



801 North Quincy Street  
Suite 500  
Arlington, VA 22203

PHONE: 703.841.9300  
EMAIL: [cstewart@americanwaterways.com](mailto:cstewart@americanwaterways.com)

Caitlyn E. Stewart  
Vice President – Regulatory Affairs

July 1, 2023

U.S. Environmental Protection Agency Docket Center  
WJC West Building, Room 3334  
1301 Constitution Avenue NW  
Washington, DC 20004

RE: California State Nonroad Engine  
Pollution Control Standards; Ocean-Going  
Vessels At-Berth and Commercial Harbor  
Craft; Requests for Authorization;  
Opportunity for Public Hearing and  
Comment (Docket ID No. EPA-HQ-OAR-  
2023-0153)

Dear Ms. Dunham:

The American Waterways Operators (AWO) thanks the U.S. Environmental Protection Agency (EPA) for the opportunity to comment on the California Air Resources Board's (CARB) request for authorization to enforce amendments to its Commercial Harbor Craft (CHC) rule under section 209(e) of the Clean Air Act (CAA).

AWO is the tugboat, towboat, and barge industry's advocate, resource, and united voice for safe, sustainable, and efficient transportation on America's waterways, oceans, and coasts. Our industry safely and efficiently moves over 665 million tons of cargo each year while emitting 43 percent less greenhouse gas than railways and 832 percent less than trucks. The industry is particularly significant in California, which ranks third among states in waterborne commerce by tonnage and fourth by economic impact, with more than \$12.2 billion in annual economic activity driven by the domestic maritime transportation industry.

AWO and its members have a long history of leading and supporting the development of practical and effective regulations to promote marine safety and protect the environment, at both the federal and the state level. Since 2019, we have engaged with CARB to ensure its proposed modifications to the CHC rule are safe and feasible for commercial harbor craft operators while still meeting CARB's goal of reducing emissions. We understand that under CAA section 209(e)(2)(A), EPA must authorize California to adopt and enforce standards it has determined to be at least as protective of public health and welfare as federal standards unless EPA finds:

- (i) The determination of California is arbitrary and capricious,
- (ii) California does not need such standards to meet compelling and extraordinary conditions, or
- (iii) California standards and accompanying enforcement procedures are not consistent with the CAA. EPA has interpreted this to mean that standards and accompanying enforcement procedures must be technically feasible, provide appropriate lead time, give appropriate consideration to the cost of compliance, and be consistent with federal test procedures.

AWO believes that, despite our engagement with CARB throughout the state rulemaking process, the amendments to the CHC rule adopted on March 24, 2022, do not meet two of the three criteria for EPA authorization. We will proceed to explain why CARB's actions have been arbitrary and capricious, why the CHC rule as amended is inconsistent with section 209, and why EPA must therefore decline to grant CARB's authorization request.

#### The Determination of California is Arbitrary and Capricious

*CARB arbitrarily premised its action on information it knew to be incorrect.*

This regulation is based on a fundamental mischaracterization of the operations of commercial harbor craft and their impacts to air quality in California.

The method CARB used to calculate the number of vessels operating in Regulated California Waters (RCW) led to an overestimate of the towing vessel population by 29 vessels. CARB relied on the USCG "Merchant Vessels of the United States" database and its own vessel registration information. These lists contain information on vessel ownership, homeport, and regulatory status. One hundred seventy-seven (177) vessels reported to CARB as operating in RCW and, based on homeport information, CARB assumed an additional 52 vessels are operating in RCW but not reporting. CARB then used this information to model the cumulative impact of towing vessels on air quality.

However, a vessel's homeport is not indicative of where it operates. AWO hired Ramboll, a leading maritime engineering consulting firm, to independently assess the number of towing vessels operating in RCW and their emissions impact. In order to evaluate the number of vessels operating in RCW, Ramboll used Automated Identification System (AIS) data. AIS is the consensus standard-setting, onboard navigation tracking technology that commercial vessels are required to carry and that monitors their movements. Using AIS data from 2019<sup>1</sup>, Ramboll identified which vessels actually operate in RCW and found that there are only 200 towing vessels, not 229 as CARB estimated.

---

<sup>1</sup> AWO chose 2019 for two reasons: first, it was the last year for which AIS data was available that was not affected by the impacts of COVID on vessel operations; and second, CARB provided vessel reporting status for that year, which allowed Ramboll to measure the difference between reporting vessels and non-reported vessel hours.

