

**Proposed Concepts for Commercial Harbor Craft in California**  
Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
Advanced Technology on New and In-Use Vessels

February 27, 2020

This document contains California Air Resources Board (CARB) staff's proposed concepts for further reducing pollution from Commercial Harbor Craft (CHC). CHC include a wide variety of vessel types owned by private and public entities, including but not limited to tug/towing vessels, ferries, pilot vessels, work boats, barges, dredges, research, crew and supply, excursion, charter fishing and commercial fishing vessels. Commercial Harbor Craft are subject to 17 California Code of Regulations (CCR) § 93118.5, the Airborne Toxic Control Measure for Commercial Harbor Craft, referred to hereafter as the "existing regulation."

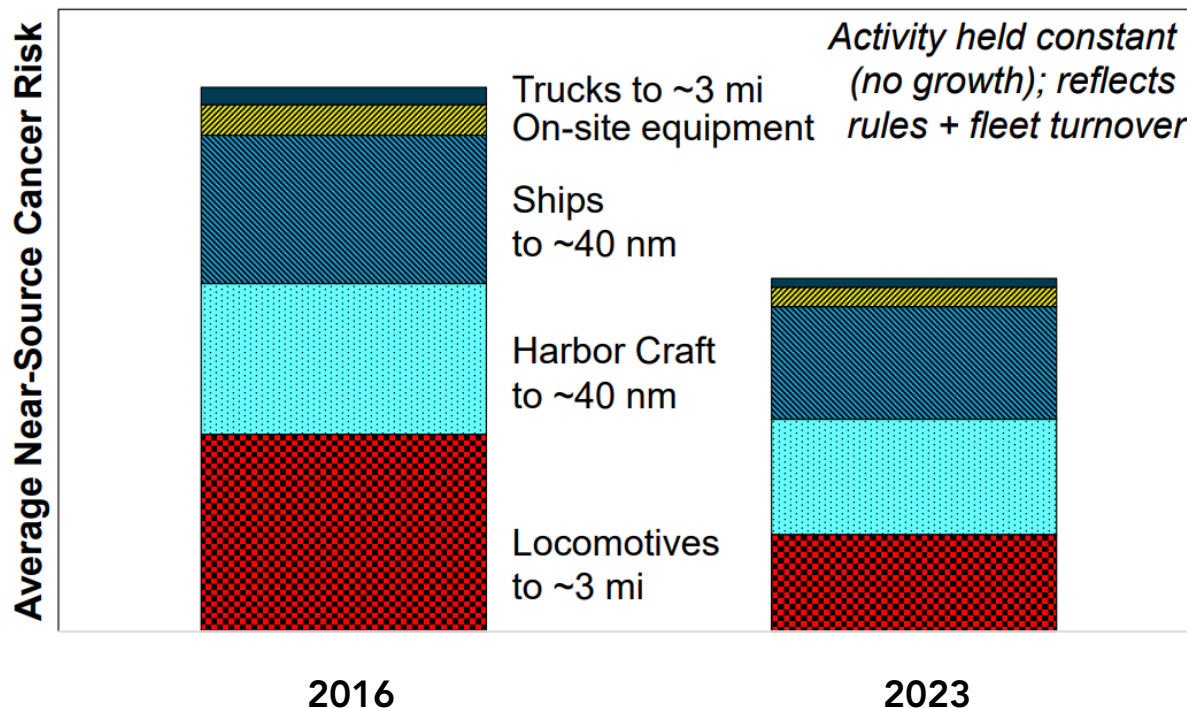
CARB staff is undertaking a rulemaking process to amend or replace the existing regulation to further reduce emissions from harbor craft, scheduled for Board consideration in 2021. The CHC rulemaking is included in CARB's Community Air Protection Blueprint, which identifies statewide strategies for delivering emission reductions in communities heavily impacted by freight sources, as required by Assembly Bill (AB) 617. The CHC rulemaking is also one of several actions CARB is undertaking additional to State Implementation Plan commitments intended to collectively reduce community health risk, attain regional air quality standards, and mitigate climate change while pushing forward the adoption of zero emission and advanced technologies.

CARB staff recognizes that under the existing regulation, harbor craft owners have made considerable investments to replace older engines with newer, cleaner engines to comply with the existing regulation. In addition, some harbor craft owners not subject to in-use requirements have voluntarily replaced their engines utilizing CARB's Carl Moyer Program administered through local air districts. However, the near-source cancer risk and local pollution contribution from harbor craft remains high. During the March 2017 Board Hearing, the Board directed staff to return within 12 months with concepts to control pollution from large freight facilities including seaports. During the March 2018 Board Hearing, staff proposed to reduce emissions from multiple freight sources including harbor craft. Leading up to the March 2018 Board Hearing, CARB staff conducted a scoping evaluation for the ports of Los Angeles and Long Beach. The scoping evaluation showed that harbor craft was still the third-highest contributor to near-source cancer risk in 2016, and will contribute an even larger proportion in 2023 once emissions from ocean-going vessels and locomotives are further reduced.

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**Proposed Concepts for Commercial Harbor Craft in California**  
 Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
 Advanced Technology on New and In-Use Vessels

**Figure 1. Average Near-Source Cancer Risk from Port Mobile Sources in 2016 and 2023\***



\*nm = nautical miles; mi = miles

The existing regulation will be fully implemented at the end of 2022, therefore CARB staff’s proposed concepts are focused on reducing emissions from 2023 through at least 2031.

Proposed concepts in this document: (1) establish expanded and more stringent requirements for engines operating on harbor craft and voluntary provisions, and (2) add mandates to accelerate deployment of zero-emission and advanced technologies into the marine harbor craft sector. These concepts are in draft form, and will be used to develop CARB staff’s regulatory proposal. A draft regulation order will be included in the Initial Statement of Reasons document, which will be released for a 45-day public comment period prior to the Board Hearing.

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**Proposed Concepts for Commercial Harbor Craft in California**  
Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
Advanced Technology on New and In-Use Vessels

**Table of Contents**

I.	Expanding Vessel Categories Subject to In-Use Requirements.....	4
II.	More Stringent In-Use Requirements.....	5
III.	More Stringent Requirements for New-Build Vessels.....	7
IV.	Mandates for Zero-Emission and Advanced Technologies.....	8
V.	Removing Exemptions for Under 50 horsepower.....	10
VI.	Requiring Replacement Vessels for Certain Vessel Categories .....	10
VII.	Compliance Extensions.....	11
VIII.	Alternative Compliance Pathways.....	14
IX.	Summary of Proposed Requirements by Vessel Type.....	15
X.	Proposed Implementation Timeline.....	17

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**Proposed Concepts for Commercial Harbor Craft in California**  
 Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
 Advanced Technology on New and In-Use Vessels

**I. Expanding Vessel Categories Subject to In-Use Requirements**

Background

The current regulated CHC categories are ferries, excursion, crew and supply, tug/tow boats, barges, and dredge, which must meet Tier 2 or 3 engine standards. New ferries carrying 75 passengers or more must meet Tier 4 engine requirements or use Tier 2 or 3 engines in conjunction with the Best Available Control Technology. The existing CHC regulation does not impose in-use requirements on workboats, pilot vessels, water taxis, charter fishing, the “other” category, and all barges (towed or pushed) over 400 feet in length or otherwise meeting the definition of an ocean-going vessel. Many double-hull fuel/petrochemical barges exceed 400 feet in length and are therefore not currently subject to the existing CHC regulation.

Proposed Concept

Table 1 indicates which vessel categories are currently subject to in-use requirements under the existing CHC regulation, and which would be subject to in-use requirements under these proposed concepts.

**Table 1:** List of vessel categories, in-use engine requirements, and requirements for evaluating feasibility or replacing vessel.

Vessel Category	Currently Regulated In-Use Category – Existing CHC Regulation	Future Regulated In-Use Category – Proposed Concepts
Ferry	Yes	Yes
Tugboats	Yes	Yes
Barges	Yes	Yes
Dredges	Yes	Yes
Crew & Supply	Yes	Yes
Tugboats on Articulated Tug Barges (ATBs)	Yes	Yes
Excursion	Yes	Yes
Pilot Vessels	No	Yes
Tank Barges	Under 400 feet and 10,000 gross tons only	Yes - all

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

Research Vessels	No	Yes
Work Boats	No	Yes
Charter Fishing	No	Yes
Commercial Fishing	No	No
Historic	No	No
Coast Guard / Military	No	No
Temporary Replacement	No	No
Ocean-Going Vessels	No	No

#### Justification/Reasoning

In-use requirements are needed for as many vessel categories as possible to maximize PM and NOx emission reductions, and eliminate any possible situations where vessels with a primary use in an unregulated category can perform work and undercut business of vessels in regulated vessel categories. CARB staff is not proposing in-use engine requirements for commercial fishing vessels in these concepts for the combination of the following reasons: the small profit margins in the industry, demonstrated lack of feasibility for Tier 4 repowers and retrofits, competition with out of State and global markets, and tendency to conduct the majority of their operations far from the coast.

