WSPA

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December 3, 2019

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sent via e-mail to: http://www.arb.ca.gov/lispub/comm/bclist.php

Re: WSPA Comments on CARB Proposed Control Measure for Ocean-Going Vessels at Berth

To the Office of the Clerk:

Western States Petroleum Association ("WSPA") appreciates the opportunity to provide comments on the California Air Resources Board's ("CARB") Proposed Control Measure for Ocean-Going Vessels at Berth ("At Berth Regulations"), released October 15, 2019, and its accompanying Draft Environmental Analysis ("Draft EA"), released October 1, 2019. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

WSPA is providing these comments as part of a continuing effort to provide feedback on the At Berth Regulations. We incorporate our previous comments submitted on February 15, March 29, May 30, June 14 and August 15, 2019 by reference herein. This letter contains both comments on the At Berth Regulations and on the Draft EA pursuant to the California Environmental Quality Act ("CEQA").

Under the California Health and Safety Code, CARB must make and support several findings before adopting the At Berth Regulations, including the following:

- CARB must document that the At Berth Regulations are necessary to attain ambient air quality standards, cost effective, and technologically feasible. *See* Cal. Health & Safety Code ("HSC") §§ 38560, 38562, 39602.5, 43013, 43018.

- The At Berth Regulations must be designed "in a manner that is equitable," must "minimize costs and maximize the total benefits to California," and must minimize administrative burden and "leakage" (i.e., "a reduction in emissions of greenhouse gases within the state that is offset by an increase in emissions of greenhouse gases outside the state.") *See* HSC § 38505(j), 38562.

- The At Berth Regulations must achieve emissions reductions that are "real, permanent, quantifiable, verifiable, and enforceable" by CARB *See* HSC § 38562.

As discussed further below, WSPA continues to have serious concerns that the At Berth Regulations, as currently proposed, are neither technologically feasible nor cost-effective, particularly in the context of operations at marine terminals hosting vessels carrying hazardous materials such as crude oil and other petroleum products. WSPA further believes that the At Berth Regulations impose certain unnecessary costs on regulated parties that result in little or no incremental benefit to California's air quality or its greenhouse gas ("GHG") levels. Many aspects of the At Berth Regulations, as detailed below, also are not likely to produce the real, permanent,

quantifiable, verifiable and enforceable emissions reductions Staff claims, and risk driving marine vessels out of California and to out-of-state marine terminals where those vessels' GHG emissions will continue unaffected by the Rule.

I. Land-Based Capture and Control Systems are Not Reasonably Feasible and Would Pose Serious Safety and Reliability Problems

In the Initial Statement of Reasons ("ISOR") for the At Berth Regulations, CARB Staff notes that it "assumed that the majority of tanker visits will use land-based capture and control systems based on industry feedback." ISOR, p. III-19. However, at numerous points in this rulemaking, WSPA and its members have informed Staff that land-based emission capture and control systems have not been designed, tested, or demonstrated to be a feasible, safe or reliable option for tankers[1]. To date, WSPA is not aware of any real-world examples of such land-based systems being successfully implemented on tankers at the scale typically seen at California marine terminals.

This real-world evidence reflects that the majority of marine terminals would be poorly situated to feasibly install and safely operate land-based capture and control systems at marine terminals. At a minimum, very large shore cranes would need to be constructed at each berth in order to reach all vessel designs, considering many tanker vessel exhaust stacks sit nearly 160 feet above the wharf. These cranes' connections to the vessel stack are not designed with the emergency break away coupling required for all tanker vessels, nor do they come with an engineered working safety margin for movement between vessels. Indeed, no emergency protocols exist *at all* for the type of connection the At Berth Regulations would mandate.

There is no data to support the concept that a land-based system can operate safely at a marine terminal. At the very least, the land-based systems currently required by the At Berth Regulations would create several significant safety concerns at California terminals:

- Exhaust systems and combustion control systems are not designed for connection to external capture devices. Such connections change the fluid dynamics of gas flow from the stack and increase the risk of an unsafe combustion space. Additionally, establishing and safely maintaining connections can be extremely difficult at night and in adverse weather conditions.

- Executing emergency disconnection procedures (which have not been developed) for such land-based systems would add steps and delay tankers in responding in an emergency (e.g., to allow safe disconnection from power, removal of shore-side equipment, engine start up, etc.). Federal anchorage regulations (33 C.F.R. § 110.215(a)(2)(B)(iv)) and California State Lands Commission regulations (2 Cal. Code Regs. ("CCR") § 2340(c)(28)) enforced by the U.S. Coast Guard (and included in local fire codes and standards under the International Safety Guide for Oil Tankers and Terminals) require all tankers moored alongside an oil terminal to be capable of safely vacating the berth within 30 minutes in order to minimize risks from dangerous flammable materials on the vessel or shore-side and avoid escalation of an incident. The additional steps required to disconnect from the capture and control system would likely extend the disconnection process to longer than 30 minutes.

[1] WSPA Comment Letter to CARB entitled "Additional WSPA Comments on CARB Proposed At Berth Regulation Working Draft, dated August 15, 2019.

- Third party owners and operators are not manned with crews and officers properly trained on how to safely operate shore-side control systems and facility operators do not have the legal authority to regulate crews aboard third-party vessels.

- Concepts for a shore-based capture and control system have not undergone a safety evaluation to assess potential fire and explosion risk associated with collection, pressurization, and transportation of gases in a crowded terminal. Additionally, no standards or procedures exist to conduct such a safety evaluation for a shore-based system.

- A wide equipment operating window would be required to account for vibrations and wind. No standards exist to assess how to define that window for a shore-based control system.

- Safety standards related to any required manual operation of the control system must be considered, especially in relation to immediately dangerous to life or health (IDLH) environment and nighttime operation.

- As no technology has been proven in practice, the ability to control key connections at the shore-based omissions control to boilers is unknown. This includes the possible inability to adjust for changes in load and while controlled, as well as the unknown effect of a control technology on the boiler combustion space.

- No tanker industry standards exist for the safe operation of this technology while transferring hazardous cargo.

See Exhibit 1, WSPA's March 29, 2019 comment letter, Enclosure B, "Proposed CARB At Berth At Anchor Regulation – Limitations and Issues Presented by Shore Based Emission Controls", which details many other dangers and complications that would be associated with the attempted operation and interface of a shore-side emissions control system with a tanker carrying hazardous and flammable liquid. Moreover, all interfaces between any emission control strategy and a tanker must be designed in conformance with an international standard endorsed by a classification society to safely and feasibly accommodate all vessels, and vessel interfaces then must be certified to that standard. To date, there is no such standard or certifications available for safe operation of shore-based emissions control during the transfer of hazardous cargo, and manufacturers have not yet designed or built systems that would qualify under such a future standard. Even if there were such a standard, boiler manufacturers have informed WSPA that in order to connect a capture and control system, modifications would be required on board every ship to be connected to the system, in order to install higher capacity blowers and modified control systems.

Woodbridge Marine, Inc., an independent marine consultant engineering firm specializing in safety inspections on oil tanker vessels, has provided a letter (attached hereto as Exhibit 2) containing further detailed discussion of feasibility and safety issues, including electrostatic hazard, handling inert gas in cargo tanks and exhaust stack pressure maintenance, emergency disconnection, the need to develop equipment suitable for all tank vessel types that visit California, safety standard certification and the need to consult standards organizations and develop new standards for emission control system safety, and review for compliance with

California's Marine Oil Terminal Engineering and Maintenance Standards ("MOTEMS"). To date, none of these issues has been addressed for tanker exhaust gas capture systems.

In addition, Woodbridge points out specific operational concerns that must be resolved, such as the need for the system to maintain a secure and safe connection accommodating both a wide range of vertical motion (during tidal movement and vessel draft changes during cargo discharge) and a wide range of lateral distances (due to variation in vessel widths and the fact that vessels can be docked either with port or starboard side facing the wharf). Thus, as Exhibits 1 and 2 demonstrate, by mandating a shore-based control system before such systems have been developed and proven feasible and safe at scale, the At Berth Regulations create a host of safety and feasibility problems with no immediate solutions yet available.

CARB Staff also incorrectly assumes that existing marine terminal berths can accommodate such mandated land-based capture and control equipment. Again, real-world evidence contradicts this assumption in many instances. For example, contrary to Staff's assertions, the existing wharf structures may not be large enough to accommodate all the equipment that would be required to install a land-based capture and control system, meaning significant and costly structural upgrades would be required. In several cases, wharfs may have to be rebuilt entirely to accommodate the weight and movement of the crane (as vessel stack locations may vary from vessel-to-vessel).

Indeed, given these numerous concerns, WSPA and other industry stakeholders have repeatedly urged Staff to delay this rulemaking and have invited Staff to partner with industry to conduct a study. This study would evaluate the technical feasibility, safety, reliability and operability of shore-based emission capture and control systems for tankers at real-world scale, and the feasibility of permitting, constructing and commissioning such a system in the timeframes in the At Berth Regulations. Staff have repeatedly declined this invitation, proposing instead to mandate compliance dates knowing a feasible real-world compliance path does not exist. This has made it impossible for Staff to point to any empirical evidence justifying the ISOR's assumption that land-based capture and control systems are feasible for tankers at California terminals. Regulations requiring tasks that cannot be practically implemented in the time periods provided are not equitable, do not minimize costs for Californians, and do not demonstrate technological feasibility as required by California law.

II. The At Berth Regulation's Compliance Deadlines are Infeasible and Do Not Reflect Experience With Real-World Terminal Construction Projects

The At Berth Regulations impose compliance deadlines of January 1, 2027 for tanker vessels that visit the Ports of Los Angeles ("POLA") and Long Beach ("POLB"), and January 1, 2029 for all remaining tanker vessels. *See* Proposed 17 CCR § 93130.7(b), (c). Section 93130.14(a) requires tanker terminal operators to develop and submit compliance plans by December 2021, detailing the "most likely control strategy" to meet the deadlines. Section 93130.14(d) requires Staff to assess the status of tanker control technologies and landside infrastructure improvements and report to the public and the Board by July 1, 2023. If this "interim evaluation" finds that the compliance deadlines need to be extended, Staff may "initiate development of potential regulatory amendments." *Id.* However, unless and until the Board adopts amendments, the deadlines will remain in effect. Regulated entities must undertake their best efforts to timely comply and, if that proves impossible, are at risk of noncompliance.

A. Completing All Steps Necessary for Construction and Permitting of Infrastructure Projects Would Be Impossible By the Proposed Deadlines

As WSPA has advised in previous written comments and in discussions with CARB Staff, it is already abundantly clear that compliance with the 2027 and 2029 deadlines is infeasible. In comments submitted August 15, 2019 (attached hereto as Exhibit 3), WSPA compiled information from member companies in an "Estimated Timeline-CARB At Berth Regulation Shore-Based Emission Control System" and "Timeline Survey Summary" (Exhibit 3, Att. A & B). The Estimated Timeline chart demonstrates that – starting with general and site-specific technical, safety and other studies immediately on rule adoption in 2020 – completion and commissioning of land-based capture and control systems for tanker vessel emissions[2] is not expected before mid-2034 in most cases and is likely to extend at least to the end of 2035 for complex installations.

In general, larger and more complex terminals will need more time to complete each step due to the larger scale of the engineering, design and construction effort. Real-world experience demonstrates that, for complex installations, it is difficult to anticipate precise timelines for each step at the outset of the process, and timelines typically lengthen as the project proceeds. With unknown permitting timelines and delays, contracting and vendor timelines, the earliest compliance demonstration for most facilities is not before 2033 (i.e., a minimum of four to six years later than the proposed 2027 and 2029 deadlines). Some of the steps in the process may partly overlap, as shown in the Estimated Timeline. However, numerous dependent steps exist and are unavoidable. Construction cannot begin until construction contracts are in place. The terms and conditions of construction contracts cannot be finalized until all necessary permits and approvals are issued. State and local permits and approvals cannot be issued until CEQA review is completed. CEQA review cannot begin until at least 30-60% of the design is complete, in order to provide an accurate and stable project description as the basis for review. Detailed design and engineering cannot begin until the preliminary project scoping, feasibility evaluation and supporting technical studies are conducted.

The Timeline Survey Summary provides additional detail on the necessary steps to achieve compliance and their estimated durations. These necessary steps include technical and feasibility studies, site-specific design, engineering, CEQA review, regulatory agency permitting and approvals, contracting, construction and commissioning. Moreover, no construction can begin without all required permits and approvals from numerous state and local regulatory agencies including the California State Lands Commission, the California Coastal Commission (where coastal permitting is not delegated to the local city or county), the California Department of Fish and Wildlife, the San Francisco Bay Conservation and Development Commission (for northern Californian terminals), the local Regional Water Quality Control Board, and the local city or county, as well as federal permits and approvals from the U.S. Coast Guard, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service and National Marine Fisheries Service. The operators have no control over the duration of environmental review and permit processing by these agencies. Some responsible agencies will not even begin processing applications until the lead agency completes CEQA review. Even if the many agencies could promptly process applications for a few projects, their limited resources would be overwhelmed when facing the simultaneous application for projects throughout the state as required for all applicants to achieve compliance by the deadlines in the At Berth Regulations. It is highly likely that the agencies would need to

[2] As discussed below in the CEQA comment section, WSPA agrees with CARB's assumption that land-based capture and control systems constitute the reasonably foreseeable means of compliance with the At Berth Regulations for tanker vessels.

stagger permit processing, so that regulated entities at the end of the queue would again be at risk of noncompliance.

Again, these deficiencies demonstrate that, as currently worded, the At Berth Regulations require an implementation schedule that is not technologically feasible.

B. Staff's Cited Terminal Project Examples are Not Representative of the Massive Infrastructure Work Needed to Comply With The At Berth Regulations

CARB Staff concedes that the time needed for permitting and construction of the required new infrastructure may delay compliance; indeed, that is the stated reason for providing for the interim evaluation. ISOR, pp. ES-30-32, III-19-23. Nevertheless, Staff claims that the proposed timeline "is both aggressive and technically feasible for implementation" (ISOR, p. ES-30) – a claim that appears to be based entirely on a handful of examples of recent projects at tanker terminals whose timelines purportedly "ranged roughly from five to seven years for completion." ISOR, pp. III-21-22. On the contrary, the real-world evidence, including evidence regarding the projects cited in the ISOR, refutes this claim.

The ISOR concedes that "[i]nfrastructure development and the permit process stand out as the most time consuming and complex parts of utilizing land-based capture and control technology to control emissions from a tanker vessel." ISOR, p. IV-52. Even so, the ISOR greatly underestimates the time required to install infrastructure at the substantial scale contemplated in the At Berth Regulations. Staff's asserted timeline of "five to seven years for completion" is based on a survey of five recent projects, four of which were undertaken to address issues identified in MOTEMS audits in 2008-2010. ISOR, pp. III-21-22. However, the ISOR presents only a truncated picture of the anticipated timelines that would be needed for wharf infrastructure projects to comply with the At Berth Regulations, by including minor projects taking far less time than At Berth Regulations projects, and by presenting only subsets of the time required for the remaining, more substantial projects.

1. *Two of Staff's Cited Projects are Far Smaller Than the Scale of Infrastructure That Would Be Required By the At Berth Regulations*

Two of the projects cited in the ISOR – the Chevron Richmond Long Wharf MOTEMS compliance project and Green Omni Terminal ShoreKat Demonstration Project – were limited to repairs of existing structures and minor equipment installation. The timelines for those two projects are not properly comparable with those for planning, permitting and constructing substantial new wharf infrastructure, such as the large cranes and other major equipment installation on new or expanded wharf decking with new supporting piles required by the At Berth Regulations. Moreover, the ShoreKat project appears to have been exempt from CEQA review, while the modest Chevron MOTEMS project did not require a full-scale EIR, only a limited Negative Declaration allowing a much shorter CEQA review timeline.

The massive scale of anticipated infrastructure projects that would be needed for compliance with the At Berth Regulations is illustrated in the ISOR (*see* ISOR, pp. IX-11 to IX-13):

- As Staff recognizes, project components include the emission treatment unit itself, "foundational support structures" for the control system with "construction of additional pilings into the sea floor", electrical connections, "[h]undreds to thousands of feet of piping and associated support structure . . . to pipe exhaust from the vessel stacks to the

emission control system," and "[s]pecially constructed crane(s) . . . to move the exhaust capture device to the vessel stack(s)."

- Staff also concedes that "support structures would be needed for the crane(s) at each berth regardless of whether the crane(s) were built on the wharf or on an adjacent standalone support structure. These structures may also require pilings into the sea floor."

- As the ISOR further notes, Staff conducted a berth-by-berth evaluation of compliance strategies at tanker terminals and found that significant infrastructure improvements would be needed at each facility to support land-based capture and control systems. *See* ISOR Appendix E, CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for Crude and Product Tanker Vessels (September 2019).[3] Except in a few cases where it may be possible to place facilities on land, Staff conceded that substantial wharf improvements would be needed to support the weight of emission capture and control systems, between one and eight large cranes, and extensive piping.

Moreover, the Draft EA (p. 9) acknowledges that: "Adding berth-side equipment may require ports and/or terminals to upgrade wharf infrastructure. This may include the addition of new pilings and new surface area to existing piers/ports and/or terminals to allow for additional weight or space for vault and cable systems… Increasing power loads for vessels to use while at berth may require electrical and support infrastructure, which would be installed by existing utility service providers. It is reasonably assumed that additional power would require the installation of new or additional high-voltage lines and substations to increase the power supply required by vessels while at berth. Construction equipment, workers, and material deliveries for power utility modifications would be needed at the ports/terminals, as well as in areas subject to upgrading along the utilities' existing infrastructure." However, the consequences of that scope of work are given short shrift.

To further clarify the scale of infrastructure projects needed to comply with the At Berth Regulations, additional information was provided to Staff by Chevron in a presentation on June 10, 2019 (attached hereto as Exhibit 4). As shown in slides 2 and 3 of Exhibit 4, the existing wharf at Chevron's Richmond Long Wharf contains no space to accommodate installation of an emission control system and cranes. At a minimum, installation of equipment at those sizes would require construction of half an acre of new deck structure as well as 4,000 to 6,000 feet of new piping. Slides 4-6 illustrate the scale of heavy pile driving activities for Chevron's MOTEMS project, which would be multiplied by the estimated 700 to 800 concrete piles, driven deep into the sea floor, necessary to provide support for an At Berth Regulations compliance project. Slide 7 illustrates the magnitude of required electrical infrastructure improvements, including miles of new electrical cable, replacement of two transformers and changes to the utility interconnection. Nor is Chevron's wharf configuration unusual; other tanker terminal wharves have similarly narrow linear designs with comparable space constraints, and likely would require a comparable magnitude of expansion, as demonstrated by the aerial photographs of Shell's Martinez dock and Marathon Petroleum's Amorco and Avon facilities in Martinez; see Exhibit 5, slides 1-3. Moreover, available space is heavily utilized and potential locations for new equipment are highly constrained even at terminals where berths are not located at the end of narrow linear docks, as illustrated by Marathon's Terminal 2 at the Port of Long Beach and Valero's Berth 164 at the Port of Los Angeles; see Exhibit 5, slides 4 and 5.

[3] Note that footnote 3 on the last page in ISOR Appendix E is incomplete. The sentence ends "this does not preclude the terminals or vessels from." The text should be revised to state what is not precluded.

2. Staff's Discussion of the Other Three Project Timelines Ignores the Additional Time Those Projects Incurred for Planning, Design, Permitting and Project Delays

The other three projects cited in the ISOR are more comparable to the scale expected for At Berth Regulations compliance projects, but ISOR reports only part of their timelines:

- The ISOR describes the Chevron Richmond Wharf Maintenance and Efficiency Project ("WMEP") as starting in 2014, when Chevron submitted its initial permit applications. However, the ISOR omits the necessary steps of project scope development following the MOTEMS audit, planning, design and technical studies, which preceded the applications.

- The ISOR describes the Port of Richmond IMTT Terminal Project as starting in 2011 and quotes an estimated completion date from a 2014 document. The ISOR again omits scoping and planning following the MOTEMS audit and also the delay in actual project completion.

- The ISOR describes only the construction period for the Berths 167-169 Shell MOTEMS Wharf Improvement Projects at POLA, omitting all planning, design and permitting steps prior to construction.[4]

The average duration for the project stages reported in the ISOR is 5.2 years, with a range of 3 - 9 years. Even based on Staff's reported information, a project taking 9 years would exceed the "five to seven years" claimed in the ISOR, p. III-21, and would be unable to meet the 2027 deadline.[5] Additional project steps omitted from the ISOR are included in the attached "Timelines for Projects Involving Substantial New Wharf Infrastructure Comparable to At Berth Regulations Compliance Projects" (attached hereto as Exhibit 6).

Below are examples of other agency approvals, construction and commissioning not discussed by Staff in the ISOR, but that likely would hinder further progress on an infrastructure project until completed:

- For any pilot test of the equipment installed at a terminal, permitting, design and construction will require additional time.

- Detailed engineering cannot begin until the feasibility evaluation study is completed, and the risks associated with the control technology are well understood, to allow for design of appropriate mitigation.

- CEQA review cannot begin until a lead agency is assigned and at least 30-60% of the design is complete, in order to provide an accurate and stable project description as the basis for review.

[4] A more accurate picture is presented elsewhere in the ISOR (p. IX-13), conflicting with these abbreviated timelines: "Ports and tanker terminals would need to conduct feasibility assessments, engineering analysis and design, and secure required permits to construct terminal infrastructure projects needed to support the land-based capture and control systems."

[5] If the two minor projects are included, the average duration of project stages discussed in the ISOR decreases to 4.6 years, with a range of 3-9 years.

- Building and other permits are dependent on completing the CEQA analysis and certifying a final Environmental Impact Report (EIR) or Negative Declaration. Many responsible agencies with permit or approval authority will not begin processing applications before the CEQA document is approved.

- Contracting for construction and installation cannot be finalized until the permits and approvals are received; before that time, the conditions under which construction will occur remain yet unknown. Additionally, construction cannot commence until contracting is complete.

- CEQA lead agencies and responsible regulatory agencies may require completion of some mitigation measures before construction commences.

- In some cases, commissioning of individual pieces of equipment can occur in parallel with the construction; however, overall commissioning cannot begin until all construction is completed.[6]

California law prohibits adopting the At Berth Regulations until and unless the proposed Regulations reflect realistic timelines that are both technologically feasible and provide sufficient time for regulated entities to minimize unnecessary implementation costs.

C. Real-World Experience With Terminal Infrastructure Projects Shows That Compliance With the At Berth Regulations Is Unattainable By 2027/2029

In addition, two other MOTEMS compliance projects at tanker terminals, involving substantial new wharf infrastructure, are included in Exhibit 6 for comparison.[7] Based on the full timelines in Exhibit 6, the actual average duration of projects comparable to At Berth Regulations projects is 11.6 years, with a range of 7-15 years. Exhibit 6 also demonstrates that, more often than not, actual project completion dates are later than the projected completion dates on schedules in planning and CEQA documents, suggesting that the ultimate timelines for projects not yet completed will run still longer, resulting in an average duration of more than 11.6 years.

Moreover, even the larger scale MOTEMS projects listed in Exhibit 6 may not fairly represent the magnitude of new wharf infrastructure for compliance with the At Berth Regulations. For example, large cranes will be needed to reach tanker stacks,[8] but no cranes have been installed for any MOTEMS work, and none of the projects described in the ISOR involved installing cranes. Major wharf expansions necessary to provide room and support for such large and heavy cranes will not only take longer to design and construct; they will also entail greater environmental impacts (as discussed in CEQA comments below), potentially involving longer CEQA review and permitting timelines including approval by additional agencies – again resulting in an average duration of more than 11.6 years.

[6] See also Slide 7 of Exhibit 4, which lists the permits that were required for Chevron's WMEP project as an example.
[7] For example, the Avon Terminal MOTEMS project included a new vessel loading/unloading platform and mooring dolphin on new steel pilings, with construction of associated facility structures, electrical, mechanical and piping systems – work which appears reasonably comparable to the scope of an At Berth Regulations compliance installation.
[8] Approximate heights which must be reached for different tanker vessel categories are: MR, 130 feet, Aframax, 133 feet, Suezmax, 140 feet, VLCC, 165 feet.

This record of timelines for comparable past projects, together with the estimated timelines for At Berth Regulations projects in WSPA's August 2015 comments, demonstrates that the 2027 and 2029 deadlines are unattainable for the majority of At Berth Regulations projects, even if project-level planning begins immediately on rule adoption in 2020.

Comments from Power Engineering Construction Co. ("Power"), attached hereto as Exhibit 7, provide independent confirmation for these concerns. Power has experience with all phases of preconstruction, design, entitlement and construction of a wide variety of marine engineering projects. Based on that experience, and on several examples of non-oil terminal projects, Power concludes that "empirically, all but the most basic construction projects prove to track into an 8 to 10-year timeline…. [d]ue to the complexity of regulatory review, the challenges of over-water design, and the limitations and work windows imposed during construction." In addition, Exhibit C to the Power comments describes timelines for projects involving large container cranes (average duration 33 months) and dock-mounted marine hydraulic cranes (average duration 17 months per crane). As noted above, the At Berth Regulations compliance projects require installation of between one and eight cranes. Cranes will need to be installed one at a time due to space limitations and to allow partial operation of the marine terminal during construction, so for some terminals, total installation time could take as long 22 years.

