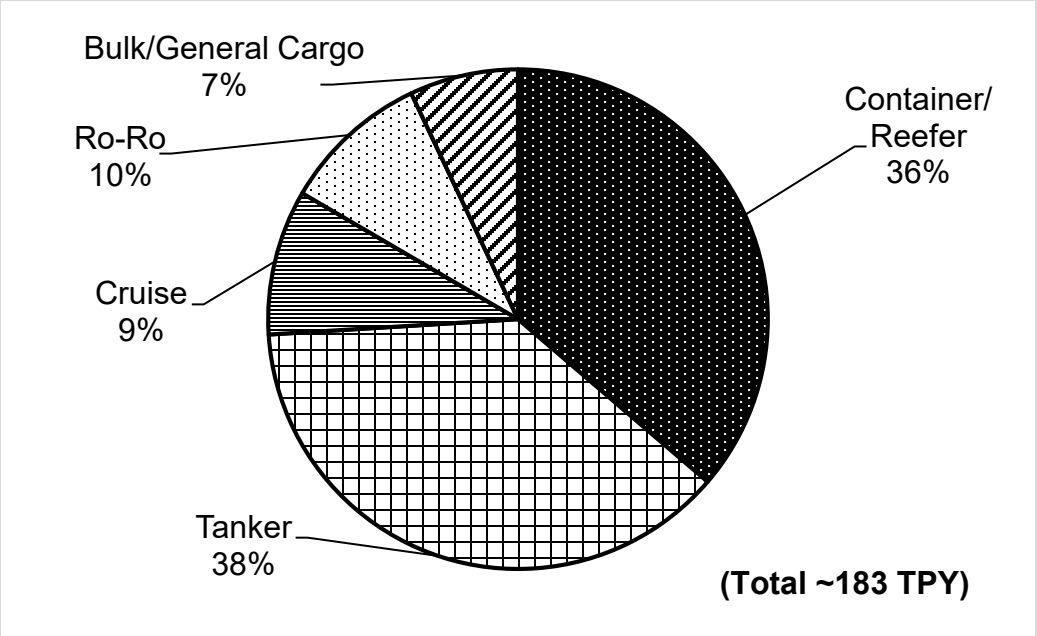


Figure D-15: 2021 Projected Statewide At Berth GHG (CO_2, CH_4, and N_2O) Emissions in Metric Tons Per Year (MT/Year) - Auxiliary Engines and Boilers

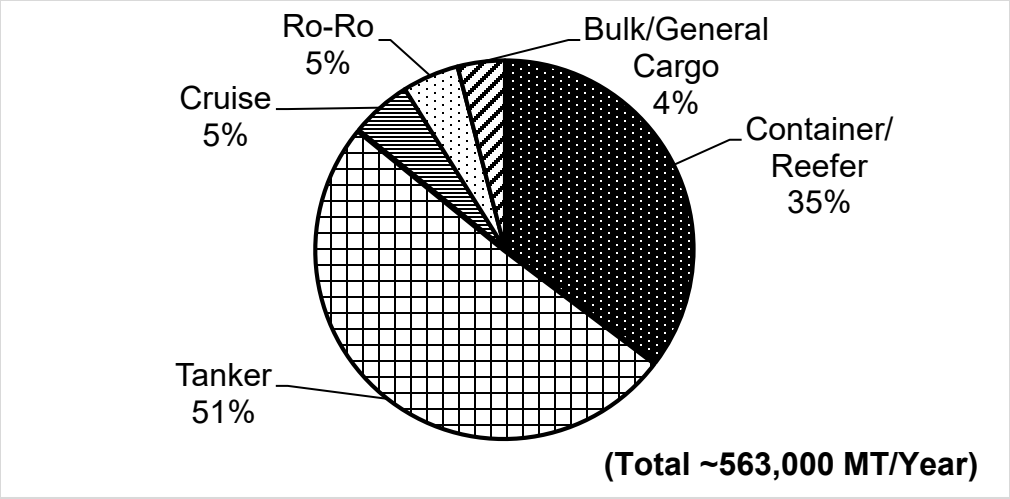


Table D.7-1 below shows the 2029 projected emissions from tankers without the Proposed Regulation and Table D.7-2 shows the 2030 projected emissions from tanker vessels with the Proposed Regulation. These tables display the significance of tanker vessel emissions and the emissions reductions from including them in the Proposed Regulation.