## II. More Stringent In-Use Requirements

#### Background

The existing CHC regulation requires certain vessel categories to repower pre-Tier 1 and Tier 1 engines to Tier 2 or 3 by a compliance date depending on the engine model year. Requirements in the existing CHC regulation will be fully implemented by December 31, 2022. For vessel categories subject to in-use requirements, the existing CHC regulation contains low-use provisions, which requires owners and operators to demonstrate that the engine has not, and will not, operate more than 80 or 300 hours per year, depending on the vessel category.

#### Proposed Concept

Vessel categories subject to in-use requirements (see Concept I) would be required either to:

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

- Repower with engines that meet a performance standard equivalent to the cleanest available marine standards (Tier 3 or Tier 4 below 600 kW, Tier 4 above 600 kW) plus a diesel particulate filter (DPF). For repower of engines below 600 kW, if there is a suitable engine model certified to Tier 4 marine standards available at the time the engine order is placed, then a Tier 4 engine must be used;
- Use an Alternative Complying Technology (ACT) that CARB has pre-approved to meet PM and NO<sub>x</sub> standards equivalent to Tier 4 + DPF. This provision would carry forward the existing provision that allows use of complying alternative technologies that CARB maintains current on its web site<sup>1</sup>. ACTs today only include strategies for complying with Tier 2 standards. In the future, ACTs could include approved technologies or combinations of technologies including cleaner fuels, hybrid systems, shore power, or other innovative control strategies. The in-use performance standards that must be met are 0.01 g PM/bhp-hr and 1.3 g NO<sub>x</sub>/bhp-hr, which is equivalent to the most stringent Tier 4 PM marine standard plus a DPF; or
- Meet low-use operational requirements (under 80 hours per year for barges or dredges or 300 hours per year for all other vessel categories). This compliance option would carry forward existing low-use provisions, which require owners and operators to demonstrate that the engine has not, and will not, operate more than 80 or 300 hours per year. Some administrative process requirements would change, such as requiring annual renewal of the low-use compliance method with opacity testing and engine maintenance information, and no greater than five vessels per fleet would be eligible for the low-use operational compliance pathway. As specified in the existing CHC regulation, engines aboard barges and dredges would not be permitted to operate more than 80 hours per year in Regulated California Waters (RCW), and engines aboard vessels in all other regulated in-use categories cannot operate more than 300 hours per year. The low-use provision would be amended to clarify that CARB will not approve low-use exemptions for vessels that circumvent the 80 or 300 hour vessel operating limit by alternating engines, and the vessel operator must document the total vessel operating hours are under the applicable low-use threshold.

#### Justification/Reasoning

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<sup>1</sup> <https://ww2.arb.ca.gov/our-work/programs/commercial-harbor-craft/chc-complying-alternative-technologies>

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

CARB staff is proposing an in-use performance standard equivalent to retrofit DPFs on Tier 4 engines installed on all vessel types with in-use requirements to reduce both near-source exposure to toxic diesel PM and regional air pollutants. The performance standard approach is intended to achieve maximum emission reductions but allow vessel owners to pursue any effective technology to achieve the reductions.

This compliance approach achieves both PM and NO<sub>x</sub> reductions relative to Tier 2 or Tier 3 engines or Tier 4 engines without a DPF, since Level 3 VDECS are capable of achieving an 85 percent reduction in diesel PM. For vessels that choose to meet the performance standard with diesel engine repowers and retrofits, CARB staff is proposing the use of the cleanest available marine certified engines combined with verified retrofit DPFs, which are a widely commercialized and proven technology on light-duty and heavy-duty equipment that has been used in on-road, off-road, and port applications for more than a decade. CARB staff is not proposing use of retrofit selective catalytic reduction (SCR) systems on Tier 3 and older engines due to the complexity of calibrating diesel exhaust fluid (DEF) dosing onto a reduction catalyst in an aftermarket application. CARB staff is aware that U.S. EPA is beginning to certify some Marine Tier 4 engines below 600 kW on a very limited basis, where the power ratings of applicable engine families straddle the 600 kW threshold; this concept would require Marine Tier 3 for engines rated below 600 kW, or Tier 4 if there is a suitable engine model certified to Tier 4.

The low-use provision is intended to exempt vessels that operate infrequently from in-use engine requirements. CARB staff is proposing a five vessel limit for each fleet claiming low-use because larger fleets that spread out operating hours among multiple vessels are potentially producing more emissions than smaller fleets that operate fewer vessels more frequently.

### III. More Stringent Requirements for New-Build Vessels

#### Background

The existing CHC regulation requires new ferries to meet current engine standards plus Best Available Control Technology. Other new-build vessels are required to meet current engine standards.

#### Proposed Concept

Proposed requirements for new vessels would include the following:

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

- Engines  $\geq$  600 kW on new-build vessels would be required to meet Tier 4 standards for all vessel categories where in-use requirements apply, plus a DPF for all engines;
- Engines  $<$  600 kW on new-build vessels would be required to meet Tier 3 standards plus a DPF, or Tier 4 plus a DPF if there is a suitable engine model certified to Tier 4;
- New tug vessels and excursion vessels would be required to be built with enhanced efficiency propulsion, such as hybrid technology, as described in Concept IV; and
- New (and in-use) ferries operating on short routes (less than 3 nautical miles) would be required to be zero-emission, as described in Concept IV.

#### Justification/Reasoning

New build vessels can be designed around the cleanest available equipment, and present the best opportunity for cost-effectively reducing emissions from harbor craft in California. The technology exists for new tug, excursion, and ferry vessels to adopt zero-emission and advanced technologies, as discussed under Concept IV.

#### **IV. Mandates for Zero-Emission and Advanced Technologies**

##### Background

There are no mandates in the existing CHC regulation for zero-emission and advanced technologies; however, advanced technologies may be approved through existing mechanisms such as the Alternative Control of Emissions (ACE) as defined in subsection (f) of the existing CHC regulation.

##### Proposed Concept

This concept would establish both voluntary provisions and mandates to accelerate deployment of zero-emission and advanced technologies into the CHC sector. There is a wide range of technologies that are rapidly developing and emerging into the mobile source and marine vessel market. For the purpose of this concept, technologies are grouped as follows:

1. **Enhanced Efficiency Diesel-Electric Vessels**, which include vessels that can deliver power to propellers through multiple pathways, such as diesel electro-mechanical propulsion systems, to reduce fuel by eliminating the need to run large main engines when vessel power demand is low (standby or low speed

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

transit modes)<sup>2</sup>. This type of propulsion system is coming to market today for vessels with highly variable duty cycles operating with relatively larger engines but lower average loads, such as escort and harbor assist tugboats.

2. **Zero-Emission Capable Hybrid Vessels**, which include vessels in certain harbor craft sectors that can demonstrate 30 percent or more of combined main propulsion and auxiliary power is derived from a zero-emission tailpipe emission source. Examples include diesel-powered vessels with battery plug-in hybrid propulsion systems capable of being charged from the grid, or vessels with hydrogen fuel cells.
3. **Zero-Emission Vessels**, which include vessels in certain categories that do not and would not use an internal combustion engine to generate propulsion or auxiliary power. Combustion engines may exist for emergency, safety, or other incidental or unforeseen purposes, but would not be permitted for use during normal operation of the vessel.

This concept would establish mandates for deploying zero-emission and advanced technologies, as shown in Table 2.

**Table 2.** Proposed Mandates for Zero-Emission and Advanced Technologies

Marine Technology Type	Vessel Category Requirement	Mandate Phase In Date
Enhanced Efficiency Diesel-Electric	New Tugs	January 1, 2025
Zero-Emission Capable Hybrid	New Excursion Vessels	January 1, 2026
Zero-Emission	New and In-Use Short (<3 nm) run ferries	January 1, 2028

If vessel owners or operators adopt zero-emission and advanced technologies early or where not otherwise required, additional compliance time could be granted to other engines or vessels within a fleet through one of two pathways described under

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<sup>2</sup>Enhanced Efficiency Diesel-Electric Vessels have been built today in the tugboat sector. By design, the vessels augment mechanical propulsion with auxiliary diesel electric generators using a power take-in (PTI) system to maximize the time diesel engines are operating in their most efficient load range (e.g. typically 80 to 90 percent of maximum rated power).

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**Proposed Concepts for Commercial Harbor Craft in California**  
Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
Advanced Technology on New and In-Use Vessels

Concept VIII. If vessel owners or operators receive public funding through pilot, demonstration, and other programs to develop and deploy zero-emission and other advanced technologies, it is possible that no additional compliance time could be granted for a different vessel within the fleet, depending on the funding program requirements.