This correction significantly changes the towing vessel emissions profile. Ramboll estimated that cumulative NOx and PM emissions from towing vessels are 72 percent and 62 percent, respectively, of CARB's estimates. CARB's model also assumed that the 52 "non-reporting" vessels that it included in its count based on homeport information operate in RCW for the same number of hours as reporting vessels. Using a CARB-provided list of vessels that filed reports in 2019, Ramboll found that the "non-reporting" vessels averaged 18 percent of the operating hours of the reporting vessels, meaning that the total unreported hours are a mere 2.3 percent of the total reported hours, not the 29 percent that CARB estimated.

AWO repeatedly informed CARB, in numerous meetings with staff and on-the-record comment letters, that its towing vessel population estimate, and emissions profile were incorrect and provided the agency with the Ramboll study. However, CARB refused to correct its model.

*CARB arbitrarily exempted one type of harbor craft using a criterion that could apply to many.*

CARB has decided to exempt approximately 1,570 commercial fishing vessels, or approximately 40 percent of the total CHC population, from the rule for the first ten years. CARB's stated reasoning for exempting commercial fishing vessels is that they:

- operate on small profit margins;
- demonstrate lack of feasibility for Tier 4 repowers and retrofits;
- compete with out-of-state and global markets; and,
- tend to conduct most of their operations far from the coast.

These characteristics equally apply to towing vessels that operate in coastal and international trade. Oceangoing tugs and barges, either towed on a wire or rigidly connected through an articulated tug barge (ATB) system, are directly analogous to fishing vessels in their size and operations. AWO comments to CARB demonstrated that repowering with EPA Tier 4 engines could be cost prohibitive for some ship assist and escort tugs. AWO's comments – as well as a California Maritime Academy study cited by CARB – also demonstrated that towing vessels have similar technical feasibility challenges as fishing vessels. Further, oceangoing tugs and barges commonly operate in interstate commerce in direct competition with self-propelled vessels in out-of-state and global markets. Lastly, AIS and Marine Exchange data show that these vessels conduct most of their operations far from the California coast, giving them a similar air emission profile to exempted commercial fishing vessels.

### *Conclusion*

Black's Law Dictionary defines "arbitrary and capricious" as a "willful and unreasonable action without consideration or in disregard of facts or law," and courts have overturned agency actions on this basis when the underlying policy judgments, reasoning, or asserted factual premises of the action are so unreasonable as to be arbitrary. By refusing to correct its towing vessel population estimate and emissions profile, CARB has premised its amendments to the CHC rule on a factual basis that is unreasonable and arbitrary. In addition, CARB's exemption of one vessel class from the CHC rule while ignoring other similarly situated vessel classes demonstrates reasoning that is unreasonable and arbitrary. Therefore, the statutory

criterion of CAA section 209(e)(2)(A)(i) has been met, and AWO urges EPA to deny CARB's authorization request on this basis.

California Standards and Enforcement Procedures Are Inconsistent with Clean Air Act Section 209(e)

New marine engine technology must meet U.S. Coast Guard (USCG) safety regulations, the standards of recognized classification societies, and EPA emissions requirements before it can be installed in a vessel. Under the CHC rule, towing vessels are required to upgrade their engines to EPA Tier 4 plus diesel particulate filters (DPFs). However, this technology is neither commercially available nor feasible for installation on existing towing vessels.

*It is structurally impossible or infeasible for towing vessels to adopt EPA Tier 4 plus DPF.*

The CHC rule relies on a California Maritime Academy (CMA) study, titled *Evaluation of the Feasibility of Installing Tier 4 Engines and Retrofit Exhaust Aftertreatment on In-Use Commercial Harbor Craft*, to demonstrate that its preferred emissions reduction strategies are technologically feasible. However, the study found that for towing vessels, this was frequently not the case. Specifically, CMA concluded that there is no combination of repower or retrofit solutions that would allow ship assist tugs to install a DPF plus selective catalytic reduction (SCR) and that installing a Tier 4 marine engine plus DPF would require reconfigurations that would cause the vessel to be out of compliance with USCG safety standards. The study also found that larger towing vessels would require major vessel reconstruction and that adding a DPF did not result in NOx emissions reductions.