Table D.7-1: 2030 Projected Emissions from Tanker Vessels[98]

2030	NOx (TPY)	ROG (TPY)	PM2.5 (TPY)	DPM (TPY)	GHG (MTY)
Auxiliary Engines	814	42	13.5	14.7	55,495
Boiler	603	33	45.6	n/a	292,932

[98] CARB, Emissions Inventory, CEPAM: 2016 SIP - Standard Emission Tool, Accessed August 21, 2019, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php.

Table D.7-2: 2030 Projected Emissions from Tanker Vessels with Proposed[99] Regulation

2030	NOx (TPY)	ROG (TPY)	PM2.5 (TPY)	DPM (TPY)	GHG (MTY)
Auxiliary Engines	359	19	6.17	6.7	55,491
Boiler	365	20	27.64	n/a	278,994

By not including tanker vessels in the Proposed Regulation, Alternative 6 would fail to meet one of the Proposed Regulation's most important objectives to achieve reductions of NOx, ROG, DPM, PM2.5, GHG and black carbon emissions above those from the Existing Regulation to provide public health benefits in communities near ports and marine terminals that are heavily burdened by freight pollution. Nor would we meet any of the main objectives to expand the Existing Regulation to tankers and tanker boilers used to power steam driven pumps for off-loading (e.g. crude tankers).

ii. Environmental Impacts

Alternative 6 would result in the modification and addition of infrastructure to port and terminal facilities throughout California, as well as modifications to vessels, resulting in construction and operational impacts similar to those discussed in Chapter 4 of this ~~Draft~~ Final EA. By excluding tanker vessels and the terminals they visit exclusively would reduce the short-term construction and long-term operational environmental impacts detailed in Chapter 4 of this ~~Draft~~ Final EA for those areas only. This would avoid the need to install shore power (involving construction of new vaults and electrical infrastructure) or alternative control technologies (involving shore or vessel based emission control equipment) for the tanker category of vessels only. The impacts reduced or avoided by this alternative would therefore be moderate.

This Alternative would reduce NOx, ROG, PM2.5, DPM, GHG and black carbon emissions from the operation of auxiliary engines on container, reefer, cruise, and ro-ro vessels while docked at berth at a California port, but will exclude a large portion of California's vessel visits from tanker vessels.[100] Removing tankers from the Proposed Regulation would dramatically reduce the overall emissions reductions needed to help meet California's emissions reduction and public health goals and as a result, Alternative 6 would fail to meet many of the project objectives of the Proposed Regulation.

[99] CARB, Emissions Inventory, CEPAM: 2016 SIP - Standard Emission Tool, Accessed August 21, 2019, https://www.arb.ca.gov/app/emsinv/fcemssumcat/fcemssumcat2016.php.
[100] CSLC, "California State Lands Commission - California Vessel Visit Information Submitted to CARB," 2018

4. Alternative 7: Industry Coalition Alternative

This alternative has been added to the Final EA in response to public comments received on the Draft EA.

a) Alternative 7 Description

An industry coalition comprised of five marine industry groups submitted their proposal to CARB as an alternative to the Proposed Regulation. This proposal, included here as Alternative 7, would involve amending the Existing Regulation by addressing implementation challenges for regulated vessel categories (i.e., container, reefer and cruise vessels), and it calls for feasibility and cost effectiveness studies prior to future expansion of the regulation. Mainly, Alternative 7 would not expand the regulatory control requirements, but rather calls for a series of feasibility studies in cooperation with industry stakeholders, and reports to the Board, before any expansion of the Existing Regulation's requirements or setting regulatory implementation dates.