Justification/Reasoning

This concept includes zero-emission mandates where technology is more feasible, and establishes a regulatory incentive framework to encourage adoption everywhere else. California remains a leader in air quality technologies, and this is a provision to ensure these technologies enter the marine market.

**V. Removing Exemptions for Under 50 horsepower**

Background

The existing CHC Regulation exempts engines less than 50 horsepower (hp).

Proposed Concept

The proposed concept would expand in-use engine standards to engines of all sizes and power displacements.

Justification/Reasoning

CARB staff estimate 23 percent of auxiliary engines are rated below 50 hp, and emissions from engines under 50 hp contribute approximately 8 percent of total auxiliary engine PM emissions. Therefore, to maximize emission reductions, and remove any incentive to install a greater number of smaller engines under 50 hp, all engine sizes need to be included.

**VI. Requiring Replacement Vessels for Certain Vessel Categories**

Background

The existing CHC regulation contains a provision that grants compliance extensions when there is "No suitable engine replacement for harbor craft" as defined in subsection (e)(6)(E)2. Under the existing CHC regulation, there is no limit to the number of annual compliance extensions that could be requested. However, no vessel

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**Proposed Concepts for Commercial Harbor Craft in California**  
Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
Advanced Technology on New and In-Use Vessels

owners/operators are currently requesting annual extensions because the technology to comply with the in-use requirements is readily available and feasible.

Proposed Concept

If a vessel in an applicable category cannot comply with a repower/retrofit, the vessel would need to be replaced to continue operating in California. The vessel operator would have up to six additional years beyond the initial engine compliance date to replace the vessel if they demonstrate both that Tier 3/4 + DPF is not technologically feasible for the vessel and they have demonstrated financial hardship and are unable to pay for compliance by the initial engine compliance date. Details on the compliance extension process are included Concept VIII.

Justification/Reasoning

Reductions from vessels are needed to achieve public health benefits. The additional time to comply (up to six years) would allow for newer engine standards to take effect and would allow vessel operators more time to plan to invest in newly built vessels to maximize potential future reductions with cleaner engines, such as emerging zero-emission and advanced technology that is still coming to market. By allowing compliance extensions under these limited circumstances where vessels would need to be replaced, CARB staff expects that vessel owners and operators would be able to take advantage of the newest technology to maximize emission reductions in the long term. Additionally, additional Tier 4 and retrofit DPF technologies may come to market that are more compact, versatile, or custom-designed for fitting into the existing in-use CHC fleet.

## **VII. Compliance Extensions**

Background

The existing regulation contains provisions for compliance extensions in § 93118.5(e)(6)(E), as follows:

1. *Change in Annual Hours of Operation;*
2. *No Suitable Engine Replacement for Harbor Craft;*
3. *Equipment Manufacturer Delays or Installation Difficulties; and*
4. *Multiple Engines on Multiple Vessels Within Same Fleet and With Same Compliance Dates*

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

This concept focuses primarily on changing the existing provision currently described as “No Suitable Engine Replacement for Harbor Craft” as defined in subsection 93118.5(e)(6)(E)2., which extends the nominal compliance date under certain circumstances. Existing requirements allow owners or operators to apply for this extension if there is no engine based on safety, function, and fitment. There is no cost element to the current process for requesting compliance extensions under the existing provision. Executive Officer approval is required for each of these circumstances, and the timeframe and renewability of each extension varies.

CARB staff understand that the more stringent in-use requirements proposed in these concepts would present technical and cost challenges for many vessels. To better understand the extent of vessel modifications that may be required to accommodate Tier 4 engines or retrofit DPF and SCR aftertreatment, CARB contracted with the California State University Maritime Academy (Cal Maritime, or CMA) to perform a feasibility and cost analysis for 13 commonly encountered yet distinctly different vessel types, each fairly representative of their intended sectors of operation. CARB staff recognizes that the selected vessels do not represent all vessels in each category, and no feasibility analysis can practically evaluate all unique vessel modifications in advance of the rulemaking. Findings of this study indicated that some vessel categories would likely require substantial reconfiguration to accommodate newer engines or aftertreatment, and fitment of new equipment is dependent on the unique vessel configuration. For instance, a ‘representative’ high-speed ferry evaluated may not precisely evaluate the extent of modifications required on other high-speed ferries operating in California. Therefore, CARB staff proposes that even where CMA identified clear feasibility for repowering and retrofitting in-use vessels, the regulation should still establish a compliance extension framework for all vessel categories.

#### Proposed Concept

This concept focuses primarily on changing the existing provision currently described as “No Suitable Engine Replacement for Harbor Craft” as defined in subsection 93118.5(e)(6)(E)2. Under this concept, regulated entities may receive extra time to comply if they document to CARB 1) that no practical or safe vessel modifications or reconfigurations are feasible to repower and retrofit engines on their vessel(s), AND 2) compliance by the deadline would cause a financial hardship.

The operator would need to submit both a feasibility analysis and a financial analysis to CARB at least one year prior to engine compliance deadlines. Vessel feasibility

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

analysis would be reviewed by CARB staff, and potentially in conjunction with a third-party naval architect with industry-specific expertise. Vessel owners or operators would need to submit financial data to CARB, which would use existing U.S. EPA models such as ABEL, INDIPAY, or MUNIPAY<sup>3</sup>, to evaluate an entity's ability to afford compliance costs. Upon approval by CARB's Executive Officer, three additional years may be granted for the operator to comply. This extension would be renewable for up to another three years for some but not all vessel categories. After a total of six years, the vessel would no longer be able to operate in California. CARB staff expects that new build vessels would fill the operational gap within the California harbor craft fleet.

CARB staff anticipates retaining other extensions under section 93118.5(e)(6)(E), as listed above, including for equipment manufacturer delays, installation difficulties, and fleets with multiple engines and vessels with the same compliance deadlines. Minor modifications to the existing rule language, such as the timeframes for extensions and ordering engines may be proposed. Infrastructure installation delays are intended to be captured in the compliance extension process for vessel categories that would be dependent upon zero-emission infrastructure, such as short-run ferries and new excursion vessels.

Other compliance extensions beyond nominal compliance dates may be granted through the Alternative Compliance Pathways concept, which is discussed under Concept VIII.

#### Justification/Reasoning

Provisions for compliance extensions are needed to account for circumstances under which compliance deadlines cannot be met. However, compliance extensions are intended to be a last resort, therefore need to be substantiated by feasibility analysis showing that no amount of modifications or reconfigurations are technically feasible to accommodate required engines and DPF aftertreatment, and that the only possible option to comply would be to build a new vessel. CARB staff is still evaluating and seeking input on how extensions would be granted if Tier 3 or 4 engines are feasible, but retrofit DPF aftertreatment is not feasible.

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<sup>3</sup> <https://www.epa.gov/enforcement/penalty-and-financial-models>

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**Proposed Concepts for Commercial Harbor Craft in California**  
Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
Advanced Technology on New and In-Use Vessels

CARB staff selected a three-year extension period to minimize compliance burden on regulated entities from needing to re-evaluate feasibility more frequently, such as on an annual basis, when only one model year of engines and new control technologies would have had opportunities to come to market.

## **VIII. Alternative Compliance Pathways**

### Background

Subsection 93118.5(f) of the existing CHC regulation provides provisions of Alternative Control of Emissions (ACE) for complying with the in-use engine requirements. The ACE option allows the applicants to demonstrate that equivalent emission reductions would be achieved, or exceeded, using alternative strategies. Alternative strategies can include engine modifications, exhaust after-treatment control, engine repower, using alternative fuels or fuel additives, or fleet averaging. ACE applications must be made available for public review and comment prior to Executive Officer action.

### Proposed Concept

CARB staff is proposing to replace the existing ACE provision with a new procedure called the Alternative Compliance Pathway (ACP) that would include a more streamlined review process. CARB staff proposes ACP options that vessel owners or operators can request.

#### *ACP, Option 1.*

At least 12 months in advance of an engine's compliance deadline, owners or operators would need to submit a detailed application to CARB demonstrating how their plan would achieve equivalent or additional emission reductions as compared to existing requirements for in-use and new vessels. This option most closely resembles the ACE provision in the existing CHC regulation. The application would undergo a public review process, and obtain EO approval. To be approved, the proposed ACP would need achieve equal or greater emission reductions than required by future engine model-year schedules outlined in the Proposed Implementation Timeline below (Section X).