Finally, and perhaps most importantly, the project timelines in the ISOR, as well as those described in Exhibits 6 and 7, all involve deployment of ***existing*** technology. As the ISOR notes, the technology for land based capture and control systems for tanker vessels does not yet exist and would be "more complex than the existing demonstration system at POLA . . . need[ing] to be scaled up from the existing systems in order to handle higher exhaust flow rates from tanker vessels." ISOR, p. III-19. In particular, designing emission controls for tanker vessels presents unique safety issues. *See* Exhibit 2, Letter from Woodbridge Marine, Inc. No technology is currently tested and proven safe for tankers, as was communicated to CARB staff by vendors during the CARB vendor meeting on April 16, 2019,[9] and also discussed in WSPA's comment letter of June 14, 2019. Significant work is needed up front to assess the risks and ensure that technology is safe, feasible and available, which will take additional time before individual projects can begin to be developed.[10]

D. <u>The Suggestion That the Compliance Deadline Should Be Shortened is Unsupported by Real-World Evidence</u>

In a letter dated November 26, 2019, the Executive Officer of the Bay Area Air Quality Management District ("BAAQMD") dismissed the ISOR's discussion of the lengthy regulatory

[9] At a meeting between CARB, vendors and industry stakeholders including WSPA members on April 16, 2019, one of the vendors, AEG, stated that the technology is not ready for a tanker demonstration. AEG's concerns included the large variation in gas volume and temperature from tanker boilers, which must be accounted for in designing emissions capture and control systems, and the need to address explosion risk from static electricity. AEG also noted the need for workable connection devices for every vessel and that relative movement of the tanker at berth is important, as large movements can rip the ducting off the stack.

[10] The Power comment letter (Exhibit 7) also explains that "issues surrounding the technical feasibility" of the system "will add to the overall project timeline through both feasibility testing and extended equipment procurement." Since Power's estimated 8-10 year "timeline should begin once a feasibility study is completed and appropriate emission control technology is proven to be readily available," it appears consistent with the 11.6 year average for projects listed in Exhibit 6.

approval process for construction over or adjacent to bay waters, stating "I believe this concern is overstated." However, the letter provides no facts or evidence to support that belief, which is contradicted by the evidence of long permitting timelines cited in and attached to this letter. The record shows that marine projects subject to the approval of multiple regulatory agencies (e.g., MOTEMS compliance projects) have taken substantially more time, not less, than estimated by CARB staff. The same record demonstrates that shortening the compliance deadline for tanker vessels to January 1, 2025, as suggested in the BAAQMD letter, is simply impossible.

The BAAQMD letter speculates that an interagency group could assist CARB in identifying and addressing concerns, and mentions the long-established interagency organization that issues dredging permits in San Francisco Bay as an example. However, that organization is narrow in its scope and only reviews dredging projects. More important, no such organization currently exists to review the projects that would be required for compliance with the At Berth Regulations. Coordination up front by an inter-agency group could ultimately result in more efficient and effective review and permitting of individual projects by individual agencies. However, BAAQMD's letter ignores the additional time needed to establish such a group and for it to carry out its coordinating efforts, which must precede the purportedly shortened review of individual projects. The more likely outcome of this additional time is that the total duration for interagency coordination plus individual project permitting would extend significantly beyond the proposed compliance deadlines.

In fact, the interagency dredging group cited in the BAAQMD letter – the Dredged Material Management Office ("DMMO") – is a particularly poor example to suggest as a model for the At Berth Regulations. The DMMO took six years to establish, beginning with a 1992 task group, followed by an initial pilot phase, a 1996 inter-agency Memorandum of Understanding ("MOU") establishing two additional pilot phases, and finally a revised MOU in 1998. See DMMO MOU (https://www.spn.usace.army.mil/Portals/68/docs/Dredging/memounderst.pdf);
DMMO Third Pilot Phase Review Report (1999)
(https://www.spn.usace.army.mil/Portals/68/docs/Dredging/Annual%20Reports/3rdpilot.pdf).
The Long Term Management Strategy ("LTMS") which the DMMO implements was developed over an 11 year period, initiated in 1990 and finally adopted in 2001, as described in the DMMO's 2018 report,
(https://www.spn.usace.army.mil/Portals/68/docs/Dredging/Annual%20Reports/2018%20DMMO%20Annual%20Report_Final.pdf?ver=2019-11-15-131717-210).

While BAAQMD's letter offers its assistance with inter-agency review, it will play only a relatively small role in the projects to comply with the At Berth Regulations. Instead, the agencies most involved will be some of the same agencies participating in the DMMO, as well as local land use authorities. There is no reason to think those agencies could move faster in the future than they have in the past.

Nevertheless, WSPA does not oppose engagement with other regulatory agencies. On the contrary, WSPA has proposed a feasibility study which would involve multiple regulatory agencies. The study would not only serve as a natural lead-in to developing an interagency process for permit review, but would also have regulatory agencies engaged up front in the safety and technical feasibility evaluations. CARB staff should recognize that while the permitting review process is a major factor in a project timeline, the first and principal roadblock is successfully addressing the technical feasibility and safety challenges outlined in this letter. WSPA's proposed study involves all the necessary stakeholders to address both challenges. This will minimize

project design recycle and improve the efficiency and effectiveness of subsequent individual project review and permitting.

E. The Interim Evaluation Report Provides No Assurance of Relief from the Unattainable Deadlines in the At Berth Regulations

The interim evaluation report envisioned under the At Berth Regulations would be of little help to regulated entities in avoiding the practical consequences of these unrealistic deadlines. Under the At Berth Regulations, Staff would have until July 2023 to prepare a report on "the progress made in adopting control technologies for use with tanker and ro-ro vessels, as well as the status of landside infrastructure improvements that may be needed to support emission reductions at ro-ro and tanker terminals." *See* Proposed 17 CCR 93130.14(d). At that time, "[i]f staff finds that the compliance deadlines for ro-ro or tanker vessels need to be extended, the report will include recommendations to initiate staff's development of potential formal regulatory amendments." *Id.*

As WSPA has explained to CARB Staff, while we agree with the need for a feasibility study (in coordination with industry stakeholders) with respect to tanker control technologies, the time to do that study is **before** adopting the At Berth Regulations that would set timetables for installation of potentially non-existent technologies, not after. Regardless of the feasibility of control technologies in 2023, regulated parties would not be able to wait until direction from Staff in late-2023 (or later) to begin the process of upgrading terminals in time to reach compliance in less than six years. By including a mandatory 2027/2029 compliance deadline in the At Berth Regulations, Staff would be effectively forcing regulated parties to commit to capital expenditures, construction planning, and permitting efforts years before the actual regulatory deadline for compliance. Even if Staff's interim evaluation report were to find continuing technology barriers in 2023, regulated parties would continue to be subject to a 2027/2029 compliance deadline until and unless CARB were to adopt changes to the At Berth Regulations (which this interim evaluation provision does not require). Staff have not produced any evidence in the record that regulated parties would be able to feasibly wait until 2023 or later to begin construction work and still reach compliance by 2029.

In sum, the evidence presented in this rulemaking strongly suggests that, even assuming that a safe and workable international standard can one day be developed for an interface between a tanker and a land-based capture and control system, the 2027 and 2029 compliance deadlines cannot feasibly be met. The ISOR's presentation of partial timelines for five projects, including two projects not comparable to the ISOR's own characterization of At Berth Regulations projects, does not contradict that conclusion. As such, there is no basis or support for imposing these deadlines as mandatory compliance requirements, subject to potential amendment following a future interim evaluation. If adopted as proposed, with patently unachievable default compliance dates (and penalties for failure to achieve them), the At Berth Regulations will be arbitrary, capricious and not supported by law or evidence. WSPA believes the Government Code, Health and Safety Code and other California laws and regulations require CARB to revise the proposed interim evaluation and compliance deadlines for proper development preparation and consideration of feasibility and cost effectiveness. *See*, *e.g.*, HSC §§ 38560, 39602.5, 39665, 43013; *see also* Gov. Code § 11346.36 & 1 CCR §§ 2000-2004 (Standardized Regulatory Impact Assessment (SRIA) requirements).

WSPA recommends that CARB incorporate a thorough and technically sound feasibility evaluation study into the regulation, with input from relevant agencies and stakeholders, to provide guidance for the most applicable compliance dates possible.

III. The Draft EA Fails to Comply With CEQA

This section contains WSPA's comments on the Draft EA pursuant to CEQA, the State CEQA Guidelines (14 CCR § 15000 et seq.), and CARB's CEQA implementation regulations, 17 CCR § 60000 et seq. Where indicated, other comments in this letter are also incorporated in our CEQA comments.

A. CEQA Requires CARB to Fully and Fairly Consider Environmental Effects Beyond Air Quality and Greenhouse Gases

The Draft EA – titled "Draft Environmental Analysis" though technically it is a "Draft Environmental Impact Analysis" under CARB's CEQA regulations, 17 CCR § 60004.2 – functions as a substitute for a traditional CEQA Environmental Impact Report (EIR) under CARB's certified regulatory program. Nevertheless, the Draft EA must comply with the substantive requirements of CEQA. CEQA Guidelines § 15250, 17 CCR § 60004(b).

In general, CEQA requires lead agencies to evaluate the potentially significant environmental impacts of their proposed actions, and to the extent feasible, mitigate those impacts to less than significant levels. In addition, CARB is subject to more specific requirements: before adopting a regulation that requires installation of pollution control equipment or compliance with performance standards or treatment requirements, CARB must (i) identify reasonably foreseeable methods of compliance; and (ii) analyze reasonably foreseeable environmental impacts of, mitigation measures for, and alternatives to, the reasonably foreseeable methods of compliance. CEQA §§ 21159(a), 21159.4. The environmental analysis must take into account a reasonable range of environmental, economic and technical factors, populations and geographic areas, and specific sites. CEQA § 21159(c).

Even though the At Berth Regulations are intended to benefit the environment by reducing air pollutant and GHG emissions, CARB must undertake a full and fair evaluation of its potential to result in unintended adverse environmental side-effects in other media. *POET LLC v. State Air Resources Board* (2012) 218 Cal.App.4th 681. The Draft EA, ISOR and attachments devote hundreds of pages to analysis of air pollutant and GHG emissions and reductions under CARB's regulatory jurisdiction. However, the central purpose of CEQA review by regulatory agencies such as CARB is to require consideration of impacts in other media, outside their jurisdiction. As discussed below, issues other than air quality and GHG are given short shrift in the Draft EA. That is impermissible under CEQA.

B. Land-Based Capture and Control Systems Constitute the Reasonably Foreseeable Means of Compliance for Tanker Vessels

As required by CEQA, the Draft EA identifies reasonably foreseeable means of compliance for vessel categories subject to the At Berth Regulations, in order to provide the basis for analysis of environmental impacts resulting from implementation of those means of compliance. For oil tanker vessels, the Draft EA finds that land-based capture and control systems constitute the reasonably foreseeable means of compliance. Draft EA, pp. 9-10, 22.

Given the difficulty of equipping a global fleet of tanker vessels with equipment to utilize shore powering, and the navigational and safety issues associated with barge-based systems at tanker terminals, it is not reasonably foreseeable that installation of onshore and onboard equipment for

connection to shore power or barge-based stack emission capture systems would be utilized as means of compliance. *See* ISOR, p. ES-30 ("Tanker vessel operators have expressed safety concerns with barge systems and indicate the method of capture and control would be land-based, which may require significant infrastructure improvements to the existing tanker terminals across the state"), p. I-31 (operators "are not prepared to make the vessel side investments because there are far fewer vessels that make regular or frequent calls to California" to justify investment in vessel modifications for shore power") and p. I-32 ("terminals with narrow channels may not be able to physically fit a barge without blocking navigation in the channel. At many of Northern California's independent marine terminals, there are also potential constraints resulting from the impacts of tidal flows and from prohibitions on impeding the transit of other vessels in designated shipping lanes (between the supports of an adjacent bridge, for example)." Site-specific navigational and safety concerns were identified at most tanker berths in the berth-by-berth analysis included in ISOR Appendix E. CARB therefore "assumed that tankers would use landside capture and control systems where exhaust gas is captured in a duct from the vessel stack and routed to an emission control system." Draft EA, p. 22.

As discussed throughout these comments, WSPA is broadly concerned with the feasibility of compliance with the At Berth Regulations. However, on the specific point of identifying the means of compliance for purposes of CEQA analysis, WSPA agrees with and supports CARB's conclusion that land-based systems will be utilized, rather than barge-based systems or shore powering. Our comments in this letter assume the use of such land-based systems.[11]

C. CARB's Timeline Is "Infeasible" as Defined In CEQA

Alternatives considered under CEQA must be reasonable and able to feasibly accomplish basic project objectives, and an EIR is not required to consider alternatives which are infeasible. CEQA Guidelines § 15126.6(a), (c). CEQA defines "feasible" as "capable of being accomplished ***in a successful manner within a reasonable period of time***, taking into account economic, environmental, legal, social and technological factors." CEQA Guidelines § 15364 (emphasis added). Among the factors that may be taken into account when addressing feasibility are site suitability, economic viability, availability of infrastructure and regulatory limitations. CEQA Guidelines § 15126.6(f)(1). Findings regarding infeasibility must be supported by substantial evidence. CEQA Guidelines § 15091(b).

In this case, it is the proposed project itself which cannot be accomplished in a successful manner within the prescribed period of time. As explained in the comments above, which are incorporated by reference in this CEQA comment, the compliance deadlines for tanker terminals in the proposed At Berth Regulations are infeasible and unreasonable. Given the scale and environmental footprint of work needed to install reasonably foreseeable land-based capture and control systems, the ISOR's claim that a reasonable period of time is allowed for compliance is not supported by the evidence. On the contrary, based on the evidence discussed above, it is clear that compliance cannot be achieved in a successful manner within a reasonable period of time. Relevant technological factors include the time needed to develop new technology and to address safety issues as discussed above. Legal factors include the time needed for project review and permitting before construction can commence. Environmental factors include the impacts of undertaking major construction projects in sensitive marine and estuary habitats, which

[11] For the same reasons, Alternative 3 in the Draft EA (p. 168), "Require Barge-based Capture and Control Only Compliance Pathway for Tanker, Ro-Ro, Newly Regulated Reefer, and Container Vessels and Shore Power Only Compliance Pathway for Cruise Vessels" should be rejected as infeasible.

will require additional time to resolve in the CEQA and permitting process. Finally, as discussed below (and again incorporated in this CEQA comment by reference), implementation of the At Berth Regulations will be far more costly and less cost-effective than Staff claims, based on an analysis that systematically underestimates the costs of compliance.

D. The Draft EA Fails to Analyze Information on Potential Impacts which CARB Already Possesses, Abusing the Tiering Provisions of CEQA

The Draft EA fails to fully and fairly disclose reasonably foreseeable adverse environmental impacts associated with implementing the At Berth Regulations. A primary reason for this failure is the Draft EA's over-reliance on a programmatic level of analysis, together with significant and unavoidable findings, to cursorily dispose of many issues. The Draft EA's generic reliance on the programmatic level of review applies to aesthetics, agricultural, construction air emissions, biological resources, cultural resources, geological risk, hazards and hazardous materials, hydrology, mineral resources, noise, traffic and utilities impacts. Indeed, the extensive scope and magnitude of issues that the Draft EA defers to project-level reviews provides further confirmation that completing CEQA review and permitting in time to allow completion of construction by the proposed deadline is a practical impossibility.

Tiered environmental review is encouraged by CEQA; *see* Pub. Res. Code § 21093. 17 CCR § 60004(g) authorizes CARB to "tier its environmental analyses using the principles set forth in California Code of Regulations, title 14, section 15152, and other tiering-related provisions in CEQA." Accordingly, CARB has prepared the Draft EA as a programmatic evaluation, which will be followed by more detailed, project-level CEQA review of individual actions undertaken to construct facilities necessary to comply with the rule. These future project-level CEQA reviews will be conducted by cities, counties or other agencies with jurisdiction over the permits and approvals required for the construction projects. Draft EA, pp. 4-5.

Nevertheless, the tiering approach "does not excuse the lead agency from adequately analyzing reasonably foreseeable significant environmental effects of the project and does not justify deferring such analysis to a later tier." CEQA Guidelines § 15152(b). Analysis at later tiers must focus "on the actual issues ripe for decision at each level of environmental review." *Id.* "While proper tiering of environmental review allows an agency to defer analysis of certain details of later phases of long-term linked or complex projects until those phases are up for approval, ***CEQA's demand for meaningful information is not satisfied by simply stating information will be provided in the future***." *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2007) 40 Cal.4th 412, 431 (emphasis added, internal quotations omitted). Yet that is what CARB has done in the Draft EA.

In virtually every one of the environmental analyses, the Draft EA asserts that impacts anticipated from the reasonably foreseeable means of compliance are "speculative" and repetitively concludes that, at the program level, adverse impacts must be considered "potentially significant and unavoidable" because implementation of corresponding mitigation measures is under the jurisdiction of the local decision makers, not CARB. *See*, *e.g.*, Draft EA, pp. 26, 31, 35, 41, 52, 63, 66, 71, 80, 96, 100, 104, 106, 112, 117, 119, 129, 131, 132, 136.

CARB claims that "this Draft EA makes a rigorous effort to evaluate significant adverse impacts and beneficial impacts of the reasonably foreseeable compliance responses that could result from implementation of the Proposed Regulation and contains as much information about those impacts as is currently available, without being unduly speculative." Draft EA, p. 4. On the

contrary, the Draft EA fails to make such a "rigorous effort" by rejecting as "speculative" all of the detailed information that CARB itself has already placed into the rulemaking record.

Notwithstanding the uncertainties of project level implementation (which, as discussed above, will push out the project timelines) CARB already has at least some information to provide more in-depth analysis than the Draft EA's repeated, rote recitations of the programmatic approach. The Draft EA identifies twenty-one projects to install land-based capture and control systems, in six geographic areas as reasonably foreseeable means of compliance with the At Berth Regulations. *See* Draft EA, p. 22: "Five land-based capture and control systems would be needed in Carquinez, four in Long Beach, five in Los Angeles, four in Richmond, two in Rodeo, and one in Stockton." While asserting that site-specific analysis would be speculative, CARB develop an analysis of construction emissions scenarios for installation of representative equipment including tanker landside and dockside capture and control systems. Draft EA p. 45 and Attachment B (with an "in depth description" of the four scenarios).

Moreover, ISOR Appendix E, "CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for Crude and Product Tanker Vessels (September 2019)" provides a berth-by-berth analysis containing further details on each of the twenty-one projects and the equipment they involve, including the number of land-based capture and control systems and number of new cranes to be installed per facility Appendix E also notes site-specific space constraints, navigational risks and potential piping routes. As the ISOR (p. I-8) acknowledges: "Many of these wharves [operated by oil companies] cannot accommodate pollution control equipment without extensive construction (on land and in the water) to support additional weight and demand for power." For at least two tanker berths, CARB has already identified potential wetland impacts from installing land-based capture and control systems and cranes. *See* ISOR Appendix E, pp. 3, 5. The Draft EA, Attachment B, develops representative facility scenarios in further detail for purposes of air quality modeling, including the construction equipment, pile driving and deck expansion that would be required (Attachment B, pp. 13-15 and Table B-24). Having analyzed the projects in some detail and already disclosed the project-specific information in the SRIA and representative scenarios in Draft EA Attachment B, CARB cannot now claim that it cannot use this information for analysis of adverse environmental impacts, even at the program level. Actual sites and site-specific equipment have already been evaluated.

The environmental analysis must take into account a reasonable range of environmental, economic and technical factors, populations and geographic areas, and specific sites. CEQA § 21159(c). By relying on the generic programmatic disclaimer, and dismissing any further analysis and disclosure on the majority of impacts as "speculative" despite the information that CARB has already collected, the Draft EA has failed to do so.

E. <u>The Record Overstates Benefits and Does Not Support Findings of Overriding Considerations</u>

Having determined that, at the program level of analysis, many impacts are potentially significant and unavoidable due to uncertainty of mitigation at the project level, CARB must adopt findings that the unavoidable significant impacts are acceptable given the anticipated environmental benefits of the At Berth Regulations, referred to as "overriding considerations." CEQA § 21081, CEQA Guidelines § 15091. However, findings of overriding considerations must be based on substantial evidence. CEQA Guidelines § 15091(b). As discussed in the sections below, and incorporated by reference in this CEQA comment, CARB's evaluation of the benefits of the At

Berth Regulations are overstated. For the same reasons, CEQA findings of overriding considerations are not supported by the overstated evaluation of benefits.

In addition, CARB's CEQA regulations provide for consideration of beneficial as well as adverse environmental impacts of its actions in the Draft EA. 17 CCR 60004.2(a)(3). For this purpose, and again for the same reasons, CARB's evaluation of beneficial environmental impacts is overstated.

F. The Draft EA Errs In Finding Less Than Significant Operational Hazard and Safety Impacts to Tanker Vessels

In one of the few exceptions to its generic assumption of potentially significant and unavoidable impacts based on uncertainty of project level mitigation, the Draft EA asserts that construction and operational impacts to vessels associated with hazards and hazardous materials will be less than significant. Draft EA, pp. 101 (Impacts 9.B-1 and 9.B-2), 151-152 (cumulative hazard impact). On the contrary, these are the impacts that are most clearly significant and unavoidable, if the At Berth Regulations are adopted as proposed without waiting for a feasibility study to demonstrate that safe and effective compliance technology exists for oil tankers. Indeed, as the ISOR acknowledges (p. III-22): "Regardless of location, safety studies need to be performed to ensure all safety consideration are met, given that the tanker vessels carry explosive cargos." Prior to such studies, the categorical dismissal of hazard impacts as less than significant at the programmatic level is, at the least, premature.

The hazard and hazardous materials section of the Draft EA (pp. 94-101) focuses on hazards from spills and hazardous materials use during facility construction and operation. Regarding construction and operational impacts to vessels, the Draft EA (p. 101) notes that vessels already utilize safe operation protocols and that vessels based in the United States must comply with Occupational Safety and Health Administration (OSHA) and U.S. EPA standards. However, safety protocols and standards do not yet exist for operating the new vessel emission control technology to be developed for the At Berth Regulations.

As discussed above, and documented in Exhibit 2 (Woodbridge Marine letter), compliance with the At Berth Regulations as proposed requires emission capture technology for tanker vessels that does not now exist. As detailed in Exhibit 2, by mandating a shore-based control system before such systems have been developed and proven feasible and safe at scale, the At Berth Regulations create serious safety risks with no immediate solutions yet available, including electrostatic hazard, stack pressure maintenance, safe and secure stack connection and emergency disconnection. As a result, the rule threatens to result in "[i]ncreased risk to the operation and also the terminal and vessel directly, including fire, explosion, loss of life and significant pollution events" and also "[s]ignificantly longer operations which also increases the risk of an accident." Exhibit 2, p. 5. Moreover, with only a nonbinding possibility of future amendment to extend compliance deadlines, the At Berth Regulations do not allow sufficient time to develop safe solutions and certify compliance with safety standards that also must be adapted to apply to the untried new technology. Thus, the Draft EA's claim of less than significant safety impacts for vessels is unsupported and implausible on its face.

For hazards associated with shore-side installation of capture and control systems (included in Impact 9.A-2), the Draft EA (pp. 96-100) takes its default approach of finding the impact significant and unavoidable, based on uncertainty of mitigation to be determined by the lead agencies that

review shore-side projects. The Draft EA does include a vague generic statement that accidents can happen but assumes that essentially "the same safety practices would continue to be used":

> "Hazardous materials that may be classified as flammable, corrosive, or reactive are often transported in ocean-going tanker vessels. Accidents that could occur during the transportation of these hazardous materials could include things such as spills, fires, and explosions that could involve terminal equipment or vessels at berth. As such, there is an inherent need for additional safety measures for all tanker vessels visiting California ports and marine terminals.
>
> Under the Proposed Regulation the same activities which occur at California ports and terminals would continue. The primary change would be the requirements to control at berth emissions. CARB staff believes the most likely control option for tanker vessels would be land-based on capture and control systems. Use of capture and control technology would require additional interfaces at ports, which requires safety management due to the transfer of flammable materials from vessels. Use of these interfaces would be similar to activities already occurring at California ports, where there are interfaces for other purposes. It is assumed that the same safety practices would continue to be used, but that use of capture and control technology would result in increased safety management efforts.
>
> This technology would therefore not increase the risk of the release of hazardous materials."

Draft EA, pp. 99-100. It is unclear what conclusion the Draft EA reaches, since it goes on to state:

> "Therefore, the requirements of the Proposed Regulation would ***not*** be expected pose significant risk for the public or the environment" (emphasis added) – but, immediately following, states that: "As such, long-term operational-related effects associated with the Proposed Project to hazards and hazardous materials ***could*** be potentially significant." *Id.* (emphasis added).

Even so, the Draft EA fails to acknowledge that the At Berth Regulations will cause "[i]ncreased risk to the operation and also the terminal and vessel directly, including fire, explosion, loss of life and significant pollution events" and also "[s]ignificantly longer operations which also increases the risk of an accident." Exhibit 2, p. 5.

Instead, the Draft EA (p. 100) assumes that "the same safety practices would continue to be used" though with "increased safety management efforts." By disregarding the risks associated with requiring new and untried technology, the analysis of non-vessel operational hazards posed by the requirements of the At Berth Regulations is also deficient.[12]

Moreover, to the extent that the Draft EA (pp. 95-96, 100) relies on project-level mitigation to reduce construction and non-vessel operational impacts to less than significant in Mitigation Measures 9.A-2 and 9.A-2 (which calls for implementation of Mitigation Measure 9.A-1), the

[12] In addition, the tanker landside control system scenario that CARB staff developed for purposes of air pollutant emission calculations describes a hazard risk not mentioned in the Draft EA itself: "Due to the explosive nature of tanker vessel's cargo, emissions control systems that require a burner should be placed far from cargo." Draft EA Attachment B, p. 12.

measures lack any performance standards or potential actions that could feasibly achieve performance standards to reduce fire, explosion and other hazard risks associated with capture and control systems for tanker vessels. (MM 9.A-1 addresses only handling and storage of hazardous materials.) Accordingly, Mitigation Measures 9.A-1 and 9.A-2 fail to comply with the requirement for deferring the development of specific details of mitigation. CEQA Guidelines § 15126.4(a)(1)(B).