Before any additional vessel types or terminals could be subject to control requirements, these feasibility studies must be conducted for ro-ro, bulk/general cargo, and tanker vessel categories and the port/terminals where they visit to establish whether or not these categories would be suitable candidates for inclusion in the Proposed Regulation. These feasibility studies would identify cost effective emissions control programs based on reasonable implementation deadlines, safety concerns associated with the use of potential emissions control strategies, infrastructure readiness, and technological feasibility.

b) Alternative 7 Impact Discussion

i. Objectives

This alternative would fail to meet several of the Proposed Regulation's key objectives. Notably, this alternative would not meet Objective 1, which is to achieve criteria pollutant and GHG reductions to provide public health benefits near ports and marine terminals because, for unregulated ports, the only action required would be to comply with recordkeeping and reporting requirements. As stated on ISOR page X-9, "[the alternative] would achieve substantially less emissions reductions for NO_X, ROG, $PM_{2.5}$, DPM, GHG, and black carbon. As a result, it would fail to provide significant additional public health benefits including communities adjacent to ports and terminals throughout the state…"

For the same reason, this alternative would not meet Objective 2, which is to reduce at berth emissions at additional ports, fleets, and terminals beyond those covered under the Existing Regulation, until an unspecified, uncertain future date, if at all. Likewise, the alternative would not meet Objective 3, which is to expand the existing emissions reductions requirements to include ro-ro vessels and tankers. Nor would it meet Objective 4, which is to achieve reductions from small fleets. Again, the sole action

under this alternative for currently unregulated fleets is to comply with recordkeeping and reporting requirements.

This alternative may also fail to meet Objective 8, which is to implement a regulatory structure that is based on individual vessel visits. A feasibility study with requirements to be determined later provides no definition or standard for what the resultant regulation would require; therefore, it is uncertain whether the regulatory structure would be based on individual vessel visits. This alternative would not meet Objective 11, which is to assist in achieving attainment of health-based federal national ambient air quality standards (NAAQS) over the next 15 years as part of nonattainment area State Implementation Plans (SIP). With the provisions that would apply to unregulated vessels, fleets, ports, and terminals not yet identified, it is not certain what emissions would be achieved. As a result, the alternative does not meet most of the basic project objectives.

ii. Potential Feasibility

Because the alternative requires only using shore power when possible and safe, this alternative is potentially feasible from a technological perspective. It may also reduce potentially significant impacts associated with construction of new infrastructure that would occur with the Proposed Regulation, though the extent to which it would do so remains uncertain. As noted throughout this EA, the potential impacts from the Proposed Regulation would be relatively minor given the disturbed, industrialized areas in which they would take place, and given the considerable emissions reductions the Proposed Regulation would achieve overall.

However, because the alternative would not meet most of the project objectives (Cal. Code Regs., tit. 14 Section 15126.6, Cal. Code Regs., tit. 17 section 60004.2(a)(5)) and because it is too vague to analyze (Cal. Code Regs., tit. 14 Section 15126.6(f)(3)), it is properly eliminated from detailed consideration in the EA.

Furthermore, this alternative is largely identical to Alternative 2 (Implementation Fixes Through an Amendment of the Existing Regulation Only), but with the potential to expand the regulatory requirements to new vessel categories at an unknown and uncertain future date, contingent upon the results of further feasibility studies. Given the uncertainty under this alternative regarding whether or when the regulatory requirements would expand to cover the additional vessel categories, CARB views this alternative as largely identical to Alternative 2, with the possibility of ultimately resembling a delayed version of the Proposed Regulation depending on further study results. Therefore, this suggested alternative is not considerably different from the others previously analyzed in the Draft EA.

Furthermore, given that the ultimate outcome of this alternative is itself speculative, CARB also views this alternative as presenting a speculative scenario that does not lend itself to typical CEQA alternatives evaluation. It also remains unclear whether and to what extent this alternative would reduce or avoid any significant environmental

impacts identified for the Proposed Regulation. These considerations are further reasons for eliminating this alternative from detailed consideration in the EA.