#### *ACP, Option 2.*

Regardless of calculated long-term emissions impacts, through submitting an ACP, vessel owners and operators could request additional compliance time to other

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 Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
 Advanced Technology on New and In-Use Vessels

engines or vessels within their fleet when adopting zero-emission and advanced technologies where not otherwise required. As stated above under Concept IV, if vessel owners or operators receive public funding through pilot, demonstration, and other programs to develop and deploy zero-emission and other advanced technologies, it is possible that no additional compliance time could be granted for a different vessel within the fleet, depending on the funding program requirements. ACP, Option 2 is a streamlined process that does not require a public review, but would require an application from vessel owners or operators, and EO approval.

**Table 3.** Voluntary Actions – Proposed Extended Compliance Time

Marine Technology Type	Additional Compliance
Enhanced Efficiency	1 Extra Year
Zero-Emission Capable Hybrid	3 Extra Years
Zero-Emission	7 Extra Years

CARB staff intends to quantify the emission impacts of this proposed concept, acknowledging that implementing this pathway to promote advanced technology may result in an emissions increases in some cases. CARB staff proposes to offer additional compliance times as outlined in Table 3 to provide regulatory incentives to deploy zero-emission and other advanced technologies with lower tailpipe emissions. To minimize redirecting emissions to concentrated regions of the state, CARB staff propose that the vessel with advanced technology would need to operate within the same air district as the vessel receiving additional time to comply.

Justification/Reasoning

Allowing owners or operators to propose alternative strategies that would achieve equivalent, or additional, emission reductions, in exchange for additional compliance time for other engines or vessels within the fleet, may incentivize some vessel owners/operators to become early adopters of advanced technology.

**IX. Summary of Proposed Requirements by Vessel Type**

Table 4 below describes whether each vessel category would be subject to in-use requirements under these proposed concepts, the maximum extension beyond

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**Proposed Concepts for Commercial Harbor Craft in California**  
 Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
 Advanced Technology on New and In-Use Vessels

original compliance date the vessel category may be eligible for, and requirements for newly built vessels.

**Table 4.** Proposed list of vessel categories, in-use engine requirements, and requirements for evaluating feasibility or replacing vessel.

Vessel Category	Regulated In-Use Category?	Maximum Extension Years Beyond Original Compliance Date	New Vessel Requirement
Ferry	Yes	6 Years	Meet current emission standards plus additional requirements as applicable
Pilot Vessels	Yes	6 Years	
Tugboats <sup>1</sup>	Yes	6 Years	
Barges	Yes	6 Years	
Dredges	Yes	6 Years	
Crew & Supply	Yes	6 Years	
Tugboats on ATBs <sup>2</sup>	Yes	6 Years	
Tank Barges	Yes	6 Years	
Research Vessels	Yes	6 Years	
Work Boats	Yes	Unlimited <sup>3</sup>	
Charter Fishing	Yes	6 Years	
Excursion	Yes	6 Years	
Commercial Fishing	No	N/A	
Historic	No	N/A	
Coast Guard / Military	No	N/A	
Temporary Replacement	No	N/A	
Ocean-Going Vessels	No	N/A	

1. Includes all tugs, including ship-assist, escort, harbor, push/tow tugs.  
 2. ATBs sometimes have Category 3 engines due to having >30 L/cylinder displacement, but operate very similar to Category 2 engines, and will remain subject to the CHC regulation  
 3. New builds would not be required due to the high cost of vessel and cost per ton of reductions associated with replacing vessels relative to other vessel types. Cost per weighted ton estimates for vessel replacement are substantially higher for these vessel categories, and the CMA feasibility study indicated that more substantial reconfigurations of in-use vessels

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**Proposed Concepts for Commercial Harbor Craft in California**  
Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and  
Advanced Technology on New and In-Use Vessels

would be required. Replacing barge, dredge, and tank barge vessels would be similarly costly per ton of reductions, but the CMA feasibility study indicated greater feasibility of repowering and retrofitting in-use vessels in these categories.

**X. Proposed Implementation Timeline**

Table 5 outlines proposed compliance deadlines based on engine model year. Note that this concept requires new vessel categories to be subject to in-use engine requirements that are not covered in the existing CHC regulation. Consequently, engines on vessel categories with no existing regulatory requirements (e.g. work boats, charter fishing vessels, etc.) would need to repower to Tier 3 and 4 earlier, and be retrofit later during the implementation period.

CARB estimates that over 4,500 engines would need to apply a compliance option that would result in retrofitting or repowering engines. This includes engines subject to in-use requirements under the existing regulation as well as engines that would be subject to in-use requirements for the first time under the new or amended regulation. The compliance table below considers the population inventory of engines based on age to provide a smooth transition of the most constant number of engines over the 9-year period. Vessel categories with highest per-vessel emissions were targeted earlier in the compliance table.

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**Proposed Concepts for Commercial Harbor Craft in California**

Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

**Table 5. Major Compliance Requirements of Existing and Proposed Regulation.**

Existing Regulation (Implementation Dates)			Proposed Regulation (Implementation Dates)									
2020 & Earlier	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	
<b>IN-USE VESSEL REQUIREMENTS</b>												
<b>Tier 2 or 3</b> <i>(Tugs, Ferries, Excursion, Crew &amp; Supply, Barge, Dredge)</i>	<b>Any Tier 0 and 1 → Tier 4*</b> <i>(generally Workboats, Research, Pilot, Tank Barges, and Charter Fishing)</i>											
	≤ MY 1993	MY 1994-2001	MY 2002-2006									
			<b>Tier 2, 3, 4 → Tier 4*+DPF**</b> <i>Ferries (Except Short Run), Pilot, All Tugs</i>									
		MY 2007-2009	MY 2010-2012	MY 2013-2015	MY 2016-2019	MY 2020-2021	MY 2022+					
			<b>Tier 2, 3, 4 → Tier 4*+DPF**</b> <i>Research, Charter Fishing, Excursion</i>									
		MY 2007-2010	MY 2011-2012	MY 2013-2014	MY 2015-2017	MY 2017+						
		<b>Tier 2, 3, 4 → Tier 4*+DPF**</b> <i>Dredges, Barges, Crew &amp; Supply, Workboats</i>										
	MY 2007-2009	MY 2010-2013	MY 2014-2017	MY 2017+								
<b>NEW VESSEL REQUIREMENTS</b>												
<b>Tier 2, 3, or 4</b> <i>All Vessels</i>		<b>New Tugs: Enhanced Efficiency Propulsion (e.g. Hybrid)</b> <i>Excludes tugs working exclusively as Articulated Tug Barges, pushing or towing tugs</i>										
<b>Tier 3 + BACT</b> <i>New Ferries Carrying 75 or More Passengers</i>		<b>New Excursion: Zero-Emission Capable (e.g. Plug-in Hybrid)</b> <i>30% or more of power must be derived from zero-emission tailpipe source</i>										
<b>REQUIREMENTS FOR ALL HARBOR CRAFT OPERATING IN CALIFORNIA</b>												
										All Short-Run Ferries: Zero-Emission		

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## Proposed Concepts for Commercial Harbor Craft in California

### Document 1 of 3: Requirements for Cleaner Combustion, Zero-Emission, and Advanced Technology on New and In-Use Vessels

\*All engines  $\geq 600$  kW would be required to be certified to Tier 4. For engines  $< 600$  kW, a Tier 4 certified engine would be required if certified by U.S. EPA or CARB and available by the compliance date. At this time, CARB staff is aware of one manufacturer with Tier 4 marine engines certified below 600 kW; therefore, CARB staff expects the majority of engines rated below 600 kW to repower to Tier 3 marine standards.

\*\*Retrofit DPF requirements would apply to all Tier 3 and Tier 4 engines.

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**Proposed Concept for Commercial Harbor Craft Regulation**  
Document 2 of 3: Operational, Reporting and Compliance Requirements

February 27, 2020

This document contains California Air Resources Board (CARB) staff's proposed concepts for further reducing pollution from Commercial Harbor Craft (CHC). CHC include a wide variety of vessel types owned by private and public entities, including but not limited to tug/towing vessels, ferries, pilot vessels, work boats, barges, dredges, research, crew and supply, excursion, charter fishing and commercial fishing vessels. Commercial Harbor Craft are subject to 17 California Code of Regulations (CCR) § 93118.5, the Airborne Toxic Control Measure for Commercial Harbor Craft, referred to hereafter as the "existing regulation."