G. The Draft EA Erroneously Rejects Impacts to Fire Protection Service as Insignificant

Like the vessel hazard analysis, the public services analysis also diverges from the otherwise conservative approach of treating impacts as potentially significant and unavoidable at the program level, to be addressed at the project. Level. Instead, the Draft EA (pp. 123-124, and p. 156 for cumulative impacts) concludes that both short-term construction and long-term operational effects of the At Berth Regulations on public services – including fire protection services – would be less than significant. This conclusion is based on the assumption that compliance with the regulations will not require a large new workforce. "Thus, the provisions of public services would be sufficient because [the] Proposed regulation is not anticipated to result in unplanned increases in population levels. As a result, short-term construction-related and long-term operational-related effects associated with the Proposed Regulation on response time for fire protection… would be **less than significant** (emphasis in original). *Id.* However, this exclusive focus on population-based demand for fire protection completely ignores any increased fire and explosion risk to vessels and to wharf and onshore infrastructure attributable the emission capture and control system itself, as documented in the Woodbridge Marine letter, Exhibit 2. Moreover, the Draft EA is internally inconsistent: though fire protection is dismissed as an insignificant issue in the public services analysis, it is recognized as requiring mitigation in the transportation impact analysis. See Mitigation Measure 17.A-2 (Draft EA, p. 131), requiring local lead agencies for implementation projects to "[c]onsult with and implement recommendations from local fire protection services regarding emergency access requirements." If local lead agencies fail to do so, the Draft EA concludes, the impact would be significant and unavoidable. By the same reasoning, the Draft EA should be revised to acknowledge the impact to fire protection in the public services analysis.

H. The Draft EA Erroneously Ignores Wildfire Risks and Public Safety Power Shutdowns

Another issue on which the Draft EA departs from its otherwise conservative program-level approach and assumptions is wildfire risk. The Draft EA (pp. 95, 100) assumes without presenting evidence that, in every case, equipment would be located in areas without substantial open space and vegetation, and summarily concludes that impacts from increased wildfire risk during equipment construction and operation would be less than significant. This is an unreasonably broad conclusion for a programmatic analysis that does not examine conditions at any specific sites. California's recent experience of severe and widespread wildfires extending into developed areas, combined with the need to address safety and fire hazard impacts as discussed above and documented in the Woodbridge Marine letter (Exhibit 2), suggest that the potential impact of increasing wildfire risk should not be so summarily dismissed.

California's recent wildfires and wildfire prevention efforts have also raised a new concern with the reliability of electrical systems: the prospect of public safety power shutdowns. The Draft EA considers electricity demand, but incorrectly assumes that electric power will always be available for operating emission control systems. The analysis should be revised to include the consequences of power shutdowns and the need for backup systems.

I. The Draft EA Provides Only Cursory Discussion of Impacts to Biological Resources

The Draft EA again falls back on the cursory programmatic approach for impacts to biological resources. Briefly acknowledging that "capture and control devices could require the construction of new pilings and surface area", the Draft EA concludes that the "potential for adverse construction-related effects related to these activities on biological resources would mainly be limited to pile driving, installation of piping and staging areas associated with facility modifications." Draft EA, pp. 59-60. The Draft EA notes that construction impacts could temporarily affect special status coastal species (identifying only two species, the California Least Tern and California Brown Pelican); downplays as "unlikely" the adverse turbidity and water quality impacts on subtidal benthic species and communities from dredging activity; and minimizes biological impacts as limited to a few species that occur in industrially developed areas, concluding (without site-specific review) that affected areas are "all highly disturbed and not likely to be supportive of a large range of biological species." Draft EA, pp. 59-60, 63-64.

In limiting and downplaying its discussion of biological impacts, the Draft EA virtually disregards the setting in which most or all marine terminals are located, surrounded by estuaries, wetlands and other biologically rich coastal areas. Though the Draft EA names only two bird species, hundreds of species of animals and plants are associated with such habitats throughout California, including many protected species.[13] Migrating and breeding fish and marine mammals pass through the area at specific times of year, unmentioned by the Draft EA, although construction work is often confined to limited periods when the species are not present. For example, pile driving within San Francisco Bay is currently restricted to a period from June 1 and November 30 ("fish windows") to protect fisheries and accommodate fish breeding seasons. (Prohibition of construction for substantial parts of the year is another factor that contributing to the long timelines for construction completion as shown in Exhibit 6.)

Indeed, the often lengthy duration of CEQA review and permitting for wharf projects is a function of the close oversight of impacts to coastal species and habitat among resource agencies such as California Coastal Commission, State Lands Commission, California Department of Fish & Wildlife, San Francisco Bay Conservation and Development Commission ("SFBCDC"), Regional Water Quality Control Boards, U.S. Fish and Wildlife Service and National Marine Fisheries Service (see, e.g., Exhibit 4, slide 6). Though landside facilities may be highly disturbed, many vessel berths are at the end of long structures projecting for thousands of feet out into marine and estuarine habitats; see Exhibits 4 and 5. Any baseline disturbance attributable to the presence of the existing structures is limited to the narrow footprints of the structures themselves. For example, many vessel berths operate in coastal areas which, by their nature, are located near endangered species habitat and wetlands. With little or no available deck space for installing new capture and control equipment, structural expansion of decking and new crane and electrical equipment support structures must be built out over undisturbed waterways and wetlands, with piles driven into undisturbed submerged lands. Moreover, some agencies such as SFBCDC treat permanent over-water shading as a significant environmental impact, which should recognized at the program level since it will have to be addressed by project-level lead or responsible agencies. Space constraints on the existing structures will also require barge-based construction work, which is slower than onshore work, resulting in longer construction impact periods which may extend over multiple seasons due to "fish window" constraints.

[13] Attachment A to the Draft EA, p. 17 notes that approximately 150 animal and 52 plant special-status species inhabit California coastal areas, wetlands, rivers and vernal pools.

CARB's berth-by-berth assessment already contains some information on biological resource impacts, demonstrating that it would not be infeasible or speculative to provide additional analysis in the Draft EA. For example, for at least two tanker berths, CARB has already identified potential wetland impacts from installing land-based capture and control systems and cranes. See ISOR Appendix E, Crude and Tanker Product Vessels table, pp. 3, 5.

J. The Draft EA Ignores the Potential for Significant Land Use Plan Conflicts

In assessing conflict with land use plans and policies adopted for the purpose of avoiding or mitigating environmental effects, the Draft EA (pp. 107-108) summarily asserts that *no impact* (not just a less than significant impact) will occur. Here, the Draft EA assumes that construction will take place within existing developed areas in or adjacent to port and terminal footprints, where industrial uses are allowable with existing zoning and conditional use permits, or where local land use authorities may grant variances. Yet elsewhere the Draft EA (p. 59) concedes that "capture and control devices could require the construction of new pilings and surface area" extending over the water. Again, the Draft EA ignores the fact that, though landside work may occur in developed and disturbed areas, many vessel berths are at the end of long structures projecting for thousands of feet out into marine and estuarine habitats; see Exhibits 4 and 5. There is no evaluation or even mention of potential conflicts with the policies and provisions in Local Coastal Programs ("LCPs"), General and Specific Plans (including those serving as LCPs), and regional plans such as SFBCDC's Bay Plan. A multitude of environmentally protective provisions and policies in these land use plans, adopted to avoid or mitigate effects on sensitive coastal areas and wetlands, will apply to compliance projects for the At Berth Regulations. Potential inconsistencies cannot be assumed away on a statewide program level, without any analysis of those plans and policies. Accordingly, land use plan conflicts must be considered an additional potentially significant and unavoidable impact which is not disclosed or analyzed in the Draft EA.

K. The Draft EA Fails to Analyze Relevant Cumulative Impacts

The Draft EA must consider cumulative impacts. CEQA Guidelines § 15065, 17 CCR § 60004.2(a)(5). For purposes of cumulative analysis, a lead agency document may choose one of two methods of identifying past, present and reasonably foreseeable future projects whose impacts may combine, together with those of the proposed project, to cause a potentially significant impact. One option is the "list" method, compiling a list of projects in the vicinity of the proposed project or otherwise likely to contribute to impacts together with the proposed project. The other option is the "projections" method, considering the contribution of the proposed project together with projected levels of local or regional growth presented in an adopted planning document, such as a general plan or a regional transportation plan. CEQA Guidelines § 15130.In the Draft EA, CARB has chosen the projections method, relying on projections in a prior Environmental Analysis prepared for the 2016 State Implementation Plan ("SIP") Strategy. Draft EA, p. 139. This approach ignores the fact that compliance for the At Berth Regulations will be projects *at berths*. Rather than comparing to statewide projections developed for purposes of analyzing impacts of air quality improvement measures in the SIP Strategy EA, the Draft EA should have examined cumulative impacts from a project list or projections for projects whose effects could combine with those of this rule. For example, the Draft EA (again relying on the programmatic level of analysis) summarily concludes that cumulative impacts to biological resources may result from implementation of the State SIP Strategy recommended measures together with the At Berth Regulations. *See* Draft EA, pp. 148-149. The State SIP Strategy's recommended measures could, as the Draft EA notes, increase demand for biofuel feedstock production, affecting areas that support biological resources. But the Draft EA ignores much more

relevant contributions to cumulative biological resource impacts from coastal zone residential and industrial development that, together with At Berth Regulations compliance projects, would impact wetlands and other sensitive habitats. The Draft EA disregards projections of regional coastal growth, instead applying a narrow, parochial focused on CARB's air quality jurisdiction which ignores the CEQA mandate to consider the full range of environmental side-effects of the rulemaking.

L. The Draft EA Fails to Analyze Reasonable Alternatives

The Draft EA must consider a reasonable range of alternatives to the At Berth Regulations as proposed, which could feasibly attain most of the project objectives but could avoid or substantially lessen significant environmental impacts. CEQA Guidelines § 15126.6, 17 CCR § 60004.2(a)(5). The Draft EA considers a limited set of alternatives, including Alternative 6 which would eliminate tankers from the scope of regulations; Alternative 6 is rejected because it would forego the air quality and GHG benefits to be obtained from regulating tanker emissions. Draft EA, pp. 175-181.

However, the Draft EA fails to consider or even mention another reasonable and feasible alternative that has been brought to CARB's attention in the administrative rulemaking process: the "Alternative Proposal for Amendments to At-Berth Regulations" proposed by an industry coalition consisting of the California Association of Port Authorities, Cruise Lines International Association, Pacific Merchant Shipping Association, World Shipping Council and WSPA, by letter dated February 15, 2019 (the "Coalition Alternative"). This is all the more surprising because the Coalition Alternative is considered for non-CEQA purposes as Alternative 3 in the ISOR, pp. X-8 – X-10.

With this comment, WSPA formally requests that the Coalition Alternative be addressed in the revised final EA as an alternative under CEQA. A lead agency must consider reasonable and feasible alternatives offered in public comments and must explain why an alternative does not satisfy the project's objectives, does not offer substantial environmental benefits or cannot feasibly be accomplished. *Center for Biological Diversity v. County of San Bernardino* (2010) 185 Cal.App.4th 866, 883.

As described in the ISOR, the Coalition Alternative would require feasibility and cost effectiveness studies prior to expansion of existing regulatory requirements. "These feasibility studies would identify cost effective emissions control programs based on reasonable implementation deadlines, safety concerns associated with the use of potential emissions control strategies, infrastructure readiness, and technological feasibility." ISOR, p. X-8. In the ISOR, CARB rejects the Coalition Alternative for non-CEQA purposes, reasoning that it would delay At Berth Rule implementation and the outcome of the infeasibility study is uncertain, thus achieving fewer and less certain reductions in air pollutants and GHG emissions.

Had the Draft EA considered the Coalition Alternative, presumably it would have reached the same conclusion. However, that conclusion is based on a flawed premise: that the At Berth Rule would actually achieve emission reductions sooner and with greater certainty than the Coalition Alternative. As discussed and demonstrated in WSPA's comments herein and submitted previously, the deadlines in the At Berth Rule cannot feasibly be met, and the feasibility study is essential for evaluation and development of safe and effective new technology to comply with the rule. The ISOR's rejection of the Coalition Alternative in comparison to the At Berth Rule is based on a fictitious scenario of compliance timelines that *will not occur*. In considering the Coalition Alternative as a CEQA alternative, the revised final EA should not rely on that flawed premise.

M. CARB Should Utilize Reasonable Objectives in Evaluating Alternatives

When evaluating alternatives under CEQA (including the no project alternative), a lead agency must consider whether the alternatives can feasibly satisfy most of the basic objectives of the project. CEQA Guidelines § 15126.6. However, CEQA prohibits framing objectives so narrowly as to preclude reasonable and feasible alternatives to the proposed project; see *In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings*, 43 Cal. 4th 1143, 1166 (2008) ("a lead agency may not give a project's purpose an artificially narrow definition"). Here, one of the project objectives included in the Draft EA refers to timing: "Assist in achieving CARB's proposed strategy to attain health-based federal air quality standards over the next fifteen years as part of nonattainment area Strategy Implementation Plans." Draft EA, p. 164. To the extent that CARB relies on consistency with that objective, it should not be read to preclude modifying the deadlines in the proposed At Berth Regulations to allow a reasonable and feasible period of time for compliance at tanker terminals.

Another of the project objectives refers to safety: "Ensure all emission control technologies do not present any safety issues that cannot be addressed with a safety exemption provision." *Id.* For the reasons discussed in these comments, the proposed project itself contains compliance deadlines that do not satisfy this objective.

N. The Draft EA Should Be Revised and Recirculated

Correcting the deficiencies discussed in these comments would require the addition of significant new information disclosing new or substantially more severe environmental impacts, thereby triggering recirculation under CEQA Guidelines § 15088.5. Accordingly, CARB must revise and recirculate the Draft EA for additional public disclosure and comment

IV. The Emissions Inventory Contains Incorrect Assumptions and Methodology

A. Staff's Tanker Emissions Growth Assumptions are Not Realistic and Contradict CARB's Own Regulatory Objectives Related to Fossil Fuel Use in California

Staff relies on two different sources to model the growth of emissions from tankers. For POLA and POLB, data were based on a report developed by Mercator in 2016 to identify long-term shipping trends and identify the risk of cargo diversion. *See* Mercator International LLC, San Pedro Bay Long-term Unconstrained Cargo Forecast (July 12, 2016). For the remaining areas, Staff relied on the Freight Analysis Framework ("FAF") developed by the Center for Transportation Analysis. Both reports present anticipated macroeconomic scenarios that lack sufficient detail to properly and specifically model expected future tanker emissions, because they do not consider any constraints particular to the tanker industry such as vessel draft limits and pipeline connection capacities. Secondly, Staff has applied expected growth in tanker activity across all the baseline 2016 tanker visits. This assumption misses the mark on real trends and even contradicts the stated goals of CARB's own policies related to fossil fuel (which generally seek to diminish fossil fuel use in California, not grow it). WSPA asks Staff to re-evaluate the results of their analysis and assume more realistic trends in the shipping industry, consistent with real-world data and CARB's own statewide fossil fuel regulatory policies and goals.

Staff also incorrectly applies inflated growth factors to expected future tanker traffic at POLA and POLB. In an attempt to identify long-term shipping trends and the risks of cargo diversion from POLA and POLB, Staff again relies on the Mercator Report. The Mercator Report forecasts

increases of roughly 50% in exports of ***non-crude oil*** (identified in the report as "refined products") between 2015 and 2040. *See* Mercator Report, pp. 17-18. Importantly, over that same period, the Report also forecasts modest ***declines*** in both crude oil and non-crude oil imports. *Id.*, pp. 17, 126. In the SRIA, Staff claims that these results support an estimated 57% growth in ***all*** "activity" at POLA and POLB between 2021 and 2032. *See* SRIA, p. 31.

Attempting to apply these numbers to anticipated future tanker traffic in California misapplies the Mercator Report and ignores real-world data. Based on 2016 data from the U.S. Energy Information Administration for Petroleum Administration for Defense District (PADD) 5, nearly 77% of all imports to the West Coast are crude oil. Even the Mercator Report reflects that, as recently as 2014, more than 68% of all liquid bulk volume at POLA and POLB was attributable to crude oil imports. *See* Mercator Report, p. 110. Given that tanker activity at the Ports predominantly represents crude oil imports, the Mercator Report does not support the notion that all tanker "activity" in California will grow by anything approaching 57% through 2032. Indeed, according to the Mercator Report, crude oil imports into POLA and POLB are forecasted to ***decline*** through 2032 and beyond. *See* Mercator Report, pp. 117-119.

The result of this incorrect reading of the Mercator Report is a dramatically overestimated growth rate for tanker emissions. Pumping emissions associated with tanker traffic should be generally declining as crude oil imports decline over time, not increasing at the rate Staff has asserted. This incorrect assumption is a fundamental flaw in Staff's analysis of claimed emissions savings associated with the At Berth Regulations.

B. Staff Incorrectly Assumes That No Tier III Vessels Will Be in Service By 2030

As one of its fundamental justifications for the At Berth Regulations, Staff assumes that no marine vessels meeting the International Maritime Organization's Tier III emissions standards will be calling at California terminals until 2030 at the soonest. Staff Report, App. H ("2019 Update to Inventory for Ocean-Going Vessels at Berth: Methodology and Results"), pp. H-6, H-36 to H-37. Comments submitted to CARB earlier in this rulemaking document that this assumption is incorrect and ignores real-world evidence to the contrary.

For example, Chevron's Richmond Long Wharf (RLW) acquired two Tier III-equivalent vessels in 2018. *See* Staff Report, Appx. H, p. H-25. Specifically, Chevron operates two Suezmax-sized tankers that lighter nearly 70% of the Richmond Refinery's deliveries of crude to RLW. These tankers use superheated steam auxiliary boilers and turbogenerators to generate electricity in low-emission mode, which yield no diesel particulate matter (DPM) and emit NOx emissions lower than those produced by Tier III-qualifying diesel engines (*i.e.*, on the order of 0.78 g/kWh, versus the Tier III 2.31 g/kWh NOx limit for a 900 rpm diesel generator). Chevron expects that fully one-third of Chevron's fleet will meet the Tier III standards by 2021 – more than nine years before Staff's assumed first date of Tier III vessel service at California terminals. Chevron anticipates that 55% of vessels visiting RLW will be Tier III compliant by 2030, and 80% will be compliant by 2035 – conclusions consistent with a separate third-party study estimating roughly 50% Tier III vessels visiting RLW by 2030. *See* Letter dated Feb. 15, 2019 from Henry T. Perea to Cynthia Marvin (attached hereto as Exhibit 8), p. 3 (Figure 1-1)

The available evidence contradicts Staff's assumption of zero Tier III vessel visits at terminals before 2030. Because Tier III-compliant vessels emit substantially less NOx per kilowatt-hour on average than Staff's assumed future vessel mix, Staff's assumption of future NOx emissions at terminals also is at odds with actual real-world experience. Indeed, based on these facts, the At

Berth Regulations would be relevant in meeting targeted emissions reductions for less than 5 years at most, before the influx of Tier III vessels will yield overall fleet NOx reductions that meet or exceed the reductions coming from the At Berth Regulations. Moreover, the types of on-board emission control associated with Tier III compliance would provide emissions reductions throughout the entire Emission Control Area (ECA) (i.e., during vessel transit and maneuvering), while the benefits anticipated by the At Berth Regulations would only accrue while vessels are at berth.[14]

Neither the ISOR nor the At Berth Regulations account for these facts. Were Staff to apply the correct assumptions consistent with real-world data, it would be forced to conclude that the cost-effectiveness of the At Berth Regulations is far less than that claimed in the Staff Report materials. It is also likely that alternatives to the At Berth Regulations would prove to be far more cost-effective in achieving real-world NOx emissions reductions.

C. Staff Overestimates Pumping Activity of Tankers At Berth at Terminals

Staff's at berth emissions inventory is also unrealistically high because it overestimates actual tanker pumping activity at berth. Specifically, Staff makes the incorrect assumption that tankers that berth at marine terminals have the same activity mode profile as tankers that berth at POLA/POLB (*i.e.*, actively pumping product 85% to 100% of the time they are at berth). *See* Staff Report, Appx. H, pp. H-21 to H-25. This is contradicted by evidence Chevron submitted to staff concerning real-world experience at Richmond Long Wharf ("RLW"). *See* Exhibit 8, p. 4. This data shows that vessels at berth (particularly non-Suezmax vessels) actually spend significant periods of time either loading by gravity feed or idling – two modes with lower overall emission rates versus times of active pumping. Thus, rather than simply assuming only two operating modes for tankers at berth – "Discharging" and "Other/Loading" – Staff should gather additional information from the ports and terminals to account for the different emissions occurring during pumping, ballasting and idling/hoteling, and use this information to arrive at a more accurate estimate of actual at berth emissions.

While Staff acknowledges the RLW data, it apparently refuses to accept the data as illustrative of any terminal's operation besides RLW. *See* Staff Report, Appx. H, pp. H-24, H-25 (separately listing discharging/loading times and resulting boiler effective power for tankers for "Richmond" and for "Rest of CA (based on POLA/POLB)"). Rather, Staff simply assumes that vessels at all other California terminals will have the same effective power loads as vessels calling at POLA/POLB – i.e., pumping 85%-100% of the time. *See* Staff Report, Appx. H, p. H-21, H-24.

This assumption does not find support in real-world practice. The mix of vessel types and operations calling to service refineries varies. Due to draft limitations, the POLB has California's only deepwater berth that can accept Very Large Crude Carriers (VLCCs) and Ultra Large Crude Carriers (ULCCs), which Staff notes engage in discharge pumping 100% of the time while at berth. In contrast, most of California's other marine terminals cannot host VLCCs and ULCCs, and vessels that do call on the terminals typically spend less of their time at-berth in an active pumping mode. This real-world evidence belies Staff's assumption that the other California's marine terminals see identical vessel types and operations as those found at the POLA/POLB.

[14] Staff also ignores the effects of other emissions mitigation measures already routinely employed on tankers at berth, including the fact that tankers currently utilize boiler emissions for use as inert gas in cargo tanks, which reduced the risk of explosion of hydrocarbon vapor in those tanks. The use of this boiler gas as a cargo inerting gas serves to reduce boiler emissions by 25%.

Moreover, it appears that there is an error in Staff's adjustment of the emissions inventory to account for the two Chevron Tier III-equivalent ships that started service in 2018. *See* Staff Report, Appx. H, p. H-25. Staff refers to the vessel class of the two ships as "Seawaymax." This is incorrect; the vessel class introduced was actually Suezmax. Since it appears Staff estimated adjusted effective power incorrectly assuming these two vessels to be Seawaymax, Staff must correct their calculations to properly reflect that the two vessels are Suezmax.

D. Staff Overestimates Future Growth of Vessel Visits at Terminals

Staff also continues to assume unrealistically high future vessel traffic growth at California terminals, predicting that tanker visits will grow between 25.4% and 318.2% by 2050. WSPA requests Staff include a section of the inventory report illustrating why growth was applied as it was. First, real-world data simply does not support such extreme predictions in growth at California terminals. For example, actual vessel calls at RLW between 2007 and 2017 experienced net growth of closer to 1% over that ten-year period, with fairly cyclical growth and declines in vessel visits within that period year-to-year. *See* Exhibit 8, p. 8. Using this data as a guide, total vessel growth rate at RLW by 2050 would be expected to be around 4% in aggregate. This growth assumption is very different than that assumed by Staff and yields a much lower forecast of future growth at the terminals based on real-world data.

Moreover, it appears Staff have not considered the carrying capacity of a tanker when applying the growth factor. Equating growth in tanker vessel visits to growth in total tonnage throughput neglects the fact that different vessels carry a range of different volumes.

- To illustrate this issue, a 400,000-ton increase in freight throughput is a year could represent 1% growth in overall tonnage, but based on vessel DWT, it would be possible for just two Suezmax vessels to carry that additional volume. Applying a 1% growth factor to a baseline number of vessels as Staff has done could yield a higher number than 2 additional vessel visits (for example, for the Richmond Complex, which had 400 tanker visits in 2016, a 1% growth factor would assume four additional tanker trips per year).

- As Staff's proposed methodology is applied over a longer period (e.g., 10 years), the difference between the anticipated number of vessels and actual vessel calls could compound, as Staff continues to ignore the larger carrying capacities of each vessel. In the example of the Richmond Complex, applying Staff's proposed method would yield an estimate of 4,627 vessels needed to physically carry the anticipated volume between 2016 and 2026, rather than 4,510 vessels that would actually be required to physically carry the volume.

For these reasons, Staff's estimates of future terminal growth result in a gross overestimation of likely future baseline emissions at marine terminals.

V. Staff's Methodology for Estimating Health Impacts is Flawed

This section incorporates comments on technical flaws with the novel methodology utilized in the ISOR, as explained in a memorandum provided by air quality expert Gary Rubenstein of Foulweather Consulting, attached hereto as Exhibit 9.

A. Staff's Assumption that DPM Health Values Can Be Assigned to Emissions from Marine Engines Operating on MGO, MDO or HFO is Inappropriate and Unfounded

In the Health Analyses document for the At Berth Regulations (Appendix G to the ISOR), Staff assumes that the cancer potency factor ("CPF") and chronic reference exposure level ("REL") for DPM are applicable to the particulate emissions from ocean-going vessel marine engines fueled with marine gas oil ("MGO"), marine diesel oil ("MDO"), and marine heavy fuel oil ("HFO"). *See* Staff Report, Appx. G, p. 3. This is inappropriate. The original DPM CPF and REL established by CARB were based largely on health effects studies looking at the exposure of railway workers to ***locomotive*** diesel engine exhaust from 1960s-vintage locomotives. Despite this limitation, Staff now seeks to apply the same CPF and REL to ***all*** modern compression ignition auxiliary engines using diesel fuel on ocean-going vessels, including those compression ignition engines equipped with diesel oxidation catalysts and diesel particulate filters – both of which have been documented to fundamentally change the chemical nature of DPM.[15]

Instead of extrapolating health-effects data based on 50-year-old technologies and fuels, Staff should assess the health impacts of modern auxiliary engines operated on fuels other than diesel fuel based on speciated composition of the exhaust for these engines, as CARB does in its risk assessments for engines using other fuels (such as gasoline, ethanol, and natural gas). The ISOR provides no explanation as to why Staff rely on such old and inapposite data, when more recent data from modern auxiliary engines is available and potentially more probative.

B. The Results of the Health Analyses Should be Placed Into Proper Context

In its 2015 Risk Management Guidance, CARB warns that changes to risk assessment methodologies have resulted in increased calculated risk values, even though a facility has not changed its operations in a way that actually negatively affects public health in the real world.