5. Alternative 8: All Proposed At Berth Regulation requirements with the inclusion of Articulated Tug Barges (ATB)

a) Alternative 7 Description

Alternative 7, "All Proposed At Berth Regulation requirements with the inclusion of Articulated Tug Barges (ATB)", would change the Proposed Regulation's definition of Ocean-going vessels to include ATBs. This Alternative would require all container, cruise, reefer, ro-ro, tanker vessels, and ATBs calling a California port or terminal (over the appropriate thresholds) to reduce emissions via a CARB approved emission control strategy (CAECS) while at berth.

b) Alternative 7 Impact Discussion

i. Objectives

Since alternative 7 would include all aspects of the Proposed Regulation as proposed with the only difference being adding in ATBs to the definition of an ocean going vessel, the majority of the project objectives would continue to be met. Alternative 7 would therefore meet objectives 1 – 10 as outlined above in this chapter. However, it is important to note that the Proposed Regulation already meets those objectives; the addition of ATBs to the program would not cause the Proposed Regulation to better meet those objectives.

ATB tugboats and barges less than 400 feet and under 10,000 gross tons are currently regulated under the Commercial Harbor Craft Regulation . ATBs operate as a combination of a tugboat, and a petrochemical tank barge. As part of the CHC Regulation, the tugboat portion of the ATB is required to use CARB ultralow sulfur diesel (0.005% sulfur), and the main and auxiliary engines must meet U.S. EPA Tier 2 or Tier 3 engine standards. Tanker vessels are currently subject to CARB's OGV Fuel Regulation (requiring 0.1% sulfur distillate fuel) and will have requirements under the Proposed At Berth Regulation. Tanker vessels operate on higher sulfur content fuels and CARB does not require tanker vessel main engines to meet any specific emission standards, as emissions standards for international OGVs are set by the International Maritime Organization.

CARB staff believes that continuing to regulate ATBs under the CHC Regulation would achieve greater PM and NOx reductions overall compared to emissions benefits that could be achieved from the requirements of the Proposed Regulation. For example, the Proposed At Berth Regulation requires the use of a CAECS while at berth. The CAECS is required to have a minimum of 80 percent control of NOx and PM for auxiliary engines and some tanker boilers only. In comparison, the CHC Regulation requires that

both main and auxiliary engines of the tugboat are subject to more stringent emission standards not only at berth, but also while in-transit.

By continuing to regulate ATBs and other tugs and barges as CHC, there are greater emissions reductions to be realized compared to regulating these sources under the Proposed Regulation. CARB staff expects to achieve greater NOx and PM reductions from ATBs under the CHC rule because expanded applicability to include tank barges, regardless of weight or length, and more stringent requirements on main and auxiliary engines on tugboats. Shifting ATBs from the CHC Regulation to the Proposed Regulation could be considered a relaxation of their current emission and planned reduction requirements, and thus would not meet the objective the Proposed Regulation to assist in achieving CARB's proposed strategy to attain health-based federal air quality standards over the next fifteen years as part of nonattainment area State Implementation Plans (objective 11).

ii. Environmental Impacts

As discussed in detail in Chapter 4, the Proposed Regulation would result in new or modified facilities or infrastructure throughout California. Vessels, terminals, and ports not included or not previously modified under the Existing Regulation could also undergo new modifications. New or additional infrastructure and modifications to vessels would result in construction and operational environmental impacts. Including ATBs in the Proposed Regulation would not serve to reduce or avoid any of these potential environmental impacts, since all infrastructure and modifications already analyzed in this EA would still be required, along with potential further new infrastructure needed to serve ATBs. As noted above, this alternative also would likely not result in any emissions benefits, either. Given that it would not reduce or avoid any significant impact of the Proposed Regulation, and given that it would not offer any significant environmental advantages, this alternative is properly dismissed from further consideration.