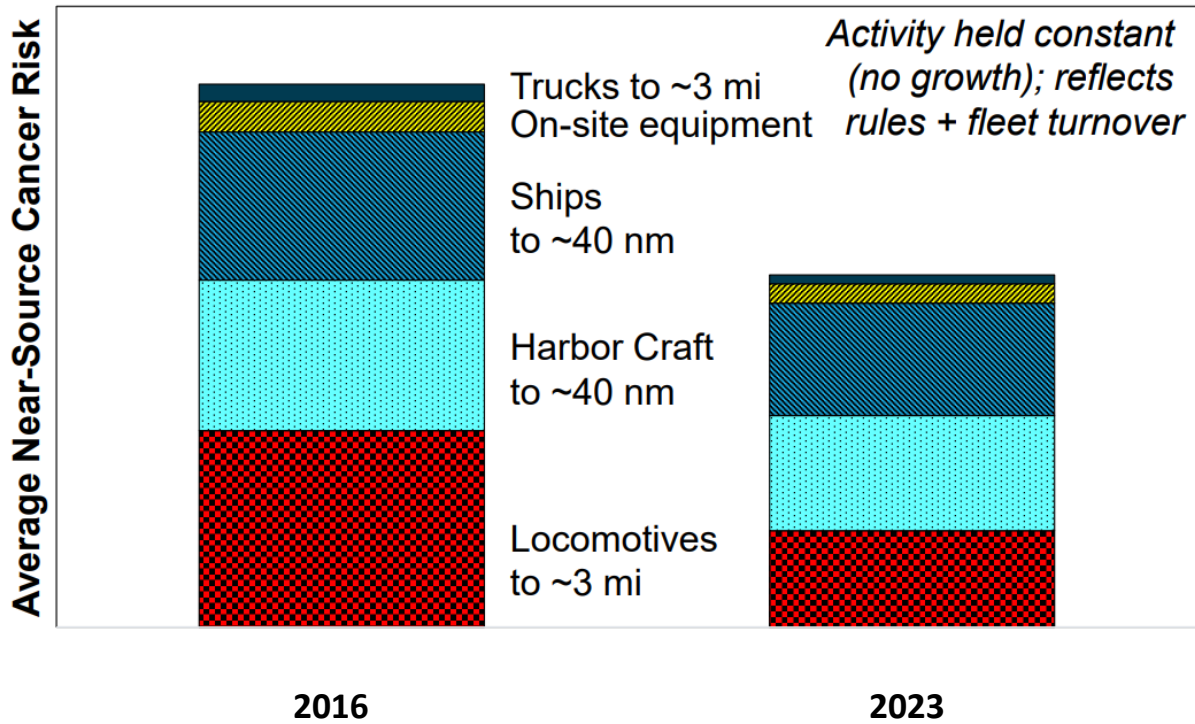
CARB staff is undertaking a rulemaking process to amend or replace the existing regulation to further reduce emissions from harbor craft, scheduled for Board consideration in 2021. The CHC rulemaking is included in CARB's Community Air Protection Blueprint, which identifies statewide strategies for delivering emission reductions in communities heavily impacted by freight sources, as required by Assembly Bill (AB) 617. The CHC rulemaking is also one of several actions CARB is undertaking additional to State Implementation Plan commitments intended to collectively reduce community health risk, attain regional air quality standards, and mitigate climate change while pushing forward the adoption of zero emission and advanced technologies.

CARB staff recognizes that under the existing regulation, harbor craft owners have made considerable investments to replace older engines with newer, cleaner engines to comply with the existing regulation. In addition, some harbor craft owners not subject to in-use requirements have voluntarily replaced their engines utilizing CARB's Carl Moyer Program administered through local air districts. However, the near-source cancer risk and local pollution contribution from harbor craft remains high. During the March 2017 Board Hearing, the Board directed staff to return within 12 months with concepts to control pollution from large freight facilities including seaports. During the March 2018 Board Hearing, staff proposed to reduce emissions from multiple freight sources including harbor craft. Leading up to the March 2018 Board Hearing, CARB staff conducted a scoping evaluation for the ports of Los Angeles and Long Beach. The scoping evaluation showed that harbor craft was still the third-highest contributor to near-source cancer risk in 2016, and will contribute an even larger proportion in 2023 once emissions from ocean-going vessels and locomotives are further reduced.

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**Proposed Concept for Commercial Harbor Craft Regulation**  
 Document 2 of 3: Operational, Reporting and Compliance Requirements

**Figure 1. Average Near-Source Cancer Risk from Port Mobile Sources in 2016 and 2023\***



\*nm = nautical miles; mi = miles

The existing regulation will be fully implemented at the end of 2022, therefore CARB staff’s proposed concepts are focused on reducing emissions from 2023 through at least 2031.

Proposed concepts in this document: (1) establish expanded and more stringent requirements for engines operating on harbor craft and voluntary provisions, and (2) add mandates to accelerate deployment of zero-emission and advanced technologies into the marine harbor craft sector. These concepts are in draft form, and will be used to develop CARB staff’s regulatory proposal. A draft regulation order will be included in the Initial Statement of Reasons document, which will be released for a 45-day public comment period prior to the Board Hearing.

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**Proposed Concept for Commercial Harbor Craft Regulation**  
Document 2 of 3: Operational, Reporting and Compliance Requirements

**Table of Contents**

XI. Idling Limits and Shore Power Requirements .....	4
XII. Facility Infrastructure .....	6
XIII. Reporting – Facilities .....	8
XIV. Reporting – Operators .....	9
XV. Vessel Identifiers .....	14
XVI. Opacity Testing .....	15
XVII. Applicability and Exemptions .....	18
XVIII. Compliance Fee .....	20

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**Proposed Concept for Commercial Harbor Craft Regulation**  
Document 2 of 3: Operational, Reporting and Compliance Requirements

**XI. Idling Limits and Shore Power Requirements**

Background

CARB staff has observed, and has received complaints from the public, about extended main engine idling and auxiliary engine operation while harbor craft are at dock. CARB staff's preliminary analysis of electronic engine records provided by vessel owners/operators indicate that up to 40 percent of all operational hours over the lifetime of the engines were at idle. Idling reduction through shutting off engines or plugging into shore power while at dock would reduce near-source exposure to diesel exhaust, oxides of nitrogen (NOx), operator fuel expenses, and greenhouse gas (GHG) emissions.

For main propulsion engines on harbor craft, CARB defines idling as operating the propulsion engine at a speed of around 600 to 650 revolutions per minute (rpm) and when engine torque is not more than a couple percent greater than the nominal friction torque of the engine, which typically occurs when the engine is disengaged from the propeller. When disengaged from the propeller, the engine is not generating any useful work, but is still operating and contributing to emissions. Auxiliary engines are typically electrical generators, which seldom operate without any load, because they provide on-board power to the vessel. Because auxiliary generators are performing work, they cannot be turned off while the vessels are docked unless an alternative power source is used.

Proposed Concept

CARB staff proposes to limit main engine idling, and auxiliary generator operation, to 15 minutes, during the following situations:

- after initial daily startup before a vessel is scheduled to embark from a slip, berth, or other docked location;
- between disembarking and embarkation – after the vessel is docked, the main engines may be operated no more than 15 minutes at idle before the vessel leaves the location; and,
- after final docking for the day or work period, before engines are shutoff for 4 or more hours.

In all instances for main engines, quick engine accelerations or turning off and restarting the engine while otherwise idling, in order to circumvent this requirement, would still be considered continuous idling. As proposed, this concept allows 15 minutes of idling after coming to dock at the end of a work period, and 15 additional

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

minutes prior to initial operation in a subsequent work period after engines are restarted. CARB defines a new work period to begin when main engines have been shutoff for 4 hours or longer, which would typically occur overnight but may also occur during midday shifts.

Because auxiliary engine operations also emit toxic diesel exhaust, this concept would require using shore power instead of operating auxiliary engines while vessels are at dock. Shore power means using electricity while a vessel is docked or residing at a stationary location adjacent to land. Auxiliary engines that are not electric generators and are not generating any useful work while at the dock would need to be shut off, similar to the requirements for main engines.

CARB staff anticipate establishing exceptions for main engine idling and auxiliary engine operations, such as:

- 1) idling for testing, servicing, repairing, diagnostic purposes, or inspections;
- 2) idling necessary to accomplish work for which the vessel was contracted (such as waiting to pull another vessel away from a dock);
- 3) idling necessary to ensure safe operation or security of the vessel; and,
- 4) operation of direct-drive or other specialty auxiliary engines while at a dockside location.

CARB staff proposes these idling and operational limits having considered input from multiple passenger ferry operators who frequently embark and disembark from different facilities over a course of a workday. CARB staff anticipates these requirements affect ferry operators most, and focused initial discussions with these operators. CARB staff is assuming that other vessel categories would be less impacted, and can meet similar operational requirements. CARB staff welcomes feedback from other vessel types that may have unique operations.

There are a couple idling restriction regulations that affect other diesel powered equipment. In title 13 CCR § 2485, "Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling", on-road heavy-duty truck idling is restricted. In title 13, CCR § 2449, "General Requirements for In-Use Off-Road Diesel-Fueled Fleets", subsection (d)(2), limits idling of diesel powered off-road equipment. Both of these regulations limit idling to 5 consecutive minutes. CARB staff proposes a longer 15-minute idling time period for harbor craft due to the size of the engine and

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

vessels, and more complex start-up procedures required with multiple engines located on the same vessel.