> "One significant area of focus is how best to communicate what impact these methodology changes will have on health risk estimates, what those new risk estimates mean, and how best to manage sources and programs in a reasonable and health protective manner. The procedures in the new OEHHA Manual will typically result in a higher estimated cancer risk from a facility even though they [the facility] use control technology and are actually maintaining or reducing its emissions. As a result, it is a challenge to communicate the new information in a way that ensures the public's right to know but does not imply that the facility has changed its operations or emissions in a way that negatively affects public health."[16]

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[15] See, e.g., *Advanced Collaborative Emissions Study (ACES): Lifetime Cancer and Non-Cancer Assessment in Rats Exposed to New- Technology Diesel Exhaust*. Health Effects Institute. Research Report 184. (January 2015)

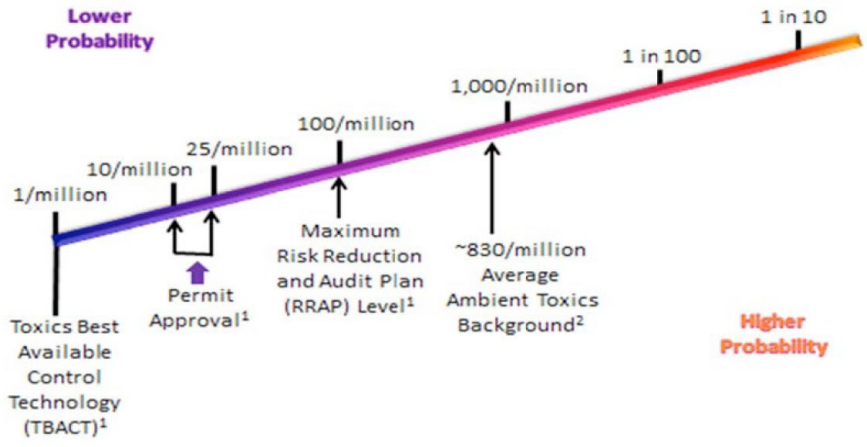
[16] *Risk Management Guidance for Stationary Sources of Air Toxics*, CARB and CAPCOA. July 23, 2015. pp. 2-3. https://www.arb.ca.gov/toxics/rma/rmgssat.pdf

The Health Analyses document does not present this background information to help the public understand the implications of the calculated risk values. This tends to mislead the average reader into thinking that the risk associated with vessels at-berth is significantly greater than normal, when the evidence actually supports the conclusion that incremental risks are far lower at the California Ports and terminals than those risks faces by an average individual living in California.

In contrast to the 2015 Risk Management Guidance, in the ISOR Staff concludes that "[e]missions from ocean-going vessels operating at berth are a significant and growing contributor to community air pollution and associated health impacts." ISOR, p. VI-1. However, nowhere does Staff compare the emissions or potential health impacts attributable to OGVs at-berth with other sources of criteria air pollutants or toxic air contaminants that Californians are exposed to each day. For example, the ISOR indicates that baseline (2016) maximum exposed individual incremental cancer risk (MEIR) attributable to ships at-berth is 74-in-a-million at the Ports of Los Angeles and Long Beach (POLA and POLB), and 16-in-a-million at the Richmond Complex (the Port of Richmond and the Chevron refinery berths). ISOR, p. V-14. While these incremental risks apply to individuals living within a relatively small distance from these two port complexes, CARB estimates that the average individual living in California is exposed to an incremental cancer risk attributable to diesel particulate matter (DPM) of approximately 520-in-a million.[17]

Furthermore, as the following graphic (from CARB's 2015 Risk Management Guidance) shows, CARB recommends development of a risk reduction plan if calculated risk levels exceed 100-in-a-million.[18] The At Berth Regulations ignore these guidelines by, in effect, imposing a risk reduction plan on a collection of sources (such as a port complex) at much lower levels, when such a plan would not be required for an individual stationary source with the same calculated risk level.

Figure II-2: Health Risk – A Relative Perspective



[17] https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health . Accessed 11/7/2019.
[18] *Risk Management Guidance for Stationary Sources of Air Toxics*, CARB and CAPCOA. July 23, 2015. p. 17. https://www.arb.ca.gov/toxics/rma/rmgssat.pdf

C. CARB's Claim That The At Berth Regulations Would Avoid $2.3 Billion in Health Impacts is Not Supported by Sound Science

Staff's Health Analyses (ISOR Appx. G) ascribe a statewide benefit of $2.245 billion[19] to the avoided adverse health outcomes attributable to the proposed At Berth Regulations. Fully 99.8% of this benefit is claimed to be associated with avoided premature deaths, and 87% of the claimed reduction in avoided premature deaths is associated with reductions in oxides of nitrogen (NOx) emissions. These avoided premature deaths attributable to NOx reductions are, in turn, attributed to the formation of particulate ammonium nitrate in a photochemical reaction that CARB acknowledges occurs well downwind of the emission source (and only after the concentrations have been substantially reduced due to dispersion) – and hence, not in the communities nearest the ports.

Relatively little formation of ammonium nitrate occurs in close proximity to the emission source, where dispersion is relatively low. Formation of ammonium nitrate increases over time (and with distance from the source), as does dispersion. While Staff's analysis is not clearly presented, Staff does not appear to address these factors in calculating reduced ambient concentrations of ammonium nitrate particulates and the associated avoided adverse health outcomes. These factors must be properly accounted for in order to get a true picture of avoided premature deaths.

D. Staff's Assumptions as to Ambient Concentrations of PM2.5 are Unexplained and Unsupported

In the Health Analyses (ISOR, Appx. G, p. G-15, G-51), Staff indicates that they used the AERMOD model to estimate reductions in ambient concentrations of $PM_{2.5}$. However, AERMOD does not contain algorithms that model the photochemical reactions that convert oxides of nitrogen emissions to secondary ammonium nitrate. While the Health Analyses document is silent as to exactly how Staff calculates the health benefits of NOx emission reductions, it appears (from the discussion at pp. G-53 to G-57) that Staff scaled the modeled $PM_{2.5}$ concentrations by the ratio of NOx emissions from sources subject to the proposed rule to modeled $PM_{2.5}$ emissions, with the further assumption that most, if not all, of the NOx emissions are converted into secondary ammonium nitrate because "[i]mpacts are assumed to take place over a wide geographic area." ISOR, Appx. G, p. G-56. If this was, in fact, Staff's assumption, it is inconsistent with both the physical science and with the approach used by both CARB and California air districts to model ambient $PM_{2.5}$ concentrations for State Implementation Plan purposes.

Moreover, Staff's assumption regarding the expected reduction in ambient nitrate concentrations attributed to the At Berth Regulations is not based on a methodology consistent with current USEPA guidance. USEPA guidance for addressing secondary nitrate formation in dispersion modeling analyses under the Prevention of Significant Deterioration (PSD) program[20] establishes a two-step process for evaluation:

[19] CARB's Initial Statement of Reasons asserts that "Total costs for all entities exceeding $2.2 billion through 2032, with a statewide valuation of avoided health impacts valued around $2.3 billion." In fact, the actual values reported in CARB's report are $2,245,207,000 for avoided health impacts, and $2,164,319,000 for net costs.

[20] Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier I Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program (EPA 454/R-19-003). (April 2019)

- A simple screening tool based on the use of Modeled Emission Rates for Precursors (MERPs); or
- Direct analysis using a photochemical model such as CMAQ.

The fact that USEPA's guidance on this point applies to a specific regulatory program (i.e., the PSD permit program) does not undermine the fundamental science – the methodology is applicable both to individual point sources and to "a group of sources in the area." The ports assessed in CARB's Health Analysis clearly fall within that second category. However, CARB's analysis of the potential health benefits of NOx emission reductions attributable to the proposed rule is not consistent with either of the two steps EPA recommends.

VI. Implementation of the At Berth Regulations Will Be Far More Costly and Less Cost-Effective Than Staff Claims

As discussed above, California law requires CARB to document the anticipated costs and adverse economic impacts of the At Berth Regulations, and to show that the At Berth Regulations as proposed are cost-effective and "minimize[s] costs and maximize[s] the total benefits to California." *See* HSC §§ 38505, 38560, 38562, 39602.5, 43013, 43018; Cal. Gov. Code §§ 11346.3, 11346.5. CARB also must demonstrate that the At Berth Regulations will not force greenhouse gas-producing ship commerce to simply relocate their activities outside California. *See* HSC §§ 38505(j), 38562.

In addition, under California law CARB must complete a Standardized Regulatory Impact Assessment ("SRIA") if a proposed regulation will have an estimated economic impact on Californians of over $50 million. *See* Cal. Gov. Code § 11346.3(c), 11346.36; 1 CCR §§ 2000(g), 2002. The SRIA must address, at a minimum:

- The creation or elimination of jobs within the state.
- The creation of new businesses or the elimination of existing businesses within the state.
- The competitive advantages or disadvantages for businesses currently doing business within the state.
- The increase or decrease of investment in the state.
- The incentives for innovation in products, materials, or processes.
- The benefits of the regulations, including, but not limited to, benefits to the health, safety, and welfare of California residents, worker safety, and the state's environment and quality of life, among any other benefits identified by the agency.
- Identification of each regulatory alternative for addressing the stated need for the proposed major regulation, including each alternative that was provided by the public or another governmental agency and each alternative that the agency considered; all costs and all benefits of each regulatory alternative considered; and the reasons for rejecting each alternative.
- A description and explanation of:
    - The economic impact method and approach, including the underlying assumptions the agency used and the rationale and basis for those assumptions;
    - The specific categories of individuals and business enterprises who would be affected by the proposed major regulation;
    - The inputs into the assessment of the economic impact;
    - The outputs from the assessment of the economic impact; and
    - The agency's interpretation of the results of the assessment of the economic impact.

Cal. Gov. Code § 11346.3(c)(1); 1 CCR § 2002.

As proposed, the At Berth Regulations would impose significantly greater costs of compliance than the ISOR estimates, with less overall emissions benefit than Staff claims. Moreover, the SRIA for the At Berth Regulations (ISOR, App. C-1) fails to fully address the topics required by law, downplaying or ignoring key adverse impacts the At Berth Regulations are likely to have on the California economy and California residents.

A. Staff Systematically Understates or Ignores Key Categories of Compliance Costs Associated With the At Berth Regulation

While WSPA appreciates that Staff have incorporated many of the additional costs identified in WSPA's May 30, 2019 comment letter to CARB on the At Berth Regulations, WSPA remains concerned that Staff still systematically underestimates the costs of compliance with the At Berth Regulations.

Perhaps most fundamentally, in the absence of a feasibility study, cost conclusions in the ISOR and SRIA are speculative at best, if not totally unfounded. Staff starts with the premise that a shore-based emissions capture and control system will be feasible for use with tankers, yet neither the SRIA nor the ISOR identifies any evidence that such a system has been demonstrated in practice at scale for a tanker, whether that be at a public port or private marine terminal. All subsequent claims of costs, economic and fiscal impacts, benefits and cost savings in the ISOR and SRIA depend on that flawed assumption, and so they themselves are not sufficiently supported. That alone renders Staff's estimates of cost impacts inadequate under the applicable regulations because Staff fails to articulate supportable assumptions, inaccurately identifies the anticipated economic impacts, and undervalues the benefits of alternatives to the proposed regulation.

Moreover, Staff's assumed annual industry growth factors (*see* SRIA, Appx. C-1, p. 67) are based entirely on the FAF, and do not appear to account for any input from operators on real-world expected growth. The FAF provides a broad national overview of several sectors of freight transportation and is not uniquely designed to forecast specific industry growth between now and 2050 among ports and private marine terminals in California serving the marine vessels at issue. Staff also does not describe what adverse impacts it believes the At Berth Regulations ***itself*** will have on future industry growth, and the rationale for that assumption.

Staff also significantly underestimates the total and per-unit indirect costs of the At Berth Regulations and overestimates the percentage of those costs that are likely to be passed on to consumers. Staff characterizes indirect costs to consumers as a per-gallon cost equivalent to total annualized compliance costs in 2030 divided by estimated total gallons of gasoline purchased by California consumers in 2030. *See* Appx. C-1 (SRIA), p. 96. This is based on Staff's assumption that ***all*** costs imposed by the At Berth Regulations will be passed on to the ultimate consumer. See Appx. C-1 (SRIA), pp. 17, 96. Neither the ISOR nor the SRIA contains any articulated basis for this assumption – and actual experience at the Ports and terminals shows that not all regulatory compliance costs can be passed onto California consumers or represented on a simple per-gallon-of-transported-fuel basis. To the extent that consumers are unwilling to take on additional per-gallon fuel costs associated with this regulation, industry will be forced to absorb those costs, and Staff has done no analysis of what adverse impacts to industry and California's economy could occur as a result of industry having to shoulder these additional costs.

In addition, as discussed above, because estimates of real-world growth at ports and terminals (*see* Exhibit 8, p. 8 for example of actual vessel call trends between 2007 and 2017) are far lower than the extreme growth predictions advanced by Staff, indirect costs for individuals will be spread over far fewer gallons of throughput in the future than Staff claims, resulting in much higher per-unit indirect costs of the At Berth Regulations. Overstating anticipated future growth at ports and terminals tends to both overstate anticipated future emissions and exaggerate the product throughput over which regulated parties will have to attempt to recoup costs (if possible). The inflated growth estimates also exaggerate the amount of emission reductions Staff claims the At Berth Regulations will achieve. Thus, in both the ISOR and SRIA, Staff systematically inflate promised emissions benefits while understating future direct and indirect compliance costs, meaning that the At Berth Regulations will be far less cost effective than Staff claims.

Finally, it appears Staff has made a number of assumptions in the SRIA based on a 2017 baseline year, yet the emissions inventory consistently uses a baseline year of 2016. Compare SRIA, p. 26, 38-39, 65, 73, 88 & App. C (using 2017 as a baseline year) with ISOR, p. V-2 (noting use of 2016 as baseline year for modeling). The difference in the number of tanker visits between these two years is substantial. Vessel visits in 2016 totaled 1,628; in 2017, vessel visits totaled 1,272. The difference in these totals is significant. WSPA is concerned that by using the 2017 vessel count instead of a 2016 count, Staff may be assuming a lower cost of implementation than would otherwise result from using the 2016 baseline. We recommend that Staff set the Inventory and the SRIA in the same baseline year or explain why it must use different baseline years between the emission inventory and the SRIA.

B. Staff Fails to Discuss the Potential Negative Impacts of the At Berth Regulations on California Commerce and Competitiveness, or the Potential for Leakage Associated with Cargo Diversion

Neither the ISOR nor the SRIA discusses the potential for the At Berth Regulations to impede international and interstate commerce into California, which could easily lead to vessel traffic increasingly finding other ports of call outside California. Indeed, Staff in the SRIA all but abandon any effort to quantify adverse impacts to commerce or competitiveness. *See* Appx. C-1 (SRIA), p. 126 (claiming that, "[t]o date, the available data and research has been insufficient to quantify the impact on the competitive advantage or disadvantage of the Proposed Regulation as it relates to cargo diversion.")

California law requires Staff to do more than throw up its hands at the prospect of assessing potential adverse impacts to commerce and competitiveness. *See* 1 CCR 2002 (CARB is mandated to identify and analyze "competitive advantages or disadvantages for businesses currently doing business within the state"). Because real-world direct and indirect compliance costs likely will be significantly higher than Staff's estimates, more capital costs will be needed for At Berth Regulations compliance (instead of potential upgrades designed to keeping the ports and terminals market-competitive), future development and expansion of California ports and terminals could suffer, operation and transportation costs could increase, and cargo may seek other, less costly points of entry (and indeed, documentation presented to CARB to date shows that such diversion is likely to occur).

Regulated ports and terminals have articulated to Staff throughout this rulemaking process that the At Berth Regulations will substantially increase compliance costs for California ports and

terminals relative to other freight hubs and ports/terminals in other states. The natural tendency of any free market will be to seek out less expensive freight hubs and modes of transport. If marine vessels seek less expensive ports and terminals outside California, the At Berth Regulations will have resulted in greenhouse gas "leakage" (i.e., a reduction in California greenhouse gases at the cost of more-than-offsetting increases in greenhouse gases outside California.) Indeed, if and when marine vessels are diverted, the result would be a net ***increase*** in GHG emissions because of the greater distance vessels would need to travel to (a) get to a non-California port or terminal, and (b) get the commodity from that new state to the consumer. Neither the ISOR nor the SRIA have accounted for or assessed the potential for these adverse impacts on California commerce, or the potential for "leakage."

***

WSPA believes the Government Code, Health and Safety Code and other California laws and regulations require CARB to revise its current rulemaking timetable to allow for proper preparation and consideration of feasibility, cost effectiveness and timelines. *See*, *e.g.*, HSC §§ 38560, 39602.5, 39665, 43013; *see also* Gov. Code § 11346.36 & 1 C.C.R. §§ 2000-2004 (SRIA requirements to assess At Berth Regulations cost impact on public health and safety, fairness and social equity, state's economy and other criteria). We would request that, at the very least, CARB include in its proposed At Berth Regulations language that allows for a feasibility evaluation study and an appropriate delay in regulatory implementation in the event the feasibility evaluation study concludes that shore-based technologies and/or other elements of the At Berth Regulations are not feasible in the regulatory timeframes provided.

WSPA appreciates this opportunity comment on the Proposed At Berth Regulations. If you have any questions regarding this submittal, please contact me at this office or Tom Umenhofer of my staff at (805) 705-9142 or via email at tom@wspa.org.

Sincerely,

cc: Tom Umenhofer – WSPA
Richard Corey - CARB

Exhibit 1: WSPA Comment Letter (March 29, 2019)

WSPA

Thomas A. Umenhofer, CCM, REPA
Vice President

March 29, 2019

Ms. Cynthia Marvin
Chief, Transportation and Toxics Division
California Air Resources Board
1001 I Street
Sacramento, California 95812

Re: WSPA Comments on CARB Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor

Dear Cynthia,

Western States Petroleum Association (WSPA) appreciates this opportunity to provide initial feedback on the California Air Resources Board (CARB) Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor, dated February 22, 2019 and the CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth For (Crude and Product) Tanker Vessels, Dated February 22, 2019. WSPA is providing these comments as part of a continuing effort to provide feedback on the At-Berth At Anchor pre-regulatory process. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

CARB staff recently provided three documents for stakeholder review:

- Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor (dated February 22, 2019),
- Updated Tanker Implementation Schedule – For Vessels Above Port/Port Complex and Terminal Thresholds (dated February 19, 2019).
- CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for (Crude and Product) Tanker Vessels (dated February 22, 2019).

Provided below is WSPA's feedback on these documents.

Discussion Draft - Control Measure for Ocean-Going Vessels At Berth and At Anchor

I. Provision: every visit must use a CARB-approved emission strategy, with some limited exception

Table 3 (Compliance Responses for All Vessel Types Where Emissions are Not Controlled as Required During Vessel Visit) identifies compliance responsible parties for vessels and marine terminals. Based on the current status of control options for oil tankers, it is apparent that all oil tankers and tanker marine terminals would fall into one category: "Exception". This is due to the fact that no emission control technology currently identified is feasible for tanker operations. Specifically, the interface between any control strategy (barge-based emission capture, land-

based emission capture or electrification) and a tanker (in addition to the control device itself) have had no certifications and are not endorsed by a class society. Therefore for safety reasons alone (in the absence of class society certifications), the "Exemption" category is appropriate under the safety/emergency circumstance in Table 3.

II. Provision: CARB staff will conduct an interim evaluation of the At berth program and report to the Board

In this conceptual provision, CARB staff will review and report to the CARB Governing Board the status of at berth emission control technologies for Ro-Ros and tankers, progress in installing the land-side infrastructure required to support at berth control systems by 2023. This report to the Governing Board will advise the Governing Board as to whether there is a need to develop any amendments to the regulation.

WSPA agrees with this requirement for a report to the CARB Governing Board. However, the timing presents a significant challenge. Provided the infrastructure required to support the land -based capture system, if technology barriers exist into 2023, the four to six years between the review and compliance date for the southern and norther ports respectively is not sufficient to complete a project, and be in compliance.

WSPA does not believe the timeline should require an entity to design infrastructure for a technology while the technology is still in development. As the ongoing development to enable a capture device to function properly on tankers could change the infrastructure requirements to support the system.

As noted in the Industry Coalition Alternative Proposal[1], the report must include key elements such as:

- Reporting compliance methodologies and evaluation benchmarks consistent with the current staff proposal for Bulk vessels.

- Feasibility study to identify cost effective emission control programs for all vessel categories based on reasonable implementation deadlines, safety concerns, and technological feasibility.

The feasibility study aspect of the report to the CARB Governing Board should be conducted in cooperation with all industry stakeholders, and be based on data which is made publicly available during study development,

With regard the 2023 reporting date, WSPA believes that subsequent feasibility "check-in" dates with the CARB Governing Board be included (i.e., 2025, 2028, 2031) to assess whether the proposed implementation deadlines remain viable or can be accelerated through additional amendments to the rule.

[1] Industry Coalition Comment Letter, "Alternative Proposal for Amendments to At-Berth Regulations", to Cynthia Marvin, CARB, February 15, 2019.

Updated Tanker Implementation Schedule

This updated implementation table for tankers cites 2027 and 2029 as deadlines for the installation of control systems for DPM and NOx at POLA/LB and other marine terminals, respectively. It is understood that the two different dates was an attempt by CARB staff to stage implementation. Given that no technology has been design, demonstrated or certified by an international authoritative body, neither implementation date (2027 or 2029) allows sufficient time for development, design, approval, CEQA review, multiple agency permitting, procurement, construction, and commissioning of any emission reduction system, regardless if the marine terminal is located in a port or other locations.

As specified in the Industry Coalition Alternative Proposal, WSPA supports tankers to report in a similar fashion as bulk fleets along with Ports and Marine Terminal Operators serving currently unregulated fleets. If a date were to be retained in the Tanker Implementation Schedule, the proposed implementation date (subject to re-evaluation) should be no earlier than 10 years following the identification of a feasible technology.

CARB Staff Analysis of Potential Emission Reduction Strategies by Port/Terminal/Berth for (Crude and Product) Tanker Vessels

Barge-Based Emission Control Systems

The conclusion of the review by CARB for some tanker marine terminals should be able to rely on single or shared barge-based capture and control systems. As WSPA has clearly stated in previous documentation (Enclosure A) provided to CARB staff, there are significant safety concerns with barge-based capture and control systems as a strategy to reduce or eliminate emissions at berth. The following list highlights some significant concerns:

- Docking pilots indicate that environmental conditions (current, wind, etc.) combined with increased vessel activity in the limited maneuvering basin may raise risks (e.g. collision, allision, grounding, line failure, etc.) to higher than acceptable levels.

- The mooring system may not be adequate for handling additional loads created by mooring a barge alongside a tanker at berth. The current barge-based emission control systems operating in California are too small to process tanker boiler emissions. Thus, barge-based systems 3-4 times larger than exist today would need to be designed and constructed. A robust analysis of mooring loads will consequently need to take place.

- Currently available undersized barges have not been tested with large marine boilers.

- There are concerns on how a balanced combustion path will be maintained to prevent dangers like boiler explosions. Boiler manufacturers have indicated that it may be possible to connect a capture and control system **if proper modifications are carried out on board each ship, to include higher capacity blowers and modified control systems**. In practice, third-party internationally traded vessels will not upgrade on board systems for a call on a single port.

- Further, currently available barge-based systems are not built to any government standard relating to capture operations. They have no certifications and are not endorsed by a class society. There is no industry vetting standards for these barges. Until industry safety standards are developed, such vessels are not allowed by responsible operators to come alongside their tankers when combustible liquids are on board.

- Per 2 CCR 2340, a tanker must be able to depart berth within 30 minutes. Whether barges of this size can be safely moved a sufficient distance by tugs in time to allow safe tanker departure in emergency conditions will need to be tested and analyzed.

- The current design uses a crane and connection to the vessel's stack and has no emergency break away coupling. Further, there exists no engineered working safety margin for movement between vessels. All interfaces to tankers must be designed and regulated to a standard. There is no standard available.

- Emergency protocols and associated systems between the barge and tanker need to be developed.

Shore-Based Emission Control Systems

The conclusion of the review by CARB for some tanker marine terminals should be able to rely on land-based capture and control systems. As WSPA has clearly stated in previous documentation (Enclosure B) provided to CARB staff, there are significant safety concerns with land-based capture and control systems as a strategy to reduce or eliminate emissions at berth. The following list highlights some significant concerns:

- In most if not all cases, two cranes would be required at each berth, to allow vessels to berth port or starboard side to. These cranes would need to be very large to accommodate reach for all vessel designs.

- Similar to barge systems, the shore crane and connection to the vessel's stacks have no emergency break away coupling and no engineered working safety margin for movement between vessels. All interfaces to tankers must be designed and regulated to a standard. There is no standard available.

- As with the barge-based system, there are concerns on how a balanced combustion path will be maintained to prevent dangers like boiler explosions. Boiler manufacturers have indicated that it may be possible to connect a capture and control system **if proper modifications are carried out on board each ship, to include higher capacity blowers and modified control systems**. In practice, third-party internationally traded vessels will not upgrade on board systems for a call on a single port.

- Emergency protocols (and likely systems) between the shore and the tanker need to be developed.

Shore Power

The CARB Staff Analysis indicates in several instances that sufficient space may be available to accommodate shore power equipment. WSPA has been clear in past communications with

CARB (Enclosure C) on the many limitations and concerns related to electrification of tankers including:

- There are no broad tanker industry standards that exist for safe operation of electrification technology while transferring hazardous cargo.

- International trading tankers are not fit with shore power connections. These internationally regulated vessels will not be compelled to upgrade systems to call on a single port in the world.

Recommendation

Each method (whether barge-based emission capture, land-based emission capture, electrification) poses significant safety concerns, technology limitations, and critical compatibility constraints for tanker vessel applications. Regardless of alternative, the infrastructure requirements for a project at a marine terminal are tremendous, require significant lead time (including environmental review and other resource agency permitting) and will also take many years to design and construct.

WSPA strongly recommends that CARB seriously consider the Industry Coalition Alternative Proposal as it provides a logical and achievable approach to bringing tankers into the regulatory framework.

With regard to these comments and the attachments we have provided, please contact me at (805) 701-9142 or via email at tom@wspa.org if you have any questions.