The findings of the CMA study are supported by renderings of potential DPFs that suggest that they would not fit within the design of existing towing vessels. In order to be optimally maneuverable, towing vessels are small relative to other types of commercial vessels, and are designed around the vessel's engine to most efficiently perform their function. This means that there is little unoccupied space in the vessel's engine room or machinery space. Tier 4 engines include SCR and take up significant engine room space. One DPF manufacturer estimated that its product would be larger than a SCR and weigh at least 10,000 pounds. This significant size and load increase would require a major reconfiguration of an existing towing vessel that is simply impracticable.

*There are no U.S. certified DPFs for towing vessels and existing DPF technology is not feasible or demonstrated to be safe for use on towing vessels.*

As of June 2023, there are no DPFs certified by EPA and USCG that are compatible with a high-powered Tier 4 marine engine. Further, existing DPF technology is not feasible and has not been demonstrated to be safe for use on towing vessels. In order to function, DPFs use active or passive regeneration. In active regeneration, the DPF uses an outside heat source, typically in the form of a burner, to heat exhaust gas to burn off soot and particulate matter trapped in the filter element. However, this external burner, colloquially referred to as a flamethrower, increases back-engine pressure. This significant alteration could void the engine's EPA tier certification because back engine pressure is one of the construction

parameters. It also has the potential to damage the engine and make the vessel unsafe to operate. It was the active regeneration DPFs that infamously caused engine fires in trucks after they were installed. Fortunately, a truck driver experiencing an engine fire can pull over and evacuate the vehicle. When a vessel's engine catches fire at sea, the only option may be to abandon ship. Passive regeneration does not cause the same back engine pressure because it uses heat from exhaust gases to burn the soot and particulate matter. However, it requires a high load to generate heat, which most towing vessels simply do not have. The CMA study also found that tugboats could not be reconfigured to allow passive regeneration for DPFs.

*It cannot be assumed that compliant technology will be approved by U.S. regulatory bodies within the lead time provided.*

CARB asserted in its Initial Statement of Reason that several engine manufacturers are committed to supporting additional technology development. The agency reiterated this at a hearing on the CHC rule in March 2022 at which CARB staff stated that there are currently no EPA-certified DPFs that can be used with Tier 4 engines but that they had spoken with two retrofit manufacturers and one engine manufacturer, all of whom stated that they are in the process of certifying engines that would meet Tier 4 plus DPF standards.

Statements from manufacturers that they are “working on it” is not the same as technology being commercially available and safe for marine use. The U.S. has significantly stricter safety standards than its international counterparts. It can take an additional three years for an International Maritime Organization (IMO) certified engine to receive EPA and USCG approval. Additionally, AWO members have contacted all major workboat engine manufacturers about supplying DPFs. They all acknowledged that adding a DPF would affect the engine's SCR performance, voiding the engine's Tier 4 certification<sup>2</sup> and putting the vessel out of compliance with EPA engine emissions requirements.<sup>3</sup> It is not reasonable to assume that this technology will be available by the compliance deadlines.

*The time it takes to repower, retrofit, or build a new vessel is longer than the lead time provided.*

Unlike other modes of transportation, or some other classes of commercial vessels, almost every towing vessel is bespoke – individually designed and constructed to meet specific physical needs and fulfill unique operational functions. As a result, towing vessel operators must extensively analyze the consequences of engine changes on the vessel before installation. The USCG and recognized classification societies require operators to seek approval of any changes to major components or essential pieces of machinery to ensure the “major conversion” is safe. This lengthy process includes performing an engineering assessment of the changes, which involves a:

- load analysis;
- stability study;
- evaluation of the propeller load in both static and dynamic conditions;

---

<sup>2</sup> 40 CFR §1068 - General compliance provisions for marine engines and vessels.

<sup>3</sup> 40 CFR §1042 – Control of emissions from new and in-use marine compression-ignition engines and vessels.

- failure mode and effects analysis (FMEA); and
- thorough engineering review of the results.

This process takes more than a year to complete and cannot begin until each machine component and all its specifications are provided. Once the plans are approved, it can take years to source an engine and compatible auxiliary equipment and procure materials, a shipyard facility, and a replacement vessel. Additionally, Tier 4 plus DPF repowers will require major structural changes and an increase in power generation capacity. These alterations will significantly expand the scope of the necessary engineering assessments. A minimal traditional repowering takes at least 15 months. However, this time does not take into account soliciting and receiving quotes for the work, the current three-month construction delay due to supply chain issues, or fact that drydocks are booking 6 to 18 months out. A full timeline detailing the steps needed to repower a vessel with a Tier 4 engine can be found in Appendix I.