#### Proposed Implementation Timeline

Proposed idling and shore power requirements would take effect on January 1, 2024. Requirements would not immediately take effect when the regulation becomes effective to allow facilities time to install any additional infrastructure to use shore power instead of using on-board electric generators. CARB staff understands that most vessel operators today already use shore power on a routine basis to reduce fuel costs and minimize engine wear.

## **XII. Facility Infrastructure**

#### Background

As advanced and alternative technologies emerge for the harbor craft sector, CARB staff is taking into consideration the infrastructure needed to support them. There are some vessels operating in California that are capable of zero-emission operation, but limited infrastructure is available to maximize the use of zero-emission operation and reduce emissions. Additionally, the introduction of zero-emission power systems is expanding, from both new and established marine powertrain manufacturers. As of today, there is insufficient infrastructure available to support widespread deployment of zero-emission and other advanced technologies. The majority of facilities have docks or slips that are equipped with shore power capabilities that enable harbor craft auxiliary engines to operate using electricity while at dock. However, there are facilities and vessels that do not have shore power capabilities. In order for harbor craft owner/operators to be able to comply with requirements for zero-emission shore power, facilities and vessel owners/operators would be required to install the necessary infrastructure.

#### Proposed Concept

CARB staff is proposing that facilities would be required to allow, and in some cases would be responsible for, the installation and maintenance of on-site infrastructure to support harbor craft that use zero-emission and other advanced technologies. In most cases, facilities would be required to maintain their existing, or install new shore power infrastructure to enable harbor craft owner/operators to plug-in vessels to use shore power while at dock instead of operating on-board generators. In other cases, facilities would be required to facilitate and work with vessel owner/operators to allow

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

the installation of charging or fueling infrastructure for zero-emission and other advanced technologies.

Table 1 below outlines the various requirements, and associated responsibilities for facility owners.

**Table 1: Infrastructure Installation and Maintenance Responsible Party for Proposal**

Proposed Requirement	Owner/Operator Responsible	Facility Responsible
Installation and Maintenance of Infrastructure to Support Shore Power Requirement		X
Installation and Maintenance of Infrastructure to Support the Use of Zero-Emission Vessels (e.g. Hydrogen Fueling Infrastructure)	X	
Installation and Maintenance of Infrastructure to Support the Use of Zero-Emission Capable Hybrid Technology (e.g. Rapid Charging Infrastructure)	X	

These proposed facility infrastructure requirements are similar to other recent CARB regulations requiring infrastructure. For example, the proposed Control Measure For Ocean-Going Vessels At Berth includes responsibilities for the ports and terminals to provide infrastructure to allow vessel owners/operators to comply with in-use requirements. As another example, to deploy and maintain zero-emission buses, the Innovative Clean Transit Regulation requires Zero-Emission Bus Rollout Plans for construction and installation of infrastructure for charging and refueling.

A possible alternative to requiring facilities to allow, but not be responsible for installing, zero-emission infrastructure at facilities is to require facilities to be responsible for providing shore power and installing infrastructure. The installation and maintenance of such infrastructure can require investments that require cost recovery over a period of time that exceeds the length of lease terms. If the tenant with a particular vessel no longer visits the facility, it may result in stranded assets for the facility. There is a higher likelihood of stranded assets for harbor craft because technology is becoming commercialized, but is not yet standardized. Unlike

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

passenger cars where standard SAE J1772 plug connections are used on most vehicles, the physical connections and charging protocols are not as established within the marine sector. Therefore, CARB staff does not propose that facilities should be responsible for installing zero-emission infrastructure at this time. However, CARB staff proposes to require facilities to allow their tenants, the owners or operators of harbor craft, to install necessary infrastructure for their operations.

#### Proposed Implementation Timeline

Under the proposal, all facilities would be required to allow installation and maintenance of infrastructure starting when the regulation becomes effective, which is anticipated to occur before January 1, 2023. Facilities would also be required to provide shore power by January 1, 2024.

### **XIII. Reporting – Facilities**

#### Background

CARB staff estimates that over one-third of subject vessels operating in the State have not satisfied the reporting requirements of CARB's regulation. Unreported vessels may have non-compliant engines, and without proper reporting, CARB is limited in its ability to locate, identify, and ensure that the vessels are compliant with the regulation and are achieving the intended emission reductions. With the addition of facility reporting requirements, it is CARB staff's goal to capture the remainder of non-reported vessels.

#### Proposed Concept

CARB staff proposes that any facility above a certain size threshold that does business with harbor craft such as, but not limited to, ports, terminals, marinas, harbors, and dock owners would be subject to reporting requirements. CARB staff is seeking input on the metric and size threshold for facilities that would be subject to this requirement. The intent is to capture the greatest number of vessels, but not subject a large number of facilities that are small businesses to onerous or overly frequent reporting requirements. To date, CARB staff has identified a total of 278 harbors, marinas, and ports within the State. A subset of those facilities would be subject to facility reporting requirements.

Applicable facilities would be required to report to CARB vessels that rent/lease or contract a slip to dock/moor for 30 or more consecutive days at their facility. The

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

basis for reporting vessels staying for 30 days or longer is to capture non-reported harbor craft, not necessarily to capture short-term vessel activity. CARB staff need to identify the vessel and its general operation location in order to perform inspections and more effectively implement the regulation. CARB staff is seeking to minimize reporting obligations for facilities that would be newly subject to some requirements of the harbor craft regulation.

Applicable facilities would be required to register and report an initial list of vessels, which would be streamlined with a new online-based reporting system that is currently under development. Thereafter, applicable facilities would be required to report a vessel within 30 days of that vessel signing a contract to rent/lease for 30 consecutive days.

Facilities would report vessels to CARB by one or more identifying numbers. If CARB staff find that the vessel has not been reported to CARB by its owner or operator, then CARB staff would require the facility to supply additional identification information so that CARB staff could contact the vessel owner or operator directly. This requirement is reporting only; at present, CARB staff is not proposing for facilities to turn away non-compliant vessels, or be subject to penalties for conducting business with non-compliant vessels.

#### Timeline

CARB staff proposes that all facilities would need to begin reporting vessels by January 1, 2023.

## **XIV. Reporting – Operators**

### Background

The existing regulation requires reporting periodically, and only after actions are taken or compliance deadlines are approaching. As mentioned above, CARB staff estimates that over one-third of vessels are not reported, and a greater fraction of owners/operators have not submitted updated reports and maintained records as required by the existing regulation.

There are two other regulatory bodies that collect information about harbor craft, but do not contain all necessary records for CARB to implement its rule effectively. One is the United States Coast Guard (USCG or U.S. Coast Guard), which requires vessels to

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

register if they are five net tons and operate in either the coastwise trade or fisheries on navigable waters of the United States or in the Exclusive Economic Zone. U.S. Coast Guard requires vessels to show evidence of the vessel build, establish the owner's U.S. Citizenship status, show proof of vessel ownership, and pay applicable registration fees. U.S. Coast Guard does not collect vessel engine or operational information. The second regulatory body is the California Department of Motor Vehicles (DMV), which requires every sail-powered vessel over eight feet in length and every motor-driven vessel that is not documented by U.S. Coast Guard that is used on waters of the State to be registered. Vessels previously registered in other states must register with California within 120 days of being brought into the State. To register with DMV, vessel owners must complete the application for registration number, certificate of ownership, and certificate of number for undocumented vessel. DMV does not collect vessel engine or operational information.

#### Proposed Concept

CARB staff proposes that owners or operators of harbor craft would be required to report to CARB annually, and after significant changes to a vessel or its operation have occurred, such as replacing an engine, selling the vessel, or changing the homeport of where a vessel operates, or updating owner/operator contact information. Recordkeeping requirements would also apply, but would not be changing substantially from provisions in the existing regulation. This concept would change the following reporting provisions:

- Removing Compliance Plan reporting requirements defined in subsection (h)(2) of the existing regulation, which consists of reporting anticipated compliance plans by February 28 of the year in which a December 31 compliance deadline exists. This requirement has been a helpful planning provision, but would not have as much value after introducing annual reporting requirements.
- Removing Demonstration of Compliance reporting requirements defined in subsection (h)(3) of the existing regulation, which consists of reporting information about new control equipment or engines. The specific Demonstration of Compliance report would not be necessary because information would be provided through new annual or significant change reporting.

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

- Requiring annual reporting, where fields should be updated at least annually if no significant changes have triggered reporting earlier. At a minimum, non-resettable hour meter readings would need to be updated for all vessels on at least an annual basis.
- New requirements for vessel owners to notify CARB when establishing a new homeport within California, or transferring a vessel from a California homeport to outside of California. Both parties, not just the purchasing party, would be required to report to CARB when selling a vessel that is currently operating within California.