Sincerely,

Enclosures

Cc: Catherine Reheis-Boyd – WSPA
Bonnie Soriano – CARB
Angela Csondes – CARB

Enclosure A

Proposed CARB At Berth At Anchor Regulation
Limitations and Issues Presented by Barge-based Emission Control

The following points represent dangers and complications identified that would be associated with the operation of a shore-side emissions control system. Regardless of the below points, any consideration of barge-based control mechanisms must operate within the existing system of safeguards and standards associated with the hazards of managing tanker cargoes. It is essential that a complete set of physical and operational standards for this category of technology be developed prior to more detailed discussions surrounding safety, siting, costs, implementation and regulatory parameters.

1. Safety

a. There are no broad tanker industry standards that exist for safe operation of barge-based emissions control technology while transferring hazardous cargo.

b. Significant safety concerns must be considered including the risks of attachment to another ship while offloading. Federal anchorage (33 CFR 110.215 (a)(2)(B)(iv)) and CA State Lands Commission (Article 5 §2340 (c)(28)) regulations enforced by the USCG require all tankers moored alongside an oil terminal to be capable of vacating the berth within 30 minutes.

- **i.** Significant time may be required to disconnect bonnet, stow bonnet arm, unmoor barge, connect tug, and secure the barge for sea if the vessel must vacate the berth under USCG orders or for the safety of the vessel and crew.
- **ii.** Potential for bonnet to ignite due to high exhaust gas temperatures
- **iii.** The hulls of the vessels are not flat at the longitudinal stack location – this creates a potential for the bonnet barge to be pinned underneath the vessel and rupture ship's fuel tanks.
- iv. Barge would sit within the containment boom area required for the transfer of persistent oils. Risk of fire and explosion is high in the event of spill.

c. Restricted evacuation; barge presents a barrier for vessel egress in case of emergency either on shore-side, the vessel, or on the barge itself. Above referenced regulations to vacate berth within 30 minutes must be complied with.

d. Safety standards related to any required manual operation of the control system must be considered, especially in relation to immediately dangerous to life or health (IDLH) environments and night-time operation.

e. As no technology has been proven in practice, the ability to control key connections of the shore-based emissions control to boilers is unknown. This includes the possible inability to adjust for changes in load and while controlled as well as the unknown effect of a control technology on boiler combustion space.

f. No tanker industry standards exist for safe operation of this technology while transferring hazardous cargo. Regardless of the dangers and complications identified

2. Path to Implementation

a. Design and permitting will take a significant amount of time and resources and can only be considered following the development of physical and operational industry standards for shore-based control technologies.

b. Should physical and operational standards be developed and accepted industry-wide, ships vary greatly in physical layout and capabilities that make it difficult to apply to one static barge-based emission control setup.

c. Third-party staffing for continuous (24 hours per day, 7 days per week) availability of tugs and barges. The implementation of a barge-based control system (whose feasibility for tanker applications has yet to be developed, much less deemed feasible) will require significant

resources including training and regulation of systems under standard operational procedures to be developed.

d. Given that no tanker industry standards exist for safe operation of this technology, industry will require time to examine and develop safe practices if possible.

3. Siting

a. Due to large variety in locations of terminals, barge-based controls are not available for all berths such as in area-restricted ports and within bays that are subject to waves and tides.
- **i.** Equipment operating window must be wide to account for motion on both barge and ship. Waves, wind and current limit barge operations alongside a loaded tanker including the potential for collision and damage to barge or ship with a possible subsequent pollution event and/or injury to personnel.
- **ii.** There is a probability of increased traffic and spacing concerns due to physical layout of some shore-side setups. Traffic and spacing concerns must be taken into account in development of physical and operational standards for this control technology.

4. Real Emissions Reductions

a. The additional time required for barge connections and disconnections will result in increased vessel port call duration.
- **i.** Bonnet barge delays could impact vessels' schedules and force them to wait at anchorage or alongside for 12+ hours when tide and current windows are missed.
- **ii.** This would increase hotel load emissions and could result in significant impacts to the logistics relative to supplies and/or products.

b. Additional emissions due to tug, barge, and control system operation.

c. Additional emissions (including GHGs) due to tug transit and maneuvering.

5. Costs

a. Retrofitting of ships to be compatible with barge-based controls as well as the implementation of the control technology will be costly.

b. Costs will be incurred by third party owners and operators of vessels who have the option to take their business elsewhere.

c. Additional personnel resources as well as training of personnel to operate new systems and interfaces will result in significant costs.

Enclosure B

Proposed CARB At Berth At Anchor Regulation
Limitations and Issues Presented by Shore-Based Emission Control

The following points represent dangers and complications identified that would be associated with the operation of a shore-side emissions control system. Regardless of the below points, any consideration of shore-side control mechanisms must operate within the existing system of safeguards and standards associated with the hazards of managing tanker cargoes. It is essential that a complete set of physical and operational standards for this category of technology be developed prior to more detailed discussions surrounding safety, siting, costs, implementation and regulatory parameters.

1. Safety

a. There are no broad tanker industry standards that exist for safe operation of shore-based emissions control technology while transferring hazardous cargo.

b. The additional time to respond, including the disconnection from power, engine start up, etc. in an emergency is a significant safety concern. Federal anchorage (33 CFR 110.215 (a)(2)(B)(iv)) and CA State Lands Commission (Article 5 §2340 (c)(28)) regulations enforced by the USCG (and included in local fire codes and ISGOTT standards) require all tankers moored alongside an oil terminal to be capable of vacating the berth within 30 minutes.

- **i.** Significant time may be required to disconnect bonnet, stow or remove bonnet arm, and remove shore-side equipment.
- **ii.** Emergency concerns and speed of vacating berth are increased for tankers due to flammable material on board and safety standards associated with operation within dangerous and hazardous areas.

c. Third-party owners and operators are not manned with crews and officers properly trained on how to safely operate shore-side control systems and facility operators do not have the legal authority to regulate crews aboard 3rd party vessels.

d. Safety evaluation of capture and control system, including but not limited to fire and explosion risk, must be conducted accounting for the collection, pressurization and transportation of gases in a crowded terminal.

e. A wide equipment operating window is required to account for vibrations and wind.

f. Safety standards related to any required manual operation of the control system must be considered, especially in relation to immediately dangerous to life or health (IDLH) environments and night-time operation.

g. As no technology has been proven in practice, the ability to control key connections of the shore-based emissions control to boilers is unknown. This includes the possible inability to adjust for changes in load and while controlled as well as the unknown effect of a control technology on boiler combustion space.

h. No tanker industry standards exist for the safe operation of this technology while transferring hazardous cargo.

2. Path to Implementation

a. Design and permitting will take a significant amount of time and resources and can only be considered following the development of physical and operational industry standards for shore-based control technologies.

b. Marine Terminals will not commit to this control option until physical and operational standards are developed and accepted industry wide and permits are acquired.

c. Space and utilities for shore-based systems in ports may be under the ownership and control of the port authorities.

Proposed CARB At Berth At Anchor Regulation
Limitations and Issues Presented by Shore-Based Emission Control

d. Should physical and operational standards be developed and accepted industry-wide, ships vary greatly in physical layout and capabilities, making it difficult to apply shore-based emission controls as shore-side controls must be configured for a specific setup.
   - **i.** This issue is compounded if all ports and terminals do not choose to implement exactly the same setup.
   - **ii.** Third-parties operate and own the vast majority of ships calling at California terminals and the retrofit of vessels to hook up to shore-side control is not under the control of any California-based stakeholder

e. Shore-side set ups vary widely (port based, open water berth, long wharf) causing available options for emissions control to vary greatly between situations.

f. Given that no broad tanker industry standards exist for safe operation of this technology, industry will require time to examine and develop safe practices if possible.

3. Compliance Determination and Regulatory Responsibility

a. It is currently unclear how a “compliant visit” will be determined.

b. Phased control percentage goals currently proposed do not assist in allowing for compliance with proposed implementation timelines as the shore-based control system (which will require a long lead time to develop will yield the same emission control level, regardless of when it is implemented.

c. If shore-based emissions control is unavailable or incompatible with a vessel, it is currently unclear who will bear the responsibility and possibility of enforcement action.

4. Siting and Function (without an interface standard)

a. The ability to install shore-based capture and control options may be significantly limited by plot space demands.
   - **i.** Infrastructure under the authority of ports (not marine terminals ot vessel operations)
   - **ii.** Infrastructure requirements including allocation or procurement of land (the natural consequence of increasing “project” scope) and facility (wharf, port) improvements including (bay in-fill, pile driving, land-use re-designation, etc.)

b. Additional electrical load to power shore-based control systems is not always available during demand response period times.

c. The capacity of Booster Pumps may be limited due to a number of factors including: available plot space, length of piping run, elevation change, pipe diameter and rating, pipe material and thickness, type of crude, etc.

d. Varying setup of ports versus open water berth and long wharf terminals present unique siting issues that are not “one size fits all”.

5. Real Emission Reductions

a. Booster pumps are driven by electricity or steam and will result in NOx and PM emissions. The quantity of these emissions must be taken into account when evaluating emissions reductions.

b. Booster pumps can help reduce, but will not eliminate, the amount of fuel burned on a ship.

Enclosure B

Proposed CARB At Berth At Anchor Regulation
Limitations and Issues Presented by Shore-Based Emission Control

6. Costs

a. Shore-based control options require significant up-front investment due to high capital cost of infrastructure development and land costs.

b. Costs of port will be passed onto tenants, making calling at California ports cost-prohibitive to international shipping companies.

c. Additional personnel resources as well as training of personnel to operate new systems and interfaces will result in significant costs.

Enclosure C

Proposed CARB At Berth At Anchor Regulation
Limitations and Issues Presented by Electrification of Tankers

The following points represent dangers and complications identified that would be associated with the operation of an electrification system for tankers. Regardless of the below points, any consideration of electrification systems must operate within the existing system of safeguards and standards associated with the hazards of managing tanker cargoes. It is essential that a complete set of physical and operational standards for this category of technology be developed prior to more detailed discussions surrounding safety, siting, costs, implementation and regulatory parameters.

1. Safety

a. There are no broad tanker industry standards that exist for safe operation of electrification technology while transferring hazardous cargo.

b. The additional time to respond, including the disconnection from power, engine start up, etc. in an emergency situation is a significant safety concern. Federal anchorage (33 CFR 110.215 (a)(2)(B)(iv)) and CA State Lands Commission (Article 5 §2340 (c)(28)) regulations enforced by the USCG (and included in local fire codes and ISGOTT standards) require all tankers moored alongside an oil terminal to be capable of vacating the berth within 30 minutes.

c. High voltage electrical connections and equipment required may not be suitable for hazardous zones:

- **i.** Hazardous zone concerns are unique to tankers as the same risks associated with cargo do not exist for container vessels or cruise ships.
- **ii.** In IMO evaluation of On-shore power supply safety standards, it was determined that there are "no unified technical requirements for high-voltage shore connection systems and no consideration is given to the electrical surge impact of cold ironing on power networks"[1].
- **iii.** International Safety Guide for Oil Tankers and Terminals (ISGOTT) Section 4.4 standards for the management of electrical equipment and installations in dangerous areas must be complied with in the implementation of any electrification system including the ability to isolate electrical equipment should a hazardous situation arise.

d. Third party owners and operators are not manned with crews and officers properly trained on how to safely operate a "Cold Ironing" or other shore-side electric power systems.

- **i.** Safety concerns regarding the expansion of CARB's OGV rule to include tankers were expressed by Intertanko in 2017 comments to CARB. Intertanko concerns included safety risk associated with electrification of tanker with hydrocarbon cargo and proximity to hydraulic pumps[2].

e. IMO safety evaluation of on-shore power determined that while shore-side power systems are grounded electrical systems, power systems for most ships are ungrounded. IMO concluded that without unified isolation, grounding and operational procedures, tanker hookups to shore-side power systems could lead to significant hazards for the power system.[3]

2. Path to Implementation

a. Given that no broad tanker industry standards exist for safe operation of this technology, industry will require time to examine and develop safe practices if possible.

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[1] IMO Maritime Safety Committee. 98th session. March 7, 2017. "Work Programme: Proposal for new output to develop safety standards for cold ironing of vessels and guidance on safe operation of On-shore Power Supply (OPS) in port"

[2] Weekly News in Detail: California Air Resources Board intends to expand use of shore power to all ship types. August 17, 2017. Retrieved on October 30, 2018 from http://www.intertanko.com/News-Desk/Weekly-News/Year-2018/No-33-2018---17-Aug/No-33-2018/#articlegen60408.

[3] IMO Maritime Safety Committee. 98th session. March 7, 2017. "Work Programme: Proposal for new output to develop safety standards for cold ironing of vessels and guidance on safe operation of On-shore Power Supply (OPS) in port"

b. Third parties own and operate the vast majority of the global tanker fleet and the retrofit of these vessels to utilize shore-side electricity systems is not under the control of California operators or ports. Unique issue to tankers due to global fleet composition.

3. Siting

a. Existing tanker shore power connections are designed only for shipyard electrification and for hotel sources. The vast majority of tankers are not designed to run pumps off shore power.

b. Tankers vary greatly in physical layout and capabilities that make it difficult to apply electrification to all ships as often the shore-side is configured for a specific setup.

c. Unlike cruise ships or container vessels, tankers do not dock at exact same berth point every time – poses issues in siting of electric connections.

d. Siting limitations due to available plot space, length of electric run, elevation change and others.

e. Substantial time and cost related to California Environmental Quality Act (CEQA) environmental impact assessment and permitting electrical infrastructure with local and state agencies.

4. Real Emission Reductions

a. The majority of oil tankers are fitted with steam driven cargo pumps. On these ships, "Cold Ironing" would only offset the house electrical loads.

b. Electrical losses over long distances to shore would decrease the effectiveness of this option as the unique situation to northern California remote marine terminals that cannot utilize port infrastructure.

5. Electricity Demand

a. Additional electrical load is not always available during demand response time periods.

b. Electricity infrastructure at ports will have to be upgraded to meet demand during peak hours, which is not under the control of the vessel owner or the company utilizing the vessel for transport.

6. CARB Authority

a. In direct conflict with existing safety regulations (see point 1.a.i.).

b. As demonstrated in *United States v. Locke, Governor of Washington, et al*, state legislation of "tanker personnel equipment and operations would cause inconsistency between the regulatory regime of the US Government and that of an individual State of the US"[4].The case law presents jurisdictional issues related to California's ability to regulate equipment for vessels engaged in interstate/international commerce.

c. Intertanko submitted comments to CARB in 2017 regarding the "possible conflict of responsibilities and liabilities in case of a shore power break during cargo operations which may result in a cargo spill event".[5]

7. Costs

a. Space constraints and required distance of electrical runs will result in significant costs to accomplish.

[4] United States v. Locke, Governor of Washington, et al. March 6, 2000. United States Ninth Circuit Court of Appeals. No 98-1701.

[5] Weekly News in Detail: California Air Resources Board intends to expand use of shore power to all ship types. August 17, 2017. Retrieved on October 30, 2018 from http://www.intertanko.com/News-Desk/Weekly-News/Year-2018/No-33-2018---17-Aug/No-33-2018/#articlegen60408.

b. Retrofitting of ships will be costly and costs will be incurred by third party owners and operators of vessels who have the option to take their business elsewhere.

Exhibit 2: Woodbridge Comment Letter (September 19, 2019)

WOODBRIDGE MARINE

191 Military East, Ste. A
Benicia, CA 94510
USA
Phone: (925) 687-1234
sfo@woodbridgemarine.com

19 September 2019

To whom it may concern.

Woodbridge Marine Inc is a California based marine consultancy specializing in the safety inspections on oil tanker vessels primarily. The company is made up of personnel that have served as senior officers on oil tankers both internationally and also in the domestic fleet.

We have been asked to comment on the possible effects of the proposed rule governing exhaust gas capture on oil tankers.

Safety and technological challenges

Section I: Overview of perceived safety issues likely to be encountered through the design and implementation of tanker vessel emission controls.

1. Whether alongside or ashore, all equipment must be certified as Class I, Div. I intrinsically safe if it is open to the atmosphere. Non-intrinsically safe equipment would need to be housed in enclosed structures.
2. There is a hazard of static electricity generation that could be caused by the exhaust gas capture system and vessel interface. The mishandling of static electricity on oil tankers can and has resulted in catastrophe. While the hazards of static electricity are well known with current technology typically in use on tank vessels. The introduction of new technology vis. a vis. exhaust gas capture has not been studied by the tank ship community and is not well understood at this time. Electrostatic hazards should therefore be studied and mitigation measures determined in order to avoid the possibly catastrophic consequences of an unexpected static discharge. (See ISGOTT Ch. 3 and CENELEC CLC/TR 50404:2003 "Electrostatics – code of practice for the avoidance of hazards due to static electricity")
3. The technology in use must include a means for emergency disconnection. In order for a tank ship to get underway in a minimum amount of time in an emergency, there should be a means to disconnect the system in a minimal time frame. (Noting that 2 CCR 2340 (c)(28)(A) calls for a tank vessel to be capable of moving away from a berth within 30 minutes.)
4. Oil tankers are required to maintain most cargoes in an inerted atmosphere. The use of inert gas is a key safety measure, and mandated by both U.S. regulations, and international standards. This is typically accomplished through the use of cleaning

exhaust gas and injecting it into the cargo tanks as the cargo is discharged. The inert gas by law must have less than 7% Oxygen by volume. Industry standards (OCIMF) call for 5% max O2.

a. Inert gas for vessels that use steam driven cargo pumps typically utilized exhaust gas from the boilers to produce inert gas. The gas is routed through a scrubber unit prior to being supplied to the cargo tanks. Not all of the gas is necessarily routed through the scrubber, and some of the gas may be released to the atmosphere in order to supply gas at a rate that matches the displacement of the cargo being pumped ashore. The boilers must be operated very carefully with a proper mix of fresh air in the combustion system in order to provide the right amount of Oxygen in the processed exhaust gas. Change of pressure in the exhaust stack would therefore affect this process and could negatively the oxygen content of the exhaust gas.
b. Boiler loads are not constant during a cargo discharge. Low loads are typical as cargo is started, with the load changing for tank switches aboard and ashore, during crude oil washing and whilst stripping (final emptying) of cargo tanks. The exhaust gas processing equipment must be able to keep up with the changes in a seamless manner in order to insure that the marine boiler is unaffected.
c. The boilers may also be used for cargo heating purposes, which can further affect the exhaust gas recovery process.
d. Inert gas can also be created through the use of an inert gas generator. IG generators are typically found on smaller vessels that do not utilize steam driven cargo pumps, and typically include burners and a scrubber unit in one combined installation.

5. The vessel / terminal interface has been intensively studied by OCIMF. The areas documented are cargo connections, mooring and personnel transfer. The use of an exhaust gas processing interface is a new concept, and has yet to be vetted from a safety aspect. Safety information and procedural guides are contained in various OCIMF publications. Chief amongst them are the International Safety Guide for Oil tankers and Terminals 5th Ed. (ISGOTT) and Mooring Equipment Guidelines 4th Ed. (MEG4). The use of ISGOTT as a basis for tank ship operations in port is recommended by The International Chamber of Shipping and the International Association of Ports and Harbors.
6. The transport of oils and chemicals in bulk via marine transportation has been de-facto regulated through the Oil Companies International Marine Forum's (OCIMF) SIRE program for over two decades, resulting in the oil tanker industry becoming the safest overall maritime sector. It is our understanding that OCIMF has not been consulted concerning the safety issues that may be encountered through the use of this new technology. Without OCIMF guidance, there is no universal set of safety guidelines available to the tanker industry for the safe use of the proposed equipment.

7. The proposed equipment should be suitable for nearly all tank vessels. It is unlikely that vessels would be modified strictly for use in California, as it is not uncommon for vessels to call once every few years, or even once in their useful life. Most tankers operate in the international spot market, and trade worldwide.
8. Exhaust streams to be accounted for would need to include up to three auxiliary generator engines, along with the possibility for one or two boilers, and / or additional small diesel engines utilized on some vessels with hydraulic cargo pump systems. Auxiliary engines are typically started and stopped as the load changes during the discharge operation.
9. There are two additional unique classes of vessel in the Alaska North Slope crude oil trade that are frequent visitors to California ports, and may require specific additional capabilities.
    a. The three vessels currently being operated by the Alaska Tanker Company (190 MDWT) utilize a diesel electric plant with four medium speed diesel powered generator engines producing 6.1MW each. Two are typically required for a cargo discharge operation. One of these vessels is currently configured for cold- ironing operations at Marathon's LB No. 121 berth.
    b. Polar Tankers Inc. operates five vessels (140 MDWT) that utilize a diesel electric system for discharging cargo. The electricity is provided by one of their two main propulsion engines along with auxiliary diesel generator engines capable of producing up to a total 3MW whilst alongside.

Section II. Additional issues specific to shore based installations.

The critical aspect that needs to be reviewed prior to any ruling on adding equipment to tanker terminals is a detailed and thorough feasibility study which would incorporate a very detailed risk assessment to ensure compliance with all international and domestic regulations.

It should be noted that OCIMF has instituted a program of Marine Terminal Inspections (Marine Terminal Information System) on a worldwide basis and they can and do refuse to moor ships to a terminal that does not meet specified standards if they believe it poses a risk to their vessel.

The state also has their own standards governing marine terminals, The Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) establish minimum engineering, inspection and maintenance criteria for all marine oil terminals in California, in order to prevent oil spills and protect public health, safety and the environment. Originally approved by the California Building Standards Commission on January 19, 2005, the MOTEMS were first published on August 10, 2005 and became effective on February 6, 2006. To ensure that the best achievable protection is provided, the Commission continuously updates the MOTEMS regulations through public and transparent rulemakings that allow abundant opportunities for public participation.

These comprehensive standards contain requirements for assessment of the structural, mechanical and electrical systems at marine oil terminals, including, but not limited to:

Audits and inspections, Structural evaluations, Seismic analyses, Berthing and mooring

Geotechnical assessments, Fire protection, Pipelines, Mechanical and electrical equipment

Electrical systems, LNG terminals

The basic safety issues have been discussed above and below are some specific operational concerns that will need to be addressed:

1. For existing marine oil terminals, all proposed new, substantially modified or re-designed structural, berthing and mooring (including Terminal Operating Limits [TOLs]), fire, piping/pipeline, mechanical or electrical systems or components are also subject to MOTEMS compliant review by the Commission, and shall be MOTEMS compliant prior to use or reuse. "As-built" re-verification may be required.
2. The location of a tanker's manifold (cargo piping termination) determines the location of a vessel alongside a berth. A shore-based system must therefore be capable of a relatively wide range of longitudinal motion along the berth.
3. Bridge wing to manifold distance range as follows:
    a. MR 50 MDWT) - 55m
    b. Panamax (75 MDWT) - 75m
    c. Aframax (105 MDTW) – 85m
    d. Suezmax (150 MDWT) 95m
    e. VLCC (320 MDWT) 120m (Berth LB 121 only).
4. Similarly, the vessel's draft during discharge will have to be safely taken into account. Drafts can typically change for vessels from fully loaded to empty of cargo (and at "normal" ballast condition) as follows:
    a. MR – 3.5m
    b. Panamax – 6.5m.
    c. Aframax – 7m.
    d. Suezmax – 9m.
    e. VLCC – 11m.
5. The full range of tides would need to be accounted for in addition to the above.
6. Unlike typical dry goods and container terminals, tank ship terminals often utilize a relatively short wharf (or "apron") combined with mooring dolphins. For those terminals, new structures would be required in order to install the equipment. The structures would have to be able to account for the differences in vessel size in order to be able to connect to the different size vessels (as detailed above), and would in most cases be required on both ends of the berth, as vessels could be docked either port or starboard side to the wharf. In addition to the engineering challenges, there would be environmental challenges to ensure wetlands safety.

Conclusion:

It is critical that before implementing the proposed rule that industry be allowed to conduct a detailed and thorough feasibility study covering the wide range of terminals in use State wide. This should ensure that the equipment is available and that it would meet the safety requirements to be installed at the marine terminal / vessel interface without creating a hazardous consequence that could result in significantly increasing the risk involved in the transfer operation. This must involve MOTEMS compliance and the possible consequences of moving forward without complete confidence from the primary partners in the transportation of petroleum / chemical and liquefied gas could include any of the following:

1. Increased risk to the operation and also the terminal and vessel directly, including fire, explosion, loss of life and significant pollution events.
2. Regulatory compliance issues.
3. Significantly longer operations which also increases the risk of an accident.
4. Owner / operators deciding the risk to utilize these terminals is unacceptable.

Yours Sincerely

Capt Andrew Lott

President

Woodbridge Marine

Exhibit 3: WSPA Comment Letter (August 15, 2019)

WSPA

Thomas A. Umenhofer
Vice President

August 15, 2019

Ms. Cynthia Marvin
Division Chief, Transportation and Toxics
California Air Resources Board
1001 I Street
Sacramento, California 95812

sent via e-mail to: Cynthia.Marvin@arb.ca.gov

Re: Additional WSPA Comments on CARB Proposed At Berth Regulation Working Draft

Dear Cynthia,

Western States Petroleum Association (WSPA) appreciates the continuing opportunity to provide additional feedback on the California Air Resources Board (CARB) proposed California Code of Regulations, Title 17, Division 3, Chapter 1, Subchapter 7.5, Sections 93130-93134.14 (At Berth Regulation) Working Draft, dated May 8, 2019. WSPA is a non-profit trade association representing companies that explore for, produce, refine, transport and market petroleum, petroleum products, natural gas and other energy supplies in California and four other western states.

This letter follows up on our conversation with you and your staff on July 18, 2019 and provides additional information regarding the need for a comprehensive feasibility evaluation study before any At Berth Regulation is adopted. Enclosed with this letter is a general outline of the contents of such a study and additional information to explain why the current compliance deadlines of 2027 and 2029 on the At Berth Regulation Working Draft are not achievable.