*California gives inconsistent lead time considerations.*

Clean Air Act section 202(a)(3)(C), the regulation for heavy duty vehicles and engines, requires California to provide at least a three-year lead time before promulgating any standard. AWO understands that there is no statutory lead time requirement for nonroad vehicles and engines but finds this variance inexplicable given the much more complex nature of designing, constructing, and retrofitting marine vessels and engines. Under the CHC rule, the earliest vessel compliance date is December 31, 2023, which is one year after its adoption by CARB. If EPA grants CARB's waiver request, the actual lead time will be much shorter. Further, as of this writing, CARB has yet to finalize all of its fact sheets, reporting templates, and other compliance guidance. This leaves vessel operators in the unreasonable position of having to prepare to comply with a rule which, six months from its first compliance date, has not been authorized by EPA, and for which they are without important information regarding CARB's interpretation and application of the rule. AWO believes that the lead time for the promulgation of standards for nonroad vehicles and engines should be, at a minimum, consistent with that for heavy duty vehicles and engines.

*The technical requirements do not give due cost consideration.*

The CMA study to determine Tier 4 and DPF feasibility found that it would cost \$2.81 million to retrofit a vessel. Jensen Maritime, a third-party engineering firm, was hired to review these results. Because of the narrow scope of the study, Jensen found that CMA had grossly underestimated the compliance costs and that it would cost \$3.7-\$4.5 million to repower a single vessel and \$16-\$24 million to purchase a new tug, which an operator would be required to do if they could not comply. AWO estimates that it will cost \$1.3 billion to bring all towing vessels operating in RCW into compliance with the new CHC rule. This could devastate smaller, family-run companies who retrofitted their vessel only a few years ago to meet the previous CHC standards with the expectation that the new engine would be used for its full useful life of 20-25 years before normal repowering or vessel replacement.

*Compliance extensions are not adequate to address technical feasibility, lead time, or cost issues.*

CARB has asserted that the CHC rule offers compliance extensions to vessel operators who can demonstrate that there is inadequate lead time, technical infeasibility or a cost burden that will prevent them from complying, and that this is adequate to address issues with the unavailability of certified engine technology, the incompatibility of the technology, the lack of adequate lead time, and the excessive cost burden. In fact, CARB's extension provisions are grossly inadequate. First, a vessel operator must perform and submit a costly engineering analysis to prove to CARB that the requirements cannot be met when the compliance challenges have been repeatedly and compellingly demonstrated. Second, and more importantly, a vessel operator can have no certainty that CARB will approve a compliance extension request. When there is no existing, commercially available engine technology that is compatible with a vessel application or certified by the appropriate regulatory bodies, it is untenable for EPA to authorize CARB to enforce a rule that could require a vessel operator to meet an impossible standard.

### Recommendations

AWO understands that EPA has historically been deferential to California's standard-setting authority under the CAA. AWO members are not opposed to being regulated. Rather, we believe a regulation should be actionable upon promulgation, which this rule is not. We therefore urge EPA to deny CARB's authorization request. If EPA does not, we recommend the agency grant a conditional waiver and require CARB to make the following changes to meet the waiver standards.

*1. Extend the ten-year exemption to oceangoing vessels regulated under the CHC rule that can prove they meet the same conditions as the exempt fishing vessels.*

CARB provided a ten-year exemption from compliance for commercial fishing vessels because they operate under very specific conditions and by not doing this, they would effectively be unable to operate in California. This is an arbitrary exemption because there are other vessels regulated under the CHC rule which could face the same fate.

We recommend EPA extend the commercial fishing vessel exemption to oceangoing tugboats that can demonstrate they meet these same criteria.

*2. Review CARB's vessel emissions analysis to confirm that there is a need for this regulation.*

Upon review from a marine engineering firm, AWO learned that CARB had inaccurately inventoried the number of vessels transiting in RCW. This revelation calls into question California's determination that the regulation will, in the aggregate, be "at least as protective of public health and welfare as applicable Federal standards".<sup>4</sup>

---

<sup>4</sup> CAA section 209(e)(2)(A).

AWO urges EPA to verify the number of commercial harbor craft that *transit* through RCW and their emissions and then use that number to determine whether the rule meets the required standard.