Vessel owners would be able to satisfy the reporting requirement by reporting to CARB by a new online reporting system that is currently under development, electronically by e-mail, or by mail.

Table 1 below outlines the company information owner/operators are currently required to report upon operating within Regulated California Waters (RCW) under the existing regulation, and the information they would be required to report under the proposed concepts. CARB staff is not proposing any changes to company information between the existing and future regulation.

**Table 2:** Reporting Requirements – Company Information.

	Currently Required by Existing CHC Regulation 17 CCR 93118.5	Proposed Future Harbor Craft Regulation
Company Name	X	X
Contact name, title, phone, fax, address, & e-mail address	X	X

Table 3 outlines the reporting information required for each vessel operated or homeported within RCW under the existing regulation and the proposed concepts. This concept would remove reporting of vessel registration address, because this information is already collected by other regulatory bodies, such as U.S. Coast Guard, and is publicly available. Vessels are commonly domiciled and operated at locations other than the address where the vessel is registered. Consequently, CARB staff

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

proposes to retain reporting the homeport of the vessel, which if changed, would qualify as a significant change, and be required to be reported to CARB within 30 days. This concept also requires owners/operators to report the approximate amount of engine operation in each regulated vessel category.

**Table 3:** Reporting Requirements – Vessel Information.

	<b>Currently Required by Existing CHC Regulation 17 CCR 93118.5</b>	<b>Proposed Future Harbor Craft Requirements</b>
Report date	X	X
Vessel name	X	X
Vessel registration address	X	
Specific vessel use(s)	X	X
Percent time in each vessel use category		X
Homeport and address	X	X
Build year	X	X
USCG Documentation Number	X	X
California Fish and Game License Number	X	X
International Maritime Organization number	X	X
Call Sign Number	X	X
Maritime Mobile Service Identity Number	X	X
CA DMV CF Number		X
Date of Sale		X
Purchasing entity name & Contact information		X

Table 4 below outlines the proposed engine reporting requirements. This concept would no longer require reporting the year of manufacture of the engine, but only engine model year, upon which U.S. Environmental Protection Agency (EPA)

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

designates engine families and tier levels. Owners or operators would be required to identify and report engine model year and engine family to CARB to ensure end users are aware of the compliance status of their equipment. CARB staff expects the online reporting system to be able to validate engine family numbers reported and indicate the tier level to which the engine is certified. In cases where online reporting is not used or does not indicate tier level, the owner or operator would still be responsible for ensuring their engine meets applicable standards. Additionally, owners or operators would be required to perform and report annually smoke opacity testing results. More information on opacity testing is contained later in this document.

**Table 4:** Reporting Requirements – Engine Information

	<b>Currently Required by Existing CHC Regulation 17 CCR 93118.5</b>	<b>Proposed Future Harbor Craft Regulation</b>
General use (propulsion or auxiliary)	X	X
Engine Location (Port vs. Starboard)		X
Current hour meter reading	X	X
Engine Make	X	X
Engine Model	X	X
Engine Family	X	X
Engine Serial Number	X	X
Year of Manufacture	X	
Engine Model Year		X
Engine Tier Level (e.g. Off-Road Tier 3, Marine Tier 4, etc.)		X
Rated Brake Horsepower	X	X
Total Engine Displacement	X	X
Number of Cylinders	X	X

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**Proposed Concept for Commercial Harbor Craft Regulation**  
Document 2 of 3: Operational, Reporting and Compliance Requirements

Annual operating hours	X	X
Annual fuel usage (e.g. gallons, kWh, etc.)	X	X
Estimated percent operating time (0-3 nautical miles (nm), >3-24 nm, and >24 nm)	X	X
DECS Manufacturer, Model, Install Date, Serial Number	X	X
Hour meter reading at last engine rebuild	X	X
Number of Full Rebuilds	X	X
Reading and date of last smoke opacity test		X
Diesel Exhaust Fluid (DEF) consumption, if engines equipped with Selective Catalytic Reduction (SCR) systems		X
DECS/Repower/Alternative Technology Installer Information (installer name, address, phone, date of installation)		X

Proposed Implementation Timeline

Proposed new reporting requirements would take effect beginning January 1, 2023. Beginning on this date, significant changes would need to be reported to CARB within 30 days. If no significant changes occur that calendar year, annual reports must be submitted no later than December 31, 2023.

**XV. Vessel Identifiers**

Background

Unique identifiers would be needed to assist facilities in implementing vessel reporting

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

requirements, assist with identifying and reporting non-compliance by non-facility stakeholders or members of the public, and to improve accountability and tracking of emission benefits.

There is currently no single identifier that can be used across all vessel types subject to the existing regulation. California DMV and the California Department of Fish and Wildlife (DFW) require labeling outside of vessels, but most vessels are not registered with DMV or DFW, and instead registered with U.S. Coast Guard only, which does not require visible identifiers on the outside of the hull of the vessel. The nautilus of a vessel is commonly on the outside of the hull, but is not unique.

#### Concept Description

CARB staff proposes to generate and assign all harbor craft operating in RCW a unique identifier that owner/operators would be responsible for making visible on the vessel. The letters and numbers of the identifier would follow a similar format, possibly in sequential order.

Owners or operators would be required to procure and affix or paint their own CARB unique identifier to vessels. CARB would identify physical criteria of the identifier (i.e. dimensions, contrasting color, etc.). Identifier requirements would apply to all vessels operating within RCW, both those home ported within and outside of California.

Existing CARB regulations already require identifier labeling to assist with implementation and enforcement. Examples include the Air Toxic Control Measure for Transport Refrigeration Units (TRU) as defined in 13 CCR § 2477, and The In-Use Off-Road Diesel-Fueled Fleets Regulation as defined in 13 CCR § 2449.

#### Proposed Implementation Timeline

All vessels would need to have their identifier labeled or affixed by January 1, 2024.

## **XVI. Opacity Testing**

### Background

CARB has received complaints about smoking harbor craft in several areas of the State. The existing regulation does not have any mechanism that allows CARB to require a harbor craft operator to identify the cause of excess emissions and take corrective action. CARB's heavy-duty in-use inspection and maintenance (I/M) programs are currently limited to on-road trucks, namely the Heavy-Duty Vehicle

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

Inspection Program (HDVIP) and Periodic Smoke Inspection Program (PSIP), and cargo handling equipment (CHE) operating at ports and intermodal rail yards. Both trucks and CHE are subject to periodic smoke opacity testing according to procedures defined in SAE J1667.

The SAE J1667 procedure requires a series of six snap accelerations of an engine in a neutral or unloaded condition, where an electronic meter records the 0.5-sec peak opacity through a 5-inch exhaust path length. The final opacity value is based on the final three measurements, which is automatically calculated by meters meeting SAE J1667 specifications. Opacity limits are set for trucks and CHE separately, but were based on the engine’s original PM emission standard and the presence of a diesel particulate filter (DPF). The lowest limits for the cleanest engines are 5 percent opacity, and the highest limits for the oldest engines are 40 percent opacity. Specific values are shown in Tables 5 and 6.

**Table 5: Opacity Limits for the HDVIP and PSIP**

PM Standard (g/bhp-hr)	Engine Model Year / Configuration	SAE J1667 Opacity Limit
0.60	MY 1990 and Earlier	40%
0.10-0.25	MY 1991 – 1996	30%
0.10	MY 1997 - 2006	20%
0.01	MY 2007 and Newer	5%
N/A	Level 3 VDECS	5%

**Table 6: Cargo Handling Equipment Opacity Limits**

Off/On-Road PM Standard (g/bhp-hr)	SAE J1667 Opacity Limit
> 0.40	55%
0.31 to 0.40	45%
0.21 to 0.30	35%
0.11 to 0.20	25%
0.05 to 0.10	15%
< 0.05	5%

#### Proposed Concept

At this time, CARB staff is performing measurements on harbor craft to inform appropriate opacity limits for marine and off-road engines used in harbor craft

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

applications. Using data collected and existing standards, CARB staff would be proposing opacity limits specific to harbor craft engines, which are generally certified using steady-state cycles on the engine dynamometer. The intent is to set an opacity limit that when exceeded, indicates with a high degree of certainty that an emission-related failure has occurred, and reparative maintenance is needed.