WSPA and many other stakeholders share CARB's strong desire to see regulations that are legally supportable, can be feasibly implemented, and are likely to achieve real-world air quality goals. In our view, the key to meeting these goals is to set a realistic rulemaking schedule to obtain the necessary information, then to work openly with stakeholders and the public to carefully assess and incorporate that information as required to ensure workable regulations. Failure to properly account for the real-world feasibility of the At Berth Regulation, we believe, could lead to adopting requirements that simply cannot be met safely and in a cost-effective manner, or that are impossible to meet at all.

Evaluation of the Feasibility of Shore-Based Emission Control for Tankers

As we discussed with you and CARB staff, WSPA continues to have serious concerns that no version of the At Berth Regulation can succeed without ensuring that it can be technically, feasibly, cost-effectively, and, as important, safely implemented within the timeline that CARB is proposing. To that end, WSPA acknowledges CARB's engagement with stakeholders to date, but believes that it is critical to first conduct a study to evaluate the technical feasibility of the proposed control option (shore-based emission capture and control) for tankers before any compliance date can be set. This is because the technology, as proposed in the regulatory analysis, has never been implemented on tankers; assuming the technology is available when it has not been proven to succeed on a tanker is a flawed approach. There are several technical differences between tankers and cargo vessels, such as managing boiler pressures when exhaust is captured, and

the possibility of vapors from tanker cargo finding their way into the capture system. At a high level, this evaluation study should assess the safety, reliability, operability, and availability of the proposed control option as well as the ability of the proposed control option to meet the regulatory requirements within the proposed timelines.

WSPA believes that participation from CARB, as well as the numerous other regulatory agencies involved in permitting and evaluation of large-scale projects such as those proposed by the At Berth Regulation, is critical for the success of the study. Such participation is especially critical in that, not only are the technical and safety issues important, but the review and permitting timelines of local and state regulatory agencies for projects of this scope are crucial for everyone to understand and factor into any given regulatory time deadline. WSPA is proposing that this effort be undertaken collaboratively between WSPA, CARB, and other local and state permitting agencies with the goal of completing the study within 3 years from the adoption of the At Berth Regulation. Upon completion of the study, WSPA proposes that a detailed evaluation report be produced, and that CARB convene additional public workshops as necessary to adequately address the findings in the report and make any necessary revisions to the proposed Regulation.

To that end, attached is a proposed report outline for an Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports. This outline provides a basic framework for an evaluation study to assess technical feasibility that we believe will address critical questions that must be answered for the At Berth Regulation to satisfy legal criteria and ultimately accomplish the goals the At Berth Regulation set out to achieve.

The following is a list of critical questions that we believe must be answered, at a minimum, by the study:

- Is the type of shore-based emission control system envisioned by the proposed At Berth Regulation technologically feasible at this time? If not currently feasible, is there a reasonable basis, supported by significant evidence, to expect that such a system will become technologically feasible in the timeframes set forth in the proposed At Berth Regulation for tankers?

- What potential safety, reliability, and operability concerns need to be resolved before the type of shore-based emission control system and vessel interface envisioned by the At Berth Regulation could be installed and operated?

- Do any of the safety, reliability, or operability concerns identified create a significant risk to human health, safety or the environment?

- Can the type of shore-based emission control system envisioned by the At Berth Regulation meet the 80% reduction in NOx, Particulate Matter, and Diesel Particulate Matter required by the At Berth Regulation?

- Can the type of shore-based emission control system envisioned by the At Berth Regulation operate in compliance with all other applicable laws and regulations, including those related to interstate and international commerce?

- Is there room for the type of shore-based emission control system envisioned by the At Berth Regulation within the existing developed footprints of marine terminal facilities? If not, would installation of the systems require new construction in expanded onshore

footprints and/or installation of new facilities on fill or pilings in wetlands, tidelands and/or submerged lands, with significant impacts on coastal onshore and offshore habitat and other sensitive areas and resources? Will new tideland leases or lease amendments from the State Lands Commission be necessary?

- Will modifications to equipment on tankers be required? Boilers and auxiliary engine connections and controls should be considered.

- What potential safety, reliability and operability concerns needs to be addressed by ship owners, manufacturers, classification societies, USCG before such a modification is applied to vessels? How will CARB ensure third party vessels are modified to comply with shore-based emission control system before calling?

- If the type of shore-based emission control system envisioned by the At Berth Regulation can be feasibly built and operated, what timeframes would be required for such construction and operation, considering timeframes required for permitting and approvals by regulatory oversight agencies and local jurisdictions with land use authority, and including delays due to potential litigation?

- If the type of shore-based emission control system envisioned by the proposed regulation can be feasibly built and operated, what would be the costs to the regulated industry?

Timeline for Implementation of the At Berth Regulation for Tankers

Even under ideal conditions, WSPA does not believe that any marine terminal can meet the proposed compliance deadlines of 2027 for the Port of Long Beach (POLB) and Port of Los Angeles (POLA), or 2029 for all other marine terminals where tankers are berthed. Based on information received from WSPA member companies, we believe that the earliest a marine terminal could comply with the proposed regulatory requirements is 2033. Additional time would be needed, at least up to two years, for larger and more complex terminals requiring a compliance date no sooner than 2035 for those facilities due to in-water work window limitations and operational construction constraints.

As was discussed and requested by CARB during our meeting on July 18, 2019, enclosed with this letter are the aggregated results from our member companies showing the estimated timelines to meet compliance with the proposed regulatory requirements. Included in the enclosure is a chart showing how long (as a range) each major step is expected to take and what timeframe (as a range) that each of those steps is expected to occur within. In general, larger and more complex terminals will need more time to complete each step due to the larger scale of the engineering, design and construction effort and because additional time needed to complete each individual step compounds over the life of the project. Also included is a table which describes in more detail what activities are include in each major step.

The major steps for any facility to meet compliance with the proposed regulation are as follows:

- General and Site-specific Feasibility Evaluation Study
- Site-Specific Design
- Engineering
- CEQA Review
- Permitting and Other Approvals

- Contracting
- Construction (Crane, Emission Control System, and Support Systems)
- Commissioning

While there are several factors that drive a longer timeline for facilities than the timeline that CARB has proposed, the single largest factor is that, at present, the technology proposed is untested and unproven as safe for tankers. This means that significantly more work is needed up front to assess the risks and ensure that the project is feasible. If there existed a proven, off-the-shelf technology that was safe for use on tankers and boilers, many of the early steps could be bypassed or the timeline shortened. But that is not the case, as was communicated by vendors during the CARB vendor meeting held on April 16, 2019, as well as in the WSPA comment letter of June 14, 2019.

Based on our conversations with you and CARB staff, WSPA also believes that CARB has underestimated the time it takes to complete many of the steps needed to meet compliance with the proposed regulation. For example, WSPA believes that CARB has significantly underestimated the time it will take a facility to apply for and receive all the required permits for a project of this nature.

At a minimum, facilities will need to receive permits or regulatory and land use approvals from the local air quality control/management district, the California State Lands Commission, the San Francisco Bay Conservation and Development Commission (for northern Californian terminals), the United States Army Corps of Engineers, the local Regional Water Quality Control Board, the California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service (if protected species are affected), the National Marine Fisheries Service (where marine mammals may be present), the United States Coast Guard, building permits and/or coastal development permits from the local city/county, and (if not delegated to the local city/county) coastal development permits from the California Coastal Commission, in addition to going through the California Environmental Quality Act (CEQA) environmental review process prior to receiving any permits and approvals.

Note that, separate from WSPA's timeline, many facilities are also in the process of updating terminals to comply with the Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) -- projects that have been in permitting, design and construction for many years. Due to the large variety of timelines for each terminal, WSPA has not included ongoing and proposed MOTEMS construction projects in our timeline.

While many of the activities can occur in parallel, those that must occur in series often will dictate the timeline. The most basic example of this occurs during permitting and construction. Construction cannot begin until permitting is complete, and permits cannot be issued until the CEQA review is complete. Construction and installation of any equipment on terminal cannot begin until such time that the support structure (foundation) is complete.

The nature of the proposed equipment, weights and locations can result in a terminal having to complete a seismic retrofit, which would extend well beyond the actual footprint of the equipment foundations. As you may recall, during our meeting WSPA members provided examples of how long it has taken to obtain permits and implement construction on marine terminal projects, such as MOTEMS. For one of our member companies, the MOTEMS initial audit was conducted in 2009 and, after design, California State Lands Commission peer review, and CEQA review and

resource agency permitting, construction was able to begin in 2018 – nine years later -- for a project that is much smaller than the size and scope proposed in the At Berth Regulation.

Below are other examples of steps that will hinder further progress on the project until completed:

- For any pilot test of the equipment installed at a port or Marine Terminal, permitting, design and construction will require additional time.

- Detailed engineering cannot begin until the feasibility evaluation study is completed, and the risks associated with the control technology are well understood, to allow for design of appropriate mitigation.

- CEQA review cannot begin until a lead agency is assigned and at least 30-60% of the design is complete, in order to provide an accurate and stable project description as the basis for review.

- Building and other permits are dependent on completing the CEQA analysis and certifying a final Environmental Impact Report (EIR) or Negative Declaration. Many responsible agencies with permit or approval authority will not begin processing applications before the CEQA document is approved.

- Contracting for construction and installation cannot be finalized until the permits and approvals are received; before that time, the conditions under which construction will occur remain yet unknown. Additionally, construction cannot commence until contracting is complete.

- CEQA lead agencies and responsible regulatory agencies may require completion of some mitigation measures before construction commences.

- In some cases, commissioning of individual pieces of equipment can occur in parallel with the construction; however, overall commissioning cannot begin until all construction is completed.

- And of course, no construction or installation can occur without first obtaining applicable permits.

It is important to note that the aggregated timeline that WSPA has attached to this communication is only an estimate. The results of the feasibility evaluation study will be necessary to refine the estimated timeline.

WSPA believes the Government Code, Health and Safety Code and other California laws and regulations require CARB to revise its current rulemaking timetable to allow for proper preparation and consideration of feasibility, cost effectiveness and timelines. See, e.g., Cal. Health & Safety Code §§ 38560, 39602.5, 39665, 43013; *see also* Gov. Code § 11346.36 & 1 C.C.R. §§ 2000-2004 (SRIA requirements to assess proposed regulation's cost impact on public health and safety, fairness and social equity, state's economy and other criteria). We would request that, at the very least, CARB include in its proposed At Berth Regulation language that allows for a feasibility evaluation study and an appropriate delay in regulatory implementation in the event the feasibility evaluation study concludes that shore-based technologies and/or other elements of the At Berth Regulation are not feasible in the regulatory timeframes provided.

WSPA also believes that the At Berth Regulation should include "off-ramp" scenarios that provide next steps for facilities that demonstrate an inability to implement all the required elements in the default timelines provided under the At Berth Regulation. In summary, WSPA requests that CARB:

1. Incorporate the feasibility evaluation study and the details included in the outline attached into the proposed regulatory language,

2. Include language in the At Berth Regulation that will provide an off-ramp or adjust the compliance deadlines based on the results of the feasibility evaluation study, and

3. Revise the proposed compliance deadlines in the At Beth Regulation to 2033 for typical terminals and 2035 for complex terminals where tankers berth.

WSPA appreciates this opportunity comment on the At Berth Regulation Working Draft. If you have any questions regarding this submittal, please contact me at (805) 705-9142 or via email at tom@wspa.org.

Sincerely,

Cc: Catherine Reheis-Boyd – WSPA
Richard Corey - CARB

Evaluation of At Berth Shore-Based Emission Control
for Tankers at California Ports
Report Outline

The evaluation study of Tankers At Berth Shore-Based Emission Control will be documented in a report that reflects the approach taken by California Air Resources Board (CARB) in the development of the document Evaluation of Cold-Ironing Ocean-Going Vessels at California Ports, dated March 2006.

The new study, to be entitled Evaluation of At Berth Shore-Based Emission Control for Tankers at California Ports will contain the following elements:

Executive Summary
I. Introduction
II. General Description of Tankers and Marine Terminals
III. Tanker Emission Inventory
IV. Technical, Safety, and Operational Review
V. Cost-Effectiveness and Economic Impact Review
VI. Conclusions
VII. References

An overview of the Sections I through VI is presented below.

Introduction

- Statement of purpose and objectives.
- Identify focus of analysis of the feasibility and cost effectiveness of shore-based emission control for tankers.
- Define shore-based emission control for tankers as capture of NO_X and PM emissions from boiler and auxiliary engines on tankers pursuant to § 93130.5 and § 93130.7 of CARB At Berth Regulation (currently Working Draft).

General Description of Tankers and Marine Terminals

- Identify unique characteristics of affected ports and marine terminals, while protecting any individual company competitively sensitive or proprietary information.
- Identify tanker classes, frequency of visits, ownership.
- Summarize tanker visit and duration information.

Tanker Emission Inventory

- Summarize updated CARB tanker sector NO_X and PM emission inventory taking into account the IMO regulations regarding Tier 3 ships and their predicted penetration into California.
- Assess by emission source types for NO_X and PM emissions.
- Review in context of overall California emission inventory.

Evaluation of At Berth Shore-Based Emission Control
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Technical, Safety, and Operational Review

Methodology

- Identify regulatory/legal requirements applicable to proposed regulations, including but not limited to:
    - Health & Safety Code (H&SC).
        - Technological and operational feasibility
        - Safety, reliability and effectiveness
        - Necessary to attain Ambient Air Quality Standards
        - Articulate potential adverse health, safety and environmental impacts
        - Show reductions are real, permanent, quantifiable, verifiable and enforceable
    - CEQA.
        - Identification of significant adverse impacts of regulations
        - Identification of reasonably foreseeable compliance alternatives/mitigation
    - U.S. Coast Guard Regulations (33 CFR)
    - PSM Regulations (e.g. 8 CCR 5189.1, 19 CCR 2762, RISO)
    - Marine Oil Terminal Engineering and Maintenance Standards (24 CCR)
- Identify regulatory agencies, local jurisdictions with land use authority, other agencies with permitting or approval authority and certification entities. Include them as stakeholders.
- Set criteria for demonstration of technical and operational acceptability (including consideration of site-specific limitations).
- Set criteria for demonstration of safety acceptability.

Analysis

The technical assessment will be prepared consistent with the criteria established through the methodology:

- Determine whether the installation of systems required to comply with the proposed regulation would satisfy or conflict with the safety, reliability, operability and effectiveness of vessels, marine terminals, the emissions control system, and supporting shoreside infrastructure, as required by regulations identified in the Methodology section.
    - Assess the effectiveness, reliability and safety of proposed methods of compliance.
    - Assess ability to attain ambient air quality standards and technological feasibility and adaptability, and potential preemption by federal law.
    - Assess whether the proposed methods of compliance are designed to achieve levels of exposure consistent with no significant adverse health impacts; identify risks of the toxic air containments (TACs) at issue and explain how the proposed ATCM will reduce risks; demonstrate the need and appropriate degree of regulation for the

identified TACs; and potential adverse health, safety and/or environmental impacts that may result from implementation.

- Assess reasonable and feasible mitigation measures and alternatives to reduce or avoid significant environmental impacts, identify permitting requirements and timeline for implementation of such mitigation measures and alternatives.

- If possible, identify applicable design standards that would comply with MOTEMS and other existing regulations that can foster vendor competition.

- Identify what changes to technology may be necessary to ensure feasibility for use in marine terminal application, safety, and/or operability.

- Conduct Risk Assessment/HAZOP for a shore-based design.

- Prepare anticipated timeline from planning through implementation, including timeline for obtaining all permits and approvals and potential litigation delay.

- Determine where, if any, a physical demonstration is required to validate the safety, reliability, operability, and effectiveness of vessels, marine oil terminals, the emissions control system, or supporting shore-side infrastructure.

Cost-Effectiveness and Economic Impact Review

Methodology

- Set economic/cost-effectiveness requirements pursuant to regulatory/legal requirements.

- Identify Standardized Regulatory Impact Assessment (SRIA) Requirements.

- Establish process for collection, de-identifying and aggregating individual company estimated capital, design, construction, CEQA review, permitting, and operational costs.

Analysis

- Determine whether systems required by proposed regulation would meet the criteria in the H&SC for cost-effectiveness.

  - Assess cost-effectiveness, relative to reliability and safety of proposed methods of compliance and ensure that the rule will result in a cost-effective combination of control measures.

  - Assess cost-effectiveness, relative to economic and noneconomic costs and public health benefits (including potential impacts on small businesses).

- Assess whether proposed regulation would meet SRIA requirements.

- True-up cost-effectiveness of achievable design and implementation schedule.

Conclusions

- Summarize findings and recommendations (including need for physical demonstration).

Evaluation of At Berth Shore-Based Emission Control
for Tankers at California Ports
Report Outline

Key Stakeholders including but not necessarily limited to the following:

- American Bureau of Shipping for class society and can perform HazOps (also involved in Cold Ironing Feasibility Evaluation Study.
- Maritime safety expertise (i.e., DNV GL, Bureau Veritas).
- Marine boiler, engine and exhaust gas cleaning system manufacturers who understand tankers (including but not limited to, Alfa Laval – familiar with ship-side issues, classification areas and largest provider of tanker boilers in the world), SAACKE – boilermaker, GmbH, Harris Pye – boiler retrofit, MAN and Wartsila - propulsion and auxiliary engine manufacturers).
- Emission abatement industry (i.e., existing technology vendors).
- OCIMF (Oil Companies International Marine Forum)
- U.S. Coast Guard
- California State Lands Commission - Marine Environmental Protection Division
- CARB, BAAQMD, SCAQMD, USEPA
- SF Bay Coastal Development Commission (BCDC)
- International Maritime Organization (IMO) - Marine Safety Committee (MSC), Marine Environment Protection Committee (MEPC) and supporting sub-committees
- Federal non-regulatory agencies: U.S. Navy, U.S. Maritime Administration (MARAD)
- University of California - Riverside
- California Maritime Academy
- International Association of Independent Tanker Ownership (INTERTANKO).

Estimated Timeline - CARB At Berth Regulation
Shore-Based Emission Control System

Major Tasks	Estimated Time (Years)	2020		2021		2022		2023		2024		2025		2026		2027		2028		2029		2030		2031		2032		2033		2034		2035	
		Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8		Year 9		Year 10		Year 11		Year 12		Year 13		Year 14		Year 15		Year 16	
		1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H	1H	2H
General & Site-Specific Studies	3.5 to 4																														
Site-Specific Design	3.5 to 5.5																														
Engineering	3 to 4.5																														
CEQA Analysis	3 to 5.5																														
Permits	2.5 to 3.5																														
Contracting	2.5 to 3.5																														
Crane Construction	3 to 5.5																														
Facility Construction	4.5 to 7.5																														
Commissioning	1 to 1.5																														

Legend

Anticipated average time needed to complete each task

Additional time needed for complex installations to complete the task

NOTES

1. The shaded areas of the bar chart which may be longer in duration than the expected time for a task as the start date of a task may vary from installation to installation.
2. The General and Site-Specific Studies are critical to evaluate the feasibility of various elements of compliance requirements to each installation (technological, safety, efficiency, cost-effectiveness etc).
3. The results of General and Site-Specific Studies may necessitate further refinement of the anticipated compliance options and timeline.
4. With unknown permitting timelines and delays, contracting and vendor timelines, the earliest compliance demonstration for most facilities is estimated to not occur before 2033.
5. For complex installations, this date could be further out; there could also be unexpected delays that are beyond operator control.

Timeline Survey Summary

Major Tasks (note tasks that can be run concurrently to help determine total lapse time from project design to commissioning)	Additional Information (provide sufficient information to break down the activity so that it is clear what it includes and its expected duration)	Estimated Years							
		Average	Min	Max	Range (Min to Max)	Range (Average to Max)	Begin Year	End Year (Avg)	End Year (Max)
General & Site-Specific Studies	General Evaluation Study	2.0	2.0	2.0	2.0	2.0	2020	2021	2021
	Site-specific Study including Safety review and possible field test	1.6	0.8	2.0	0.8 - 2	1.6 - 2	2022	2023	2023
Site-Specific Design (preliminary and final, includes assessments on utilities, siting for egress and safety as well as infrastructure)	Front End Engineering Design, Preliminary and Detailed Design, Crane, Scrubber, Electrical Design, Shipside Modification Design, Determine footprint, electrical calssification and unit supply requirements, Coordinate with engineering, construction and technology companies, Review of utilities and existing infrastructure to support future terminal projects, Requirements for and consideration of MOTEMS.	3.5	1.0	5.5	1 - 5.5	3.5 - 5.5	2022	2025	2027
Engineering (engineering drafts for construction ex. built-for purpose, ship-to-berth variable height for loading and unloading operations, utility and infrastructure details)	Marine analysis of current and future vessels (MOTEMS Review), Detailed engineering calculations for process, energy and structural integrity, Coordination with utility providers that supply electricity, water and natural gas to the facility, Engineering Design Issued for Permit, Engineering Design Issued for Construction, Engage Classification Society to Develop Standards for Shipside Modifications	2.9	1.8	4.5	1.8 - 4.5	2.9 - 4.5	2023	2026	2027
CEQA Analysis (engineering and site-specific details will be evaluated under CEQA to determine whether additional mitigations are required including preparation of an EIR, public comment periods, hearings, review of the EIR until a final adopted EIR results with specific mitigations for impacts if any)	Initiate Multi-Agency Process, Prepare applications, Initiate EIR, Develop EIR, Develop Mitigation Strategy, Finalize and Approve Mitigation Strategy, Public comment review, possible re-engineering of design to meet public concerns, Re-evaluation of both Site specific design and engineering (as needed), Purchase Mitigation Credits	2.9	1.2	5.5	1.2 - 5.5	2.9 - 5.5	2024	2026	2028
Permits (local, state, federal – CSLC, Bay Conservation and Development Commission, ACOE, CF&W, RWQCB, National Marine Fisheries Service, Air Districts, Port permits includes: preparation, review by agency, approval, development of mitigation plans and other recommendations made by agency.)	Coordination with multiple permitting agencies, at various locations within the state, Includes time for review, comments and any necessary requested changes which may require some re-design and engineering, Submit Environmental Applications, Environmental Applications Approved, Submit Building Applications, Building Applications Approved	2.5	1.1	3.5	1.1 - 3.5	2.5 - 3.5	2025	2027	2029
Contracting (bid process, selection, procurement)	Multiple RFPs (General Engineering, Specialty Engineering, Marine Engineering, Emissions Control Equipment, Pumps/Blowers, Crane and Scrubbers Design and Fabrication, Construction RFPs including general, marine, electrical, crane installation), Contractor vetting and selection, Insurance and procurement of long lead items such as steel, pre-fab materials	2.2	0.6	3.5	0.6 - 3.5	2.2 - 3.5	2026	2028	2030

Timeline Survey Summary

Major Tasks (note tasks that can be run concurrently to help determine total lapse time from project design to commissioning)	Additional Information (provide sufficient information to break down the activity so that it is clear what it includes and its expected duration)	Estimated Years							
		Average	Min	Max	Range (Min to Max)	Range (Average to Max)	Begin Year	End Year (Avg)	End Year (Max)
Crane Construction / Installation	Install Crane Foundations and Cranes - Consider extensive lead times, Multiple locations, Limited availability of construction equipment, Delays when ships at berth	2.7	0.7	5.5	0.7 - 5.5	2.7 - 5.5	2028	2031	2033
Facility Construction (including deck modifications, pilings, gangway construction, additional/new ducting, piping, , seismic retrofit, new power infrastructure)	Multiple phases of construction at various locations (Limited ability to overlap construction at different locations, constrained by contractor availability and safety oversight and continuation of business, Assumes construction at one facility at a time), Consider extensive lead times, Piling, foundation, civil/structural steel works, electrical upgrades, Fabrication and Transport of Cranes & Scrubber, Procurement of Other Materials, Prep and Demo Work, Install Central Gas Collection System, Scrubbers, Support Systems (Piping/Electrical), Shipside Modifications, Consider confined construction activity for few months per year (power supply, threatened species protection)	4.5	0.7	7.5	0.7 - 7.5	4.5 - 7.5	2029	2033	2035
Commissioning and Compliance Demonstration (verification of CARB compliance along with other federal and state requirements)	Consider longer commissioning durations for new technology, Commissioning for Terminal Operations and Operator-owned ships, Operator training and oversight, modifications to ensure proper operation to achieve compliance, Multiple agencies would either witness compliance testing or perform their own (CARB, local Air District, etc.)	0.9	0.2	1.5	0.2 - 1.5	0.9 - 1.5	2033	2034	2035

Exhibit 4: Chevron Presentation: At-Berth Costs Q&A (June 10, 2019)