3. *Extend the deadlines for regulatory compliance.*

In its authorization request, CARB argues that the compliance extensions in the CHC rule provide additional flexibility, which help to meet the cost, lead time, and technical consideration threshold for EPA authorization. AWO disagrees. EPA should require CARB to amend the rule to be achievable within the prescribed deadlines, instead of approving a rule with the understanding that no regulated entity will be able to meet it on schedule.

AWO recommends the changes outlined in the following tables to CARB’s existing deadlines. The 2009 CHC rule required operators to update vessel engines to at least Tier 2. These extensions would give early adopters of higher-tier engines the ability to use them for their useful life.

Compliance Dates for Tier 3, or Tier 4 Engines on Ferries (Except Short-Run Ferries), Pilot Vessels, All Tug/Towboats, and Push Boats			
Year of Engine	AWO Proposed Compliance Deadlines (Approved DPF)	AWO Proposed Compliance Deadlines (No Approved DPF)	CARB Proposed Compliance Deadlines
2009 and Earlier	12/31/2027	12/31/2034	12/31/2024
2012 and Earlier (Pilot Vessels)	12/31/2029	12/31/2036	12/31/2025
2010-2012*	12/31/2029	12/31/2036	12/31/2025
2013-2015**	12/31/2031	12/31/2038	12/31/2026
2016-2019**	12/31/2033	12/31/2040	12/31/2027
2020-2021**	12/31/2035	12/31/2042	12/31/2028
2022 and Later**	12/31/2037	12/31/2044	12/31/2029

\*Ferries (Except Short-Run Ferries), All Tug/Towboats, and Push Boats.

\*\*All vessels listed in the title of this table, including ferries (except short run), pilot, all tug/towboats, and push boats.

Compliance Dates for Tier 3, or Tier 4 Engines on Barges, Dredges, Crew and Supply Vessels, and Workboats			
Year of Engine	AWO Proposed Compliance Deadlines (Approved DPF)	AWO Proposed Compliance Deadlines (No Approved DPF)	CARB Proposed Compliance Deadlines
2009 and Earlier	12/31/2036	12/31/2042	12/31/2026
2010-2013	12/31/2038	12/31/2044	12/31/2027
2014-2017	12/31/2040	12/31/2046	12/31/2028
2018 and Later	12/31/2042	12/31/2048	12/31/2029



*4. Amend the E2 Extension to lower the burden of proof on vessel operators to demonstrate technical infeasibility and give operators 18 months to retrofit a vessel with a DPF once it becomes available for their engine.*

The current rule requires vessel operators to prove that there is inadequate lead time, technical infeasibility, or a cost burden that will prevent them from complying. If EPA has determined that all these criteria have been reasonably considered, vessel operators should not also have to prove it on an individual basis. AWO recognizes that EPA's determination is based on the aggregate, rather than individual circumstances. Therefore, we request that EPA require CARB to amend the extensions as follows:

- **Proving Technical Infeasibility.** The E2 Extension requires applicants to submit an engineering analysis proving that no combination of any EPA-certified engines and CARB-verified DPFs can be used on the vessel as designed,<sup>5</sup> an extensive and expensive requirement. Because vessels are already required to adopt the cleanest engine available, AWO believes that operators should only be required to demonstrate that no DPFs are compatible with their new engine.
- **Extending Lead Time.** The E2 Extension requires operators to retrofit a vessel with a DPF within six months of one becoming available for that engine.<sup>6</sup> It takes at minimum 15 months to retrofit a vessel, as demonstrated in Appendix I. Rather than requiring operators to meet an unachievable deadline and be forced to apply for a scheduling extension,<sup>7</sup> EPA should require CARB to change this deadline to 18 months.

### Conclusion

AWO supports CARB's goal of reducing the impact of marine engine emissions and improving California's air quality. However, we do not believe the rule, as written, meets the statutory threshold for EPA approval and urge you to deny CARB's request for authorization under CAA section 209(e).