CARB staff propose that all main and auxiliary diesel engines operating on regulated in-use vessels would be required to perform annual opacity testing, and meet applicable opacity limits whenever the test procedure is administered. The proposed concept requirements include the following:

1. Annual opacity testing would need to be performed by vessel owner/operators by December 31, 2023. The results are required to be reported to CARB within 30 days of the completed test and no later than December 31, 2023.
2. Engines of all model years and tier levels would be subject to opacity limits. Tier 2 and newer engines would be subject to opacity testing beginning four years after the model year of the engine..
3. CARB would have authority to perform opacity testing in the field, or audit opacity test records at any time. Opacity limits would be required to be met at all times after January 1, 2023.
4. Swing engines, which are engines maintained dockside for temporary replacement of a vessel engine during repair or routine maintenance, would not be subject to opacity testing when maintained at dockside locations. However, once installed into a vessel with regulated in-use engine requirements, opacity testing would need to be performed prior to the vessel entering normal revenue service, but can occur after sea trials, defined as the initial testing the performance of newly installed engines.
5. Vessels with a homeport outside of California would be required to perform an opacity test within 30 days after entering RCW, and test result would remain effective for one year.
6. Low use engines (operating below 80 hours for barges and dredges or 300 hours for all other vessel types annually) would also be required to perform opacity testing annually starting January 1, 2023, regardless of engine model year, tier

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## Proposed Concept for Commercial Harbor Craft Regulation

### Document 2 of 3: Operational, Reporting and Compliance Requirements

level or compliance deadline, and be subject to the same testing and reporting requirements as other engines. Passing opacity testing would be required when considering approving the low use compliance method.

Opacity testing records would be required to be reported to CARB electronically or by mail within 30 days of completion, and would be subject to recordkeeping requirements.

## XVII. Applicability and Exemptions

### Background

The following types of vessels are exempt from all provisions of the existing regulation:

- Vessels traversing California coastal waters without stopping and without entering any California inland waterway or port, except in limited situations such as when the vessel is in distress or must stop to comply with U.S. Coast Guard regulations,
- Recreational vessels operated primarily for pleasure,
- Ocean-going vessels, except ocean-going tugboats and towboats,
- Military tactical support vessels,
- All U.S. Coast Guard vessels, and
- Temporary emergency rescue/recovery vessels.

The following vessels are exempt from the in-use engine compliance requirements of the existing regulation:

- Historic vessels,
- Temporary replacement vessels,
- Near-retirement vessels, and
- All other harbor craft not included in a regulated in-use vessel category of excursion, ferry, tug/tow, barge, dredge, and crew & supply.

### Proposed Concept

CARB staff is considering only minor changes to the exemptions for the new harbor craft requirements, as outlined in Tables 7 and 8 below. More detail on these changes can be found on the new concepts and requirements for in-use harbor craft.

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**Proposed Concept for Commercial Harbor Craft Regulation**  
 Document 2 of 3: Operational, Reporting and Compliance Requirements

**Table 7:** Compliance Exemptions from the CHC Regulation Entirely

	<b>Exempt from Existing CHC Regulation 17 CCR 93118.5</b>	<b>Exempt from Proposed Future Harbor Craft Requirements</b>
Non-stopping vessels except for in limited situations	X	X
Temporary emergency rescue/recovery vessels	X	X
Diesel-powered Recreational vessels primarily for pleasure	X	Under evaluation
Ocean-going vessels	All except ocean-going tugboats	All except ocean-going tugboats, tank barges
U.S. Coast Guard vessels	X	X
Military tactical support vessels	X	X

Table 8 below outlines the proposed compliance exemptions from only the in-use engine compliance requirements. This concept would subject all engines to the in-use engine requirements, including those rated less than 50 hp. In addition, vessels to be retired within one year of the compliance date for an engine would no longer be automatically granted an additional year of compliance. Because CARB staff expects a number of vessels would be retired and replaced to meet in-use requirements, a separate compliance extension process would be established that if approved on a case-by-case basis, could grant up to six (6) additional years of time a vessel can operate.

**Table 8:** Compliance Exemptions from the In-Use Requirements

	<b>Exemptions from Existing CHC Regulation 17 CCR 93118.5</b>	<b>Exemptions from Proposed Future Harbor Craft Requirements</b>
Temporary replacement vessels	X	X
Registered historic vessels	X	X
Engines rated less than 50 hp	X	

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**Proposed Concept for Commercial Harbor Craft Regulation**  
 Document 2 of 3: Operational, Reporting and Compliance Requirements

Near-retirement vessels meeting certain criteria	X	
Low-use engines	X	X
Commercial fishing vessels	X	X
Emergency vessels*	X	X

\*Categorized as a specific type of workboat in the existing regulation. These include vessels whose primary purpose is police, fire, or other emergency operation.

CARB staff intends to retain the requirement in the existing regulation that limits the approval of a temporary replacement vessel to no more than 12 months out of a 24-month period for a single California vessel being replaced. Moving forward, CARB staff intends to prohibit use of temporary replacement vessels in place of existing vessels in the fleet that are taken out of service due to in-use compliance deadlines. Owners or operators electing to request use of a temporary replacement vessel would need to submit a request to CARB at least one year before any compliance deadlines of engines aboard the vessel, and describe how the temporary replacement vessel would no longer be needed to maintain business operations by the compliance deadline(s) of engines aboard the vessel being replaced. Temporary replacement vessels would also be limited to those with main and auxiliary engines certified to Tier 2 or newer standards.

**XVIII. Compliance Fee**

Background

CARB is authorized by Health and Safety Code Section (HSC) 43019.1 to adopt a schedule of fees to cover reasonable costs associated with compliance. The existing CHC regulation does not contain a fee provision. However, other CARB regulations do contain fee provisions to offset the cost of implementation and enforcement.

Proposed Concept

CARB would propose to include a compliance fee in the new or amended regulation. In accordance with HSC 43091.1, the fee amount would be based on estimates of CARB personnel, equipment, and other operational costs to conduct implementation and enforcement of the regulation. This would include, but not be limited to, receiving and processing vessel owner/operator and facility reports, including

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## **Proposed Concept for Commercial Harbor Craft Regulation**

### Document 2 of 3: Operational, Reporting and Compliance Requirements

outreach and follow-up with regulated parties, re view and approval of compliance extension requests, and statewide enforcement of the regulation.

CARB staff is in the process of determining the exact fee amount and structure to be proposed. CARB staff is seeking input on how fee structures could be structured to consider different vessel operations. For example, should there be a flat fee for all vessels each year, should there be a fee based on the number of hours a vessel is operated, and should fees be set differently by category of CHC?

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**Proposed Concept for Commercial Harbor Craft Regulation**  
Document 3 of 3: Staff Questions for Stakeholder Input

February 27, 2020

CARB staff is requesting feedback and data to both refine the regulation concepts in Documents 1 and 2 and accurately evaluate the potential cost of these concepts. Stakeholders are encouraged to provide staff with as much information as possible to ensure that staff is not overlooking or underestimating potential costs or operational considerations that will help staff refine the regulation concepts.

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Cost of Compliance with Proposed In-Use Standard (Concept II): How much would it cost vessel owners to comply with the proposed in-use performance standard of Tier 4 + DPF?

- What would be the estimated cost to retrofit or repower an existing vessel to meet the performance standard?
- What would be the estimated cost of a replacement vessel that meets the performance standard?
- What alternative technologies have you considered that could work for your vessel operations and achieve similar emission reductions?
- How long would it take and what would be the estimated cost to conduct an engineering/naval architect analysis to assess the feasibility of or plan for a retrofit/repower of your vessel(s), or to design a new vessel?
- How many years do you estimate it would take to raise enough capital for retrofit or repowers, or a replacement vessel?
- How many years would you expect to continue operating your existing vessel(s) in the absence of any CHC Regulation requirements?

Zero Emission and Alternative Control Technologies (Concepts III and IV): What operational concerns exist for adopting zero-emission or alternative technologies for your vessel type?

Compliance Extensions (Concept VII): How should extensions be granted if a naval architect analysis shows that Tier 4 engine(s) are feasible on a vessel, but a retrofit DPF is not?

Idling and Operational Limits for Shore Power (Concept XI): Staff has considered input from multiple passenger ferry operators in developing the proposed concept.

- What other vessel types have operations that could inform these potential requirements?

## Proposed Concept for Commercial Harbor Craft Regulation

### Document 3 of 3: Staff Questions for Stakeholder Input

- What other shore power-related issues or obstacles should staff be aware of?

Shore Power and Zero-Emission Infrastructure (Concepts IV, VIII, and XII): What would be the process for installing infrastructure for harbor craft shore power or to support zero-emission vessels (such as hydrogen fueling and rapid charging infrastructure)?

- Who would pay for the equipment (facility, vessel owner, etc.)?
- How long would it take for planning, engineering, agency approvals, and construction?
- What agencies would be involved?
- What would the approximate cost be?

Facility Reporting (Concept XIII): Do stakeholders have any other suggestions besides facility reporting to help CARB improve the percentage of vessels that are reporting to CARB as required?

Compliance Fee (Concept XVIII): How could CARB structure fee structures to consider different vessel operations? (e.g. should there be a flat fee for all vessels each year, fee based on hours a vessel operates, fees based on vessel category, etc.?)