Chevron

human energy®

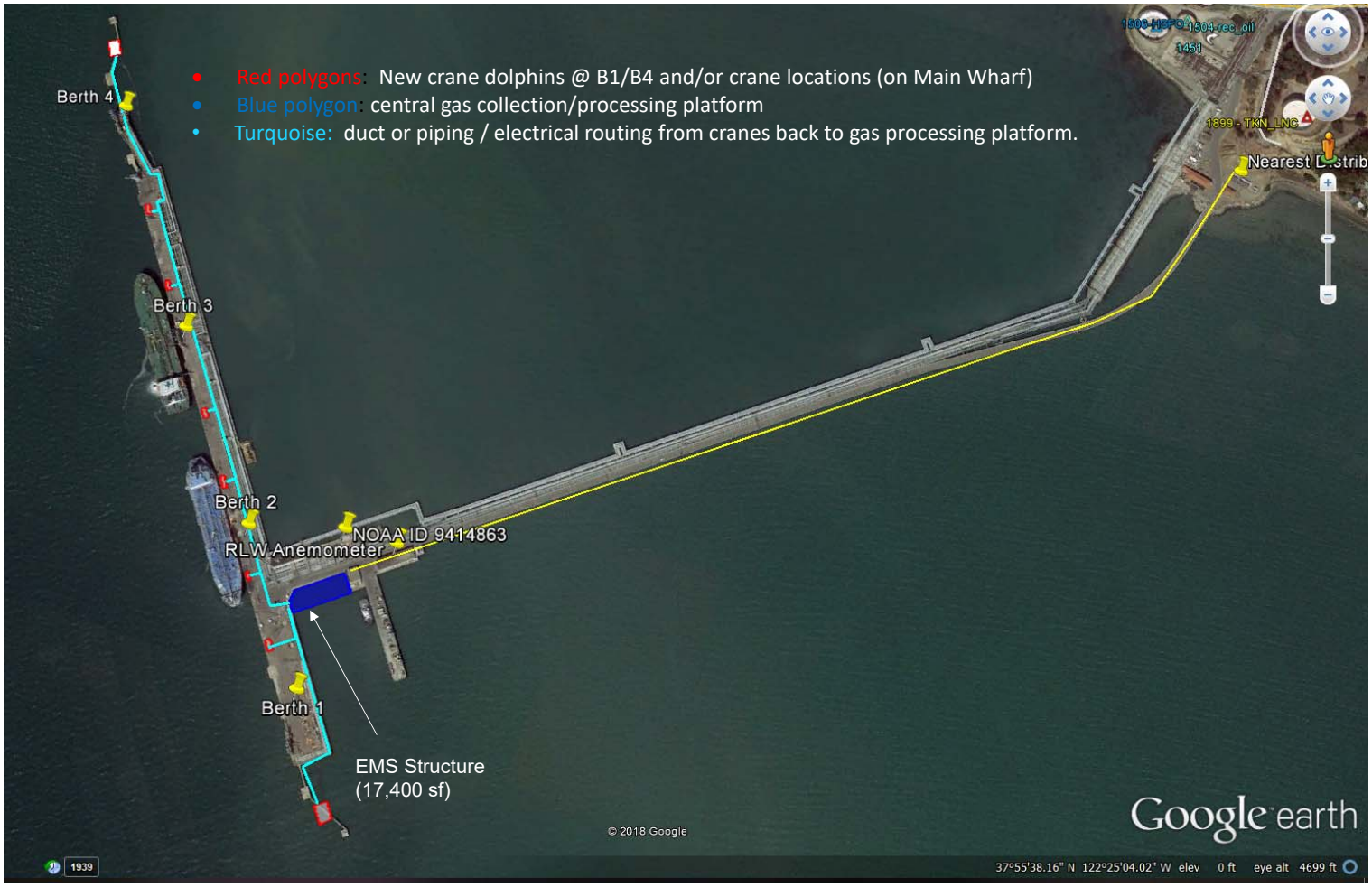
At-Berth Costs Q&A

2019 June 10

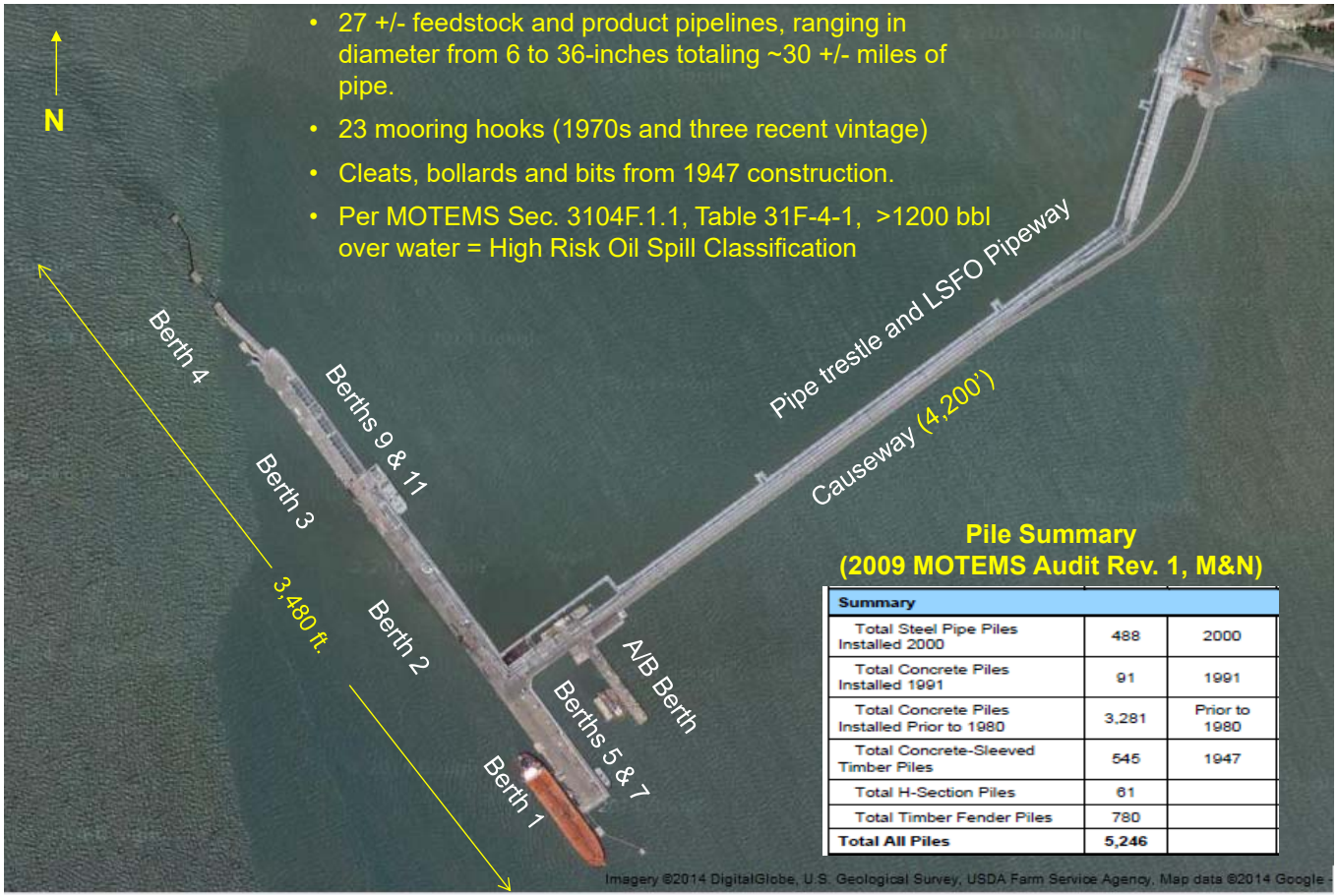
Overview

Estimated required infrastructure at Wharf:

- **23,600 ft² (0.5 ac)** of new deck/structure.
  - EMS platform
  - B1/B4 crane dolphins (3000 sf)
  - Estimated ~700-800 24" concrete piles
- **8** new cranes for stack-based controls.
  - At least 4 piles per crane foundation.
  - Replace decking
  - Relocate piping/under-deck obstructions.
- **4,000-6,000 ft** of new ducting to EMS platform at Main Wharf
  - Pipe supports
  - Conduit supports



Richmond Long Wharf Today



- 27 +/- feedstock and product pipelines, ranging in diameter from 6 to 36-inches totaling ~30 +/- miles of pipe.
- 23 mooring hooks (1970s and three recent vintage)
- Cleats, bollards and bits from 1947 construction.
- Per MOTEMS Sec. 3104F.1.1, Table 31F-4-1, >1200 bbl over water = High Risk Oil Spill Classification

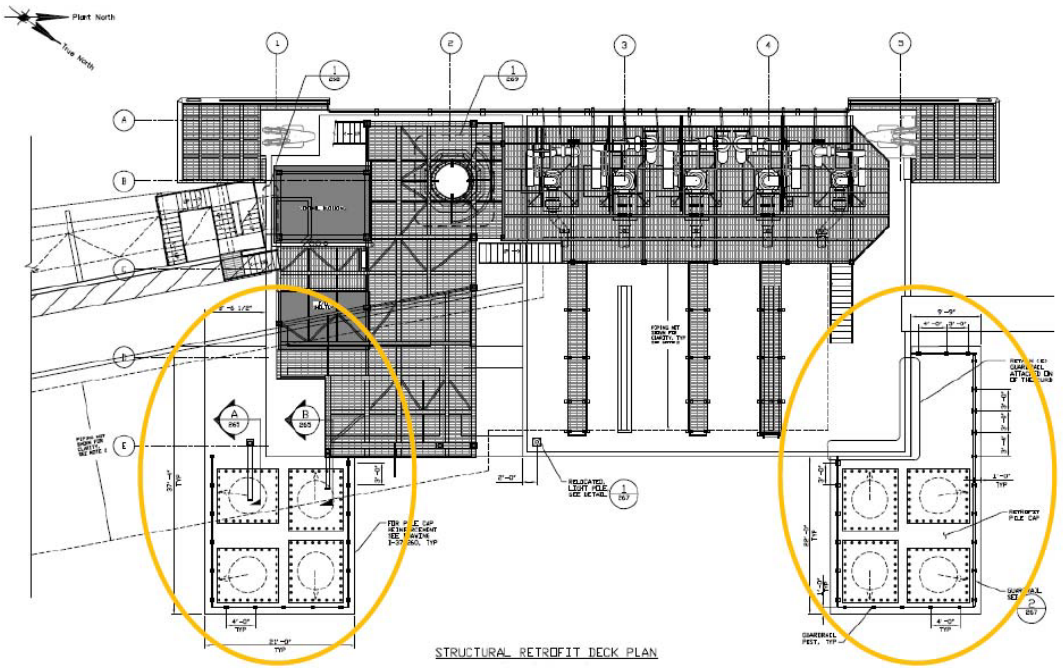
Pile Summary
(2009 MOTEMS Audit Rev. 1, M&N)

Summary		
Total Steel Pipe Piles Installed 2000	488	2000
Total Concrete Piles Installed 1991	91	1991
Total Concrete Piles Installed Prior to 1980	3,281	Prior to 1980
Total Concrete-Sleeved Timber Piles	545	1947
Total H-Section Piles	61	
Total Timber Fender Piles	780	
Total All Piles	**5,246**	

MOT Structural Design driven by MOTEMS

Berth 4 Seismic Retrofit

(8 new 60-in diameter steel batter piles)



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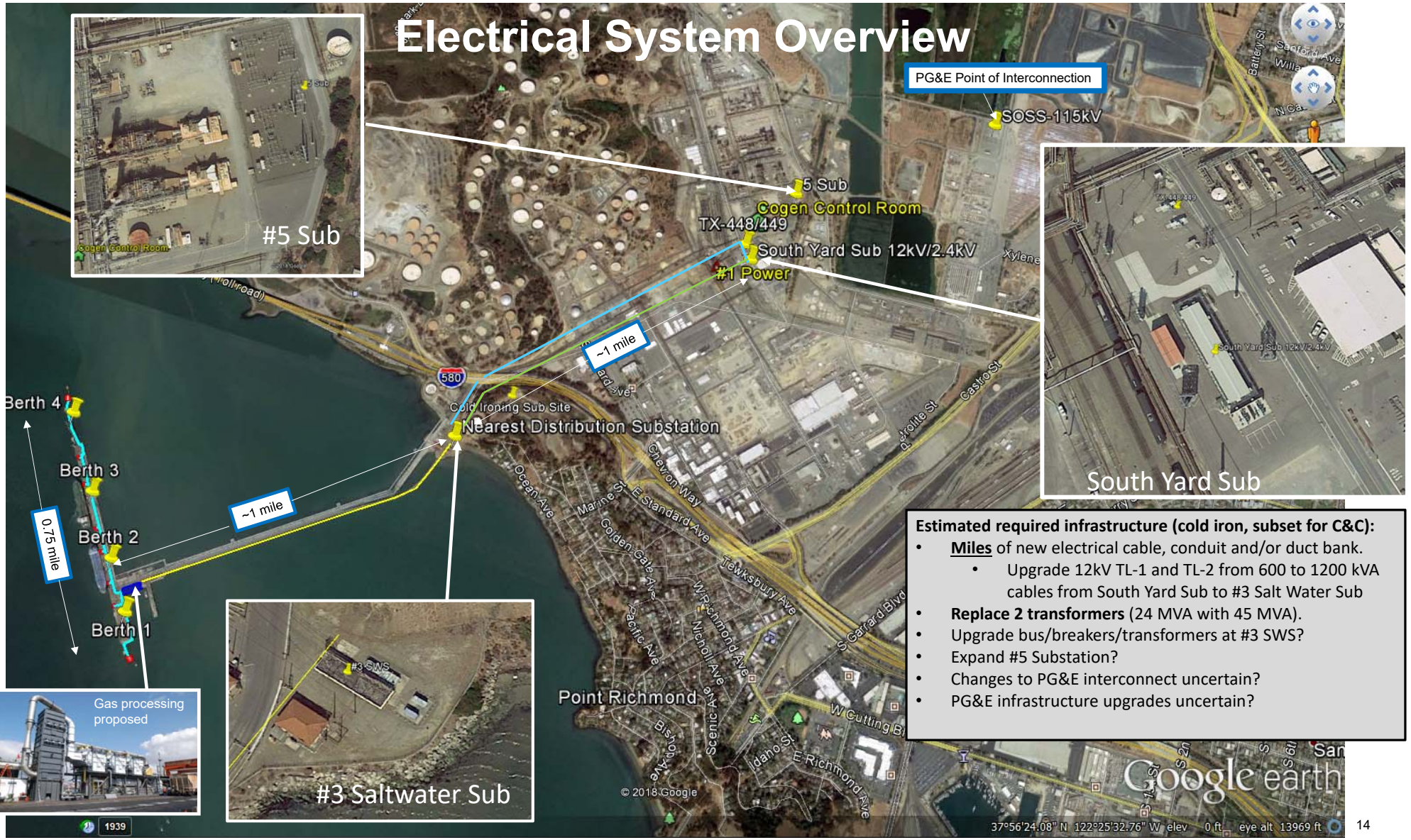
RLW Construction for Pile Supported Foundation

B4 Gangway

Construction Methods – Driving concrete pile through deck

Electrical System Overview



Estimated required infrastructure (cold iron, subset for C&C):

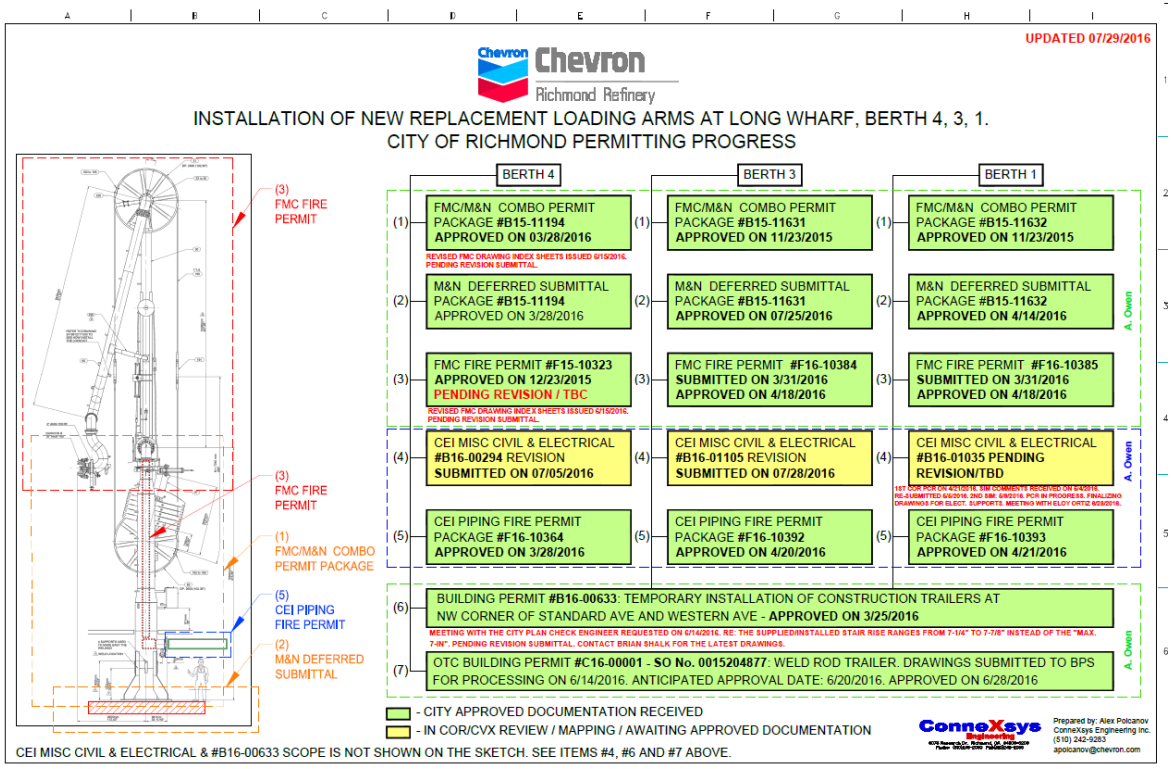
- **Miles** of new electrical cable, conduit and/or duct bank.
  - Upgrade 12kV TL-1 and TL-2 from 600 to 1200 kVA cables from South Yard Sub to #3 Salt Water Sub
- **Replace 2 transformers** (24 MVA with 45 MVA).
- Upgrade bus/breakers/transformers at #3 SWS?
- Expand #5 Substation?
- Changes to PG&E interconnect uncertain?
- PG&E infrastructure upgrades uncertain?

PERMIT REQUIREMENTS – WMEP

Agencies with discretionary permits:

Permitting Agency		Anticipated Approvals/Regulatory Requirements
Local	City of Richmond	Ministerial Building Permits in accordance with the California Building Code and City of Richmond Zoning Ordinance
State	California State Lands Commission (CEQA lead agency)	Environmental review and project approval pursuant to an existing lease
	California Department of Fish and Wildlife (CDFW)	California Endangered Species Act Fish Section 2081
	San Francisco Bay Regional Water Quality Control Board (SFBRWQCB)	Clean Water Act Section 401 Water Quality Certification
	San Francisco Bay Conservation and Development Commission (BCDC)	Amendment to Refinery Long Wharf Permit No. M1987.015
Federal	U.S. Army Corps of Engineers (USACE)	Clean Water Act (CWA) Section 404 (under Nationwide Permit No. 3)
	U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation under federal Endangered Species Act (if necessary)
	National Marine Fisheries Service (NMFS)	Marine Mammal Protection Act – Incidental Harassment Authorization

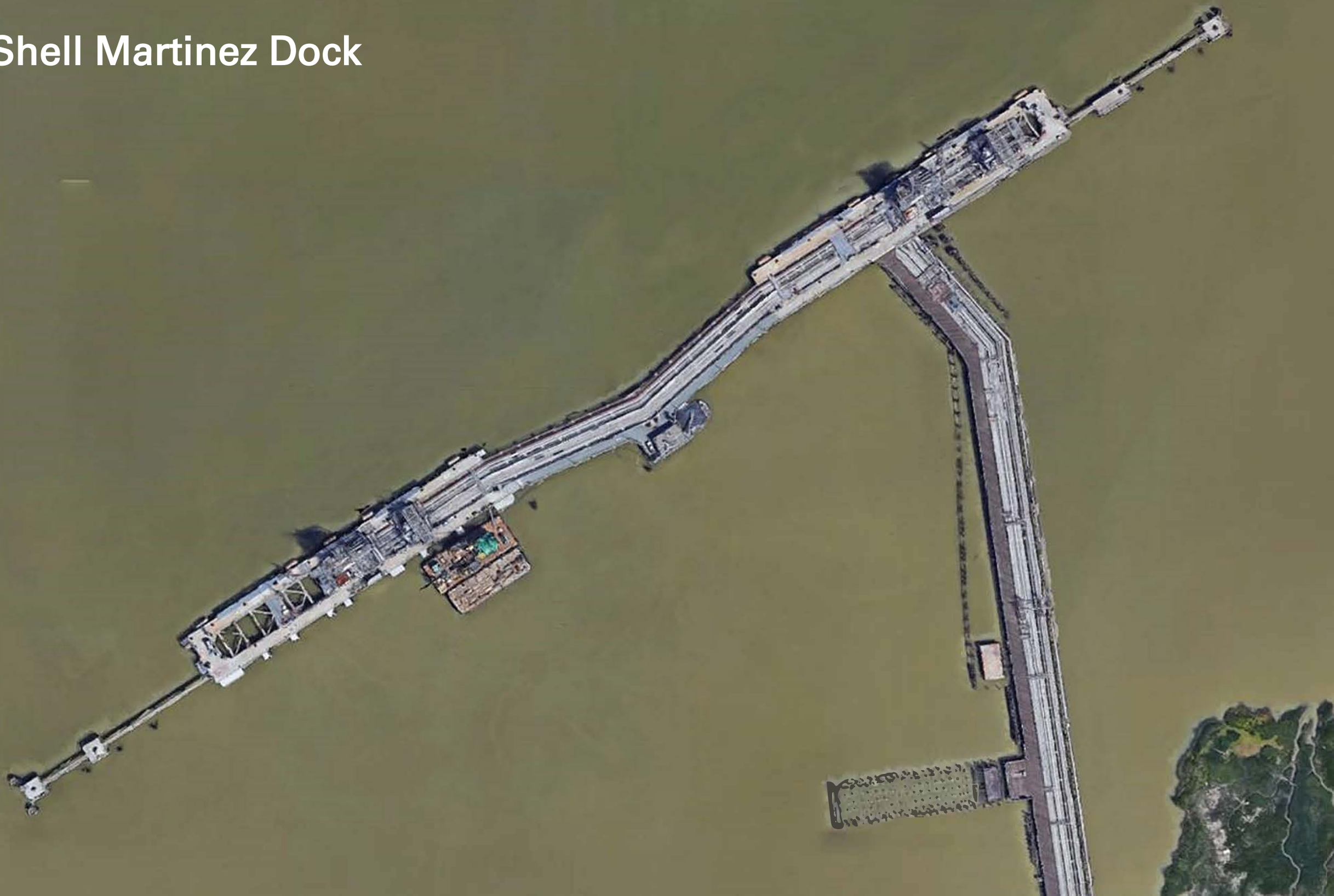
Local ministerial building permits:



Plus mitigation costs for impacts to marine habitat (WMEP): 2017 = ~$2.5MM/acre ($250K/0.11ac impact)

Exhibit 5: Aerial Photographs of Marine Terminals

Shell Martinez Dock



Martinez – Amorco Wharf

Martinez – Avon Wharf

POLB – Terminal 2


Los Angeles Berth 164
Pipelines
Access ramp
Pipelines
Access ramp
Pump house
Pipelines
terminal buildings
Pipelines
Truck turning lot
Pipelines
Pipelines
Access ramp
Vapor Unit

Exhibit 6: Wharf Improvement Project Timelines

Timelines for Projects Involving Substantial New Wharf Infrastructure Comparable to At Berth Rule Compliance Projects

ISOR Reported: Average 5.2 Years, Range 3 - 9 Years[1]

Actual: Average 11.6 Years, Range 7 - 15 Years

Project	Start and Completion Dates and description, as reported in ISOR, pp. III-19 – 21	Actual Timeline with Start and Completion Dates	Timelines Comparison
Chevron Richmond Wharf Maintenance and Efficiency Project (WMEP)	Project "started from 2014 and is estimated for completion by 2023…. The project's initial design, permit submittal and approval phase lasted from 2014 to 2017. The construction phase for the one of the berth improvements began in 2018 and estimated for completion by 2022. The construction phase for the other berth improvements began in 2018 and estimated for completion by 2023. There will be a 2 month period after construction for operation evaluation of the new components."	**October 2008:** Project inception and scope development incorporating MOTEMS audit findings **January 2010-September 2014:** Project design and planning process, including required technical studies **April 2014:** Initial permit applications submitted **October 2016**: Mitigated Negative Declaration (MND) **June 2017** MND Addendum **July 2017:** Permits received from State Lands Commission, San Francisco Bay Conservation and Development Commission, Cal. Dept of Fish & Wildlife, Regional Water Quality Control Board, Army Corps of Engineers, National Marine Fisheries Service **2018:** Construction commenced. **April 2022**: Estimated completion of Berth 4 seismic retrofit	CARB: 9 years Actual: 15 years if completed on schedule

[1] Project durations reported in the ISOR include two projects – the Chevron Richmond Long Wharf MOTEMS compliance project and Green Omni Terminal ShoreKat Demonstration Project – that were limited to repairs of existing structures and minor equipment installation. Those two projects are excluded from this chart as not properly comparable with the timelines for planning, permitting and construction of substantial new wharf infrastructure to achieve compliance with the At Berth rule, i.e., new cranes and other major equipment installation on new or expanded wharf decking with new supporting piles. If those projects were included, with timelines reported in the ISOR, the average project duration for projects in the ISOR would be 4.6 years, range 3-9 years.

		construction **February 2023**: Estimated completion of Berth 4 fender replacement construction *Source: Information provided by 10/8 and 10/9/18 emails from K. Boven, Chevron, to N. Light, CARB*	
Port of Richmond IMTT Terminal Warf Modification Project	"Based on the available information, CARB staff assessed that the project started in late 2011 and was completed by early 2015."	**2008**: Project planning initiated **Fourth quarter 2011:** Basis of design and concept layout **Third quarter 2012 – end of 2013**: Permitting **Second quarter 2014:** Construction commenced **First quarter 2015:** Estimated completion of construction from 2014 summary **October 2015:** Actual construction completion *Source: California State Lands Commission, International-Matex Tank Terminals, IMTT Wharf Modification Project Prevention First 2014 (October 7, 2014)* (https://www.slc.ca.gov/wp-content/uploads/2018/08/PF2014_MOTEMS-IMTT.pdf), *updated by N. Lucas, IMTT, personal communication*	CARB: 3.5 years Actual: 7 years
Berths 167-169 Shell MOTEMS Wharf Improvement Projects (POLA)	"The construction for this project began in 2017 and scheduled to be completed in 2020."	**2010:** MOTEMS audit **July 2015**: Notice of Preparation of Environmental Impact Report (EIR) **March 2018:** Draft EIR **July 2018**: Final EIR	CARB: 3 years Actual: 13 years if completed on schedule

		August 2023: Estimated completion of construction from EIR *Source: Berths 167-169 [Shell] Marine Oil Terminal Wharf Improvement Project Final EIR (July 2018), p. 1-5 (https://kentico.portoflosangeles.org/getmedia/3a7e6ce5-41ab-4d09-9e6f-c9b2f6d63559/Shell-MOTEMS_FEIR)*	
Tesoro Avon Terminal MOTEMS update	Not included in ISOR; modifications include construction of new vessel loading/unloading platform and mooring dolphin on new steel pilings, and construction of associated facility structures, electrical, mechanical and piping systems	**March 2008**: MOTEMS audit **April 2014:** EIR Notice of Preparation **September 2014:** Draft EIR **January 2015**: Final EIR **2016:** Estimated completion of construction from EIR **February 2017**: Actual construction completion *Source: Tesoro Avon Marine Oil Terminal Lease Consideration Final EIR (Jan. 2015), p. 2-8 (https://www.slc.ca.gov/wp-content/uploads/2018/09/2.0_PD.pdf); updated by B. McDonald, Marathon Petroleum, personal communication*	CARB: Not included in ISOR Schedule in CEQA document: 8 years Actual: 9 years
Berths 238-239 [PBF Energy] Marine Oil Terminal Wharf Improvements Project	Not included in ISOR; modifications include construction of new marine platforms and associated mooring and breasting dolphins at both berths	**2008:** MOTEMS audit **March 2018**: Draft MND **June 2018**: Final MND **March 2020**: Estimated completion of construction from MND **December 2022**: Expected completion of construction based on current information *Source: Berths 238-239 [PBF Energy] Marine Oil Terminal Wharf Improvements Project, Final Initial Study/Mitigated*	CARB: Not included in ISOR Schedule in CEQA document: 12 years Actual: 14 years if completed on schedule

		Negative Declaration (June 2018), p. 2-10 (*https://kentico.portoflosangeles.org/getmedia/4db8b80c-7101-4158-b656-00664f9c04df/PBF_Energy_ISMND_Final*); *updated by M. Kajioka, PBF Energy, personal communication*)	

Exhibit 7: Power Engineering Construction Co. Comment Letter (November 6, 2019)

November 6, 2019

Clerk's Office
California Air Resources Board (CARB)
1001 "I" Street
Sacramento, CA 95814

Subj: Comments on Proposed Control Measure for Ocean-Going Vessels at Berth

To CARB Staff:

I am writing to provide commentary on the proposed timeline for the design, permitting, construction, and testing of an At-Berth Shore Based Emission Control Program for Tankers at California Ports. As an Oakland, CA resident and business owner, I share CARB's desire to implement regulations that achieve real world air quality goals.