Sincerely,



Caitlyn Stewart  
Vice President – Regulatory Affairs

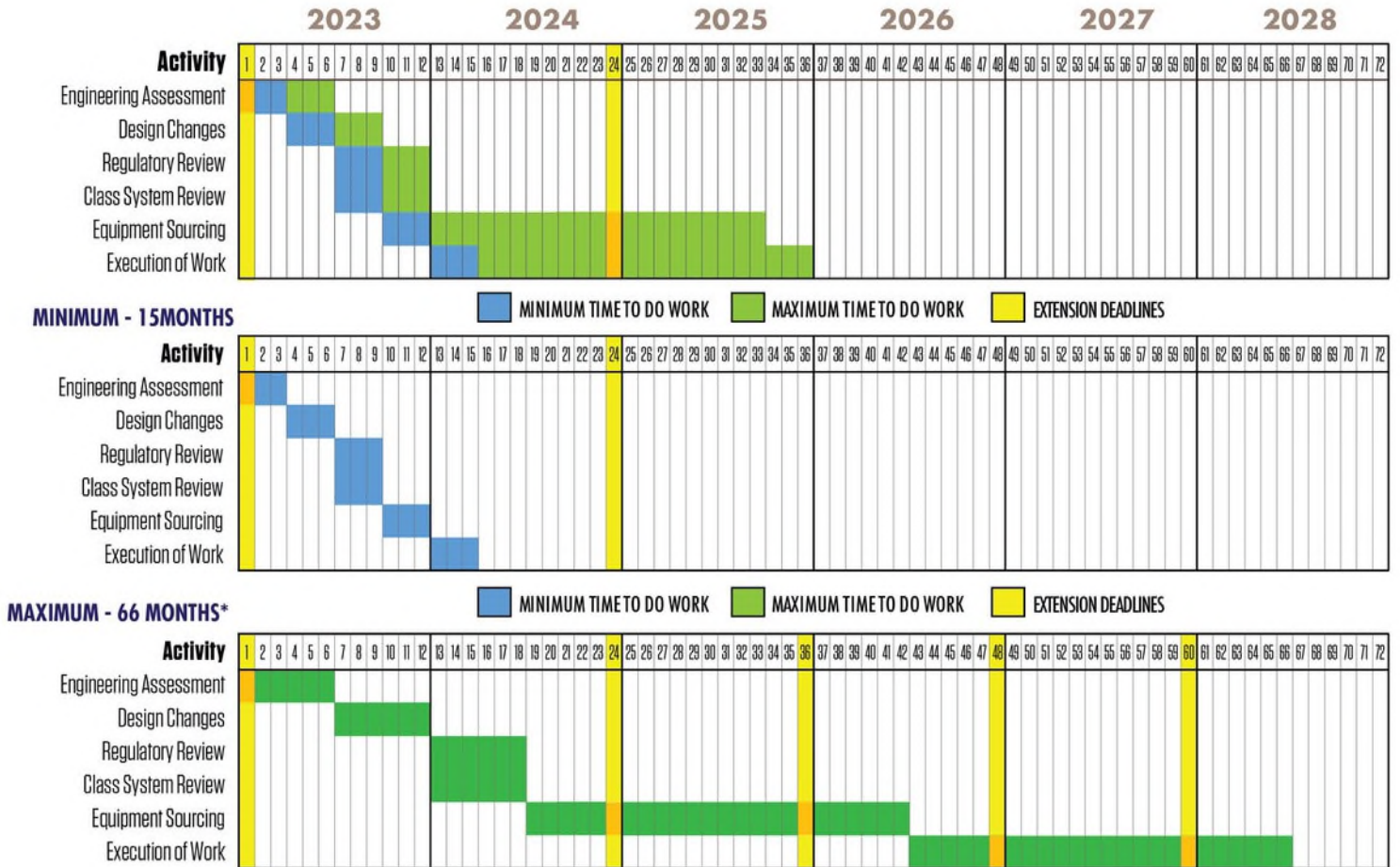
---

<sup>5</sup> CHC section (e)(12)(E)(2)(b).

<sup>6</sup> CHC section (e)(12)(E)(2)(d).

<sup>7</sup> CHC section (e)(12)(E)(5).

## Appendix I



\* This is maximum for minor vessel changes and minimum for major vessel changes  
 - An engineering assessment will take 3-6 months for a minor change and a minimum of 6 months for a major change. Installation of a Tier 4 or higher engine in some vessels and all installations of DPFS will be considered major changes  
 - Drydock reservations are part of equipment sourcing. Currently, drydocks in California are booked 6-18 months out  
 - AWO membership is seeing delays in equipment procurement due to supply chain issues. This has added about 3 months to a regular timeline  
 - While not all vessels require class approval, a majority of tugboats, towboats, and barges do.