My goal in writing is to share my experience as a California marine contractor – specifically as it applies to the lengthy project timelines of most marine projects in California and the reality of how difficult it is to move quickly through the phases of marine work. Marine projects routinely face regulatory hurdles and engineering constraints not found in land-based construction. These hurdles and constraints translate into long program schedules. I believe the timeline being considered for the Proposed Control Measure is unrealistically short and doesn't consider the unique nature of designing, entitling, and constructing over-water structures and facilities.

As background, I am the President and Principle owner of Power Engineering Construction Co. We are a marine contractor based in Alameda, CA. The company has been in business for 33 years and I've been here for 27 of those years. Our business focuses on building and repairing in-water structures. Our slogan is "Engineering Construction near, on, and under the water". We routinely get involved in up-front preconstruction, design, and entitlement of marine structures and systems as part of the service we offer our clients. Our customer base is diverse and includes most major oil companies, a variety of municipal clients including SFPUC, the Port of San Francisco, WETA, and a range of private business owners working along the waterfront. For a small snapshot of projects we've completed throughout California, the attached graphic **(Exhibit A)** shows our recent San Francisco waterfront projects.

The range and breadth of our marine construction experience affords us a unique perspective in how long it takes for a successful project to go from concept to operation. In general, we advise clients to expect a full project timeline of 8-10 years for a standard over-water marine facility; this timeline includes work from concept, through entitlement, to construction and operation.

One can quibble with the durations of individual tasks including site studies, engineering, the CEQA process, contracting, etc. However, empirically, all but the most basic marine construction projects prove to track into an 8 to 10-year timeline. The attached spreadsheet **(Exhibit B)** shows three example projects *outside* of the marine oil terminal industry that

support this assertion. Each of these projects was considered publicly desirable, faced little opposition, and each was managed by a very motivated team. Regardless, each example project followed a decadal life cycle due to the complexity of regulatory review, the challenges of over-water design, and the limitations and work windows imposed during construction.

While the three example projects demonstrate only a small sample size, these projects provide similarities to the work required to implement an At-Berth Emission Capture program. In a sense, the example projects provide a lower bound for the anticipated project duration as none was completed in an active marine terminal. An active marine fuel terminal imposes additional safety and scheduling constraints that generally result in longer construction durations.

Also, the projects selected as examples do not consider one key element of the proposed new regulation: issues surrounding the technical feasibility of an At-Berth Shore Based Emission Control System. The Emission Capture equipment and supporting machinery will add to the overall project timeline through both feasibility testing and extended equipment procurement. The attached spreadsheet **(Exhibit C)** shows a sampling of recent heavy over-water equipment purchases (cranes and fuel loading arms) and demonstrates the additional timeline that may be required. One can assume the required emission control equipment, or the expansion of required electrical infrastructure, will follow a similar (if not longer) procurement cycle to these example purchases.

Overall, I ask the CARB staff to consider proposing on an 8-10 year timeline for design, entitlement, and construction of an At-Berth Emission Control program in California Marine Terminals. This timeline should begin once a feasibility study is completed and appropriate emission control technology is proven to be readily available.

Should you have any questions, please contact me at 415-559-0097.

Sincerely;

Power Engineering Construction Co.

David Mik
President

Enclosed:
Exhibit A – Power Engineering Construction Co. example projects
Exhibit B - examples of three relevant marine project timelines.
Exhibit C - examples of equipment procurement and installation timelines.

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- Water and Wastewater
- Creek/Wetland/Habitat Restoration
- Slope Stabilization and Rock Bolting
- Concrete Rehabilitation

Design-Build

Power has established a reputation for understanding the needs of Owners and Engineers on design-build projects. Through coordination of project team members, Power Engineering has demonstrated the ability to inspire the Owner, Permitting Agencies, Engineers, Subcontractors, and its staff to work together in taking design-build projects from concept to completion.

Located in Northern California serving the West Coast.

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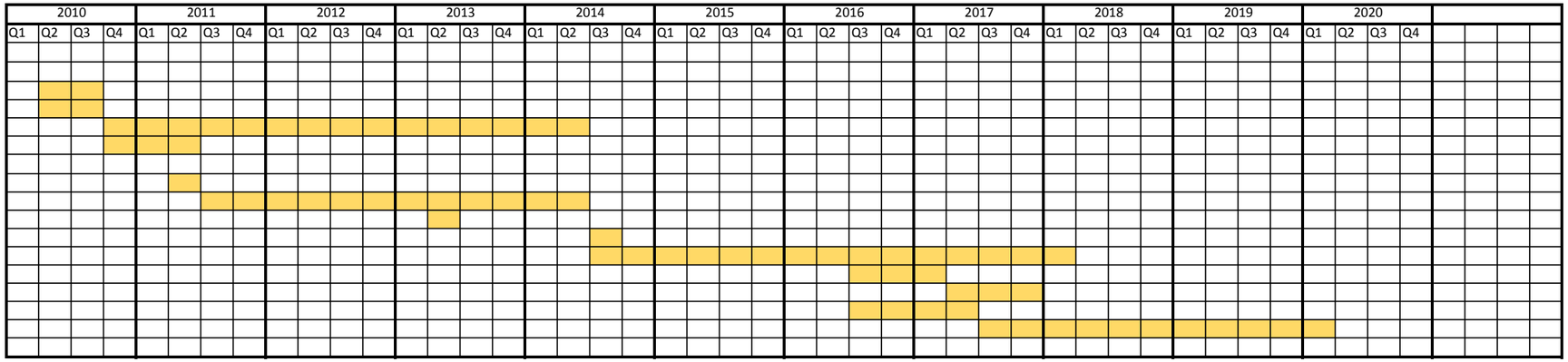
Example Marine Construction Projects in Northern California
Timeline Summary

Project Lifecycle Duration	Number of Years
WETA SF DFTX, SF, CA	10.0
SFFD Fire Station 35, SF, CA	8.5
Exploratorium Museum at Pier 15	10.5

WETA - SF Downtown Ferry Terminal, SF, CA

($76M over-water ferry terminal)

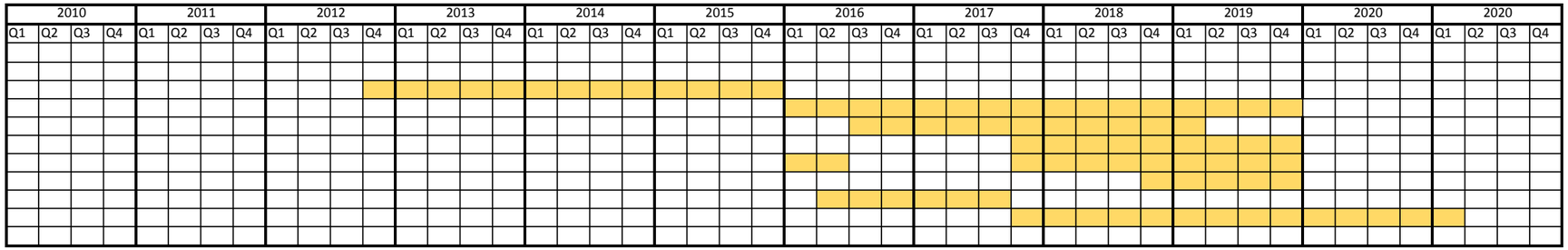
Hire Design Consultants
Hire Environmental Consultants
Design
Environmental Preparation
Environmental (NEPA/CEQA):
NOI/NOP
EIR Development
Draft EIR
Final EIR/Final Determination
Permitting
Contracting - Section 1
Construction - Section 1
Contracting - Section 2
Construction - Section 2



SFFD Fire Station 35 - New Floating Fire Station, SF, CA

($31M new-build floating fire station)

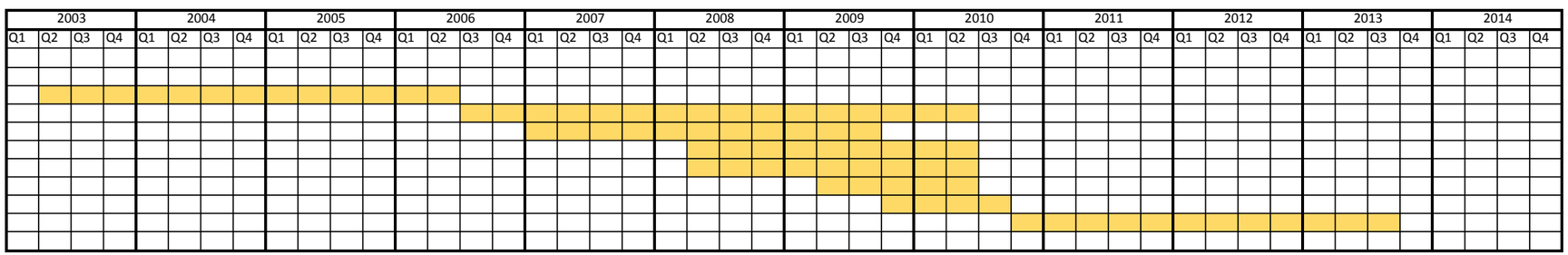
Site Determination, Massing, Funding, Initial Contact with Regulators
Regulatory/Entitlement Process
CEQA Process (Project received a Neg. Dec.)
Regulatory Approvals
Design
Permitting
Contracting
Construction



Exploratorium Museum at Pier 15, SF, CA

($51M in-water/$300M total construction of new museum space)

Site Determination, Massing, Funding, Initial Contact with Regulators
Regulatory/Entitlement Process (over 30 AHJ's involved)
CEQA Process
Regulatory Approvals
Design
Permitting
Contracting
Construction



Heavy Equipment
Procurement & Installation Duration

Large Container Cranes (source, Shanghai Zhenhua Heavy Industries/ZPMC/Liftech Consultants, Inc.)

	Average	Min	Max	
Duration for Standard Cranes:	33.0	30.0	36.0	

(for non-standard, add "several quarters" to duration)

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection												
Design												
Fabrication												
Delivery												
Installation & Testing												
(install duration is for one berth)												

Conventional Dock Mounted Marine Hydraulic Cranes (source, Rapp Marine NW, LLC - see WETA Central Bay Maintenance Terminal, Chevron RLW Berth 2, etc.)

	Average	Min	Max	
Duration for Hydraulic Cranes:	17.0	15.0	19.0	

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection												
Design												
Fabrication												
Delivery												
Installation & Testing												
(install duration is for one berth)												

Rotary or Dual Counterweight Fuel Loading Arms (source, FMC/PEC - see Chevron RLW Loading Arm Replacement Project

	Average	Min	Max	
Duration for Fuel Loading Arms:	23.5	22.0	25.0	

	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Procurement/Vendor Selection												
Design												
Fabrication												
Delivery												
Installation & Testing												
(install duration is for one berth)												

Exhibit 8: Chevron Comments (February 15, 2019)

Henry T. Perea
Manager, CA/OR/WA Government Affairs

February 15, 2019

Ms. Cynthia Marvin
California Air Resources Board
1001 I Street
Sacramento, California 95814

via e-mail at cynthia.marvin@arb.ca.gov

Re: Chevron Comments to Proposed At Berth and At Anchor Regulation Emission Inventory and Preliminary Health Analyses

Dear Ms. Marvin,

Chevron Products Company and Chevron Shipping Company (collectively, "Chevron") have prepared comments in response to the release of data related to the *DRAFT: 2018/2019 Update to Inventory for Ocean-Going Vessels: Methodology and Results* and *Preliminary Health Analyses: Control Measure for Ocean-Going Vessels (OGV) At Berth and At Anchor ("HRA").*

After close review of the Inventory, Chevron contends that some of the data and assumptions used when calculating the inventory dramatically overestimate emissions from tankers at Richmond Long Wharf (RLW). Specifically, the areas of major concern are:

- Substantial underestimation of the impact of Tier III tankers which will significantly reduce emissions from vessels at berth as early as 2030.
- Overestimation of activities of tankers at berth, resulting in significantly inflated emissions inventory for tankers.
- Application of highly incompatible data from POLB/POLA to operations at RLW, resulting in a significantly inflated inventory.
- Forecasts of future vessel traffic growth that significantly exceed historical data and Chevron's own forecast for tanker traffic at RLW.
- Potential misinterpretation of the HRA model as currently depicted. Chevron recommends minor changes in the presentation of the HRA data to provide a better representation of the actual situation.

We recognize that CARB has spent considerable time and effort on this analysis, and we offer the following comments in an effort to provide greater accuracy. Chevron looks forward to continuing discussions on how to proactively and practically reduce emissions from our facilities in support of on-going CARB efforts.

1. Introduction of Tier III Compliant Vessels prior to 2030

- Delayed expected introduction of Tier 3 marine engines to 2030 or later, based on a study by Starcrest and Ports of LA/LB

At the core of CARB's proposed regulation is the assumption that there will be zero Tier III-compliant vessels in service before 2030, and consequently, CARB asserts the only mechanism to achieve emission reductions by OGVs is through regulation of OGV at berth emissions. CARB cites a study by Starcrest (2017), which concludes that there will be no Tier III vessels in service in the world's fleet, and Starcrest's study is based on vessels with the potential to call at the Port of Long Beach (POLB) and Port of Los Angles (POLA).

Chevron Government Affairs
1201 K Street, Suite 1910, Sacramento, CA 95814
Tel 916 325 3000 Fax 916 441 5031
henryperea@chevron.com

As a marine terminal, Chevron RLW receives a distinctly different population of tanker vessels than POLA/POLB. In short, marine terminals operations and the vessels that call at them are distinctly different than port operations. In particular, the RLW and other Northern California marine terminals lack the capability to accommodate ULCC and VLCC vessels.

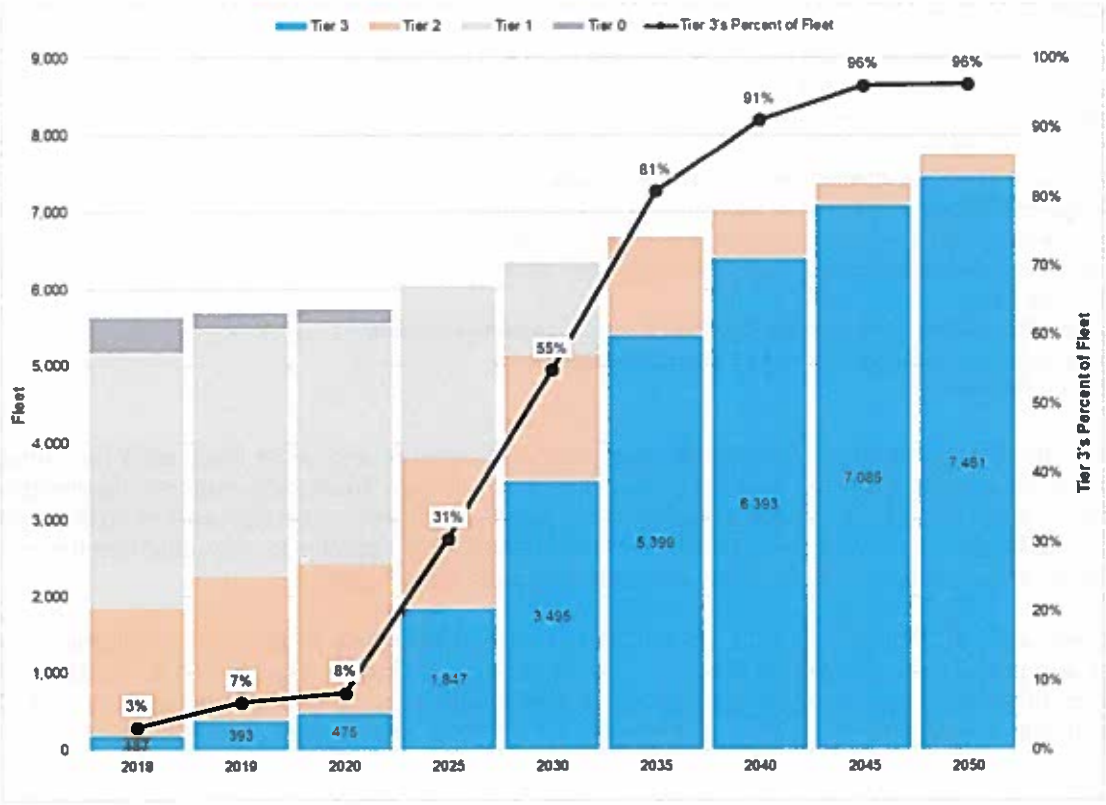
Further, Chevron implements vessel clearance procedures to ensure that all vessels calling at RLW are suitable to fit our fender spacing at berth, and meet our operational, health and safety standards or "OE" standards. Consequently, our vessel vetting criteria effectively prohibits foreign-flagged tankers older than 18 years to call at RLW. There may be other vessel types with a longer useful life up to 25 years, such as chemical carriers that carry only clean refined products, or US-flagged Jones Act vessels. Nevertheless, the vast majority of ships that can call at RLW, and that meet our vessel clearance standards, will be 18 years of age or younger. These age guidelines for vessels calling at marine terminals are common to the industry.

Using an industry vessel database purchased from Clarksons, Chevron Shipping assessed the portion of the world's fleet that has the capability to call RLW. For existing vessels, one can estimate the keel laid date and determine what engine tier level was installed in the ship. As of 2018, 1-2% of the world fleet meets Tier III requirements. In fact, Chevron took delivery of 2 Tier III vessels in 2018, and one third of our total fleet will be Tier III by 2021. This is significant because there are currently more than zero Tier III vessels, indicating large errors in Starcrest's forecast that Tier III tanker vessels will not exist until 2031 at the earliest (Figure 3.8, Starcrest 2017).

More specifically, Chevron built two Suezmax-sized tankers that are used to lighter nearly 70% of Richmond Refinery's crude deliveries to the RLW. These two lightering vessels have keel-laid dates in 2013 but were designed to be able to operate their electrical generation at RLW in low-emission mode by using superheated steam auxiliary boilers and turbogenerators, which do not produce diesel particulate matter (DPM) and have a much lower NOx emissions than Tier III diesel engines. In fact, according to a boiler burner maker, marine boiler NOx emissions are 0.78g/kWh, significantly lower than the Tier III limit for a 900 rpm diesel generator which is 2.31g/kWh www.volcano.co.jp/english/pdf/Volcano_TCS_Bulletin_004PB.pdf. As of 2018, these vessels, with NOx emissions below Tier III levels, represent a considerable amount of our annual at berth emissions (70% of our crude deliveries are via Suezmax-sized vessels).

Our study concluded that 55% of vessels calling at RLW would be expected to be Tier III compliant by 2030, and 80% of vessels would be Tier III compliant by 2035. In addition to our analysis, an independent 3rd party conducted a similar analysis and demonstrated similar results – about 50% of vessels by 2030. With two independent data evaluations, we believe the Starcrest (2017) report is erroneous and calls into question the entire purpose of the proposed at berth regulation. If nearly 80% of vessels calling at Northern California Marine Terminal Complexes owned/operated by major oil companies will be Tier III-compliant by 2035, then this regulation will have less than 5 years of relevance toward achieving its target emission reductions before vessel-side technologies meet or exceed the 80% control factor. Further, on-board emission controls will exceed the magnitude of reductions capable with at berth controls, because on-board controls will benefit the entire Emission Control Area (ECA) during transit and maneuvering. Consequently, the cost-effectiveness of this proposed at berth regulation appears to be very low.

Figure 1-1: Forecast of percentage of Tier III vessels capable of calling at RLW by year
(*Source: Chevron forecast using Clarkson's commercially available fleet database, factoring in vessel clearance procedures*)



Key Assumptions

- 2018 global fleet data from Clarksons Research
  - Data as of December 2018
- Ships built after 2020 assumed Tier 3
  - 50% assumed Tier 3 in 2019
  - 50% assumed Tier 3 in 2020
- Useful life per industry standards
  - Crude and Product – 18 years
  - Chemical – 25 years
- Fleet growth assumed to be 1% per year

2. Vessel Parameters and Activities at Berth

3. General Emissions Inventory Methodology and Sources

Broadly, the following steps describe the inventory process, with more detail included later in the report, along with the source data:

1. Vessel broadcasting data along with GIS mapping determines the number of vessel visits for each port in California (grouped by vessel type and vessel size)
2. Vessel broadcasting data also determines the average length of stay for all vessel visits (by vessel type, size and port)
3. Information on average engine effective power (based on the Starcrest Vessel Boarding Program) is combined with vessel visit and duration information
4. Future years are forecasted by applying a growth rate (specific to port, vessel type, and in some cases vessel size) and assuming an equivalent age distribution of vessel visits in the future
5. Compliance data from CARB's Enforcement Divisions is used to determine reduced engine activity time – and therefore reduced emissions – resulting from CARB's At Berth Regulation

The table below (Table 2-1) summarizes the vessel categories and auxiliary and boiler loads as a percentage of pumping load for pumping, loading and idle activities. Using this methodology, Table 2-2 compares the energy used per vessel type for vessels calling at RLW against CARB's calculated energy per vessel type assuming POLA/POLB engine loads, and corresponding emissions. CARB's current methodology appears to over-estimate the at berth emissions at RLW by at least a factor of two or more, depending upon vessel type.

As mentioned previously, VLCCs and ULCCs do not call at marine terminals in Northern California. For the remaining vessel categories, there are distinct differences between the load factors seen in POLA/POLB and those at RLW. In addition to the load factors, the actual activities performed by the vessels calling at RLW and, likely, other marine terminals are significantly different than the way CARB has represented the activities in their calculations.

The largest difference appears to be that CARB's calculation of "Average Engine Effective Power" assumes vessels are pumping 100% of the time that they are at berth, when in fact, at RLW, vessels except Suezmax spend significant amount of their time at berth loading by gravity feed. The pumping rates/discharge rates are generally higher than the gravity-fed loading rates. Vessels are also idle for a substantial period while at berth, when they are neither pumping nor loading. Consequently, the assumption that the vessels are pumping continuously leads to over estimating emissions at berth.

Vessels at berth pump to two primary destinations within Chevron Richmond Refinery:

1. Crude deliveries are pumped directly to low-elevation crude tanks,
2. Non-crude deliveries are pumped to the base of the RLW causeway, whre electric booster pumps move delivered products to tanks higher in the refinery tank field.

The non-crude ships discharging feedstocks or blendstocks use only enough energy to push the product from the cargo hold and fill the pipeline, but not to move the product up hill. Using electric pumps in the refinery pump stations is a low-emission means of offloading vessels and distributing product to the refinery tankage.

To achieve a more accurate estimate of actual at berth emissions, CARB should follow the calculation methodology proposed below by ship type to reflect that vessels at berth are performing different activities during their visit, namely pumping to discharge feedstocks, and then loading to take refined product which is at the vessel "idle" or "hoteling" load:

1. [Average Pumping Duration] x [Average Pumping Load] x [Emission Factor] = Pumping Emissions
2. [Average Ballasting Duration] x [Average Ballasting Load] x [Emission Factor] = Ballasting Emissions

3. [Average Hoteling Duration] x [Average Hoteling Load] x [Emission Factor] = Hoteling Emissions
4. Total Vessel at Berth Emissions = [Pumping Emissions] + [Ballasting Emissions] + [Hoteling Emissions]

NOTE: The pumping load is correlated to the pumping rates by vessel type at RLW. The pumping rates at each terminal are unique to the piping and tank configuration, geography and operational constraints of each terminal.

Table 2-1: RLW Vessel Type, Activities and Associated Loads Represented as % of Pumping Load.

Vessel Type	Pump Type	Percent of Calls	Average Hotel Time (hrs)	% of Hotel Time			% of Auxiliary Load during pumping			% of Boiler Load during pumping			
				Loading	Discharge	Idle	Loading	Discharge	Idle	Loading	Discharge	Idle	
SeaWayMax	Diesel	54%	42.70	43%	37%	20%	70%	100%	55%	100%	100%	100%	
	Steam	2%	54.96	64%	0%	36%	100%	100%	80%	100%	100%	100%	Steam pumpers at RLW only load
PanaMax	Diesel	3%	69.47	0%	75%	25%	55%	100%	36%	100%	100%	100%	
	Steam	4%	58.98	9%	59%	32%	100%	100%	64%	45%	100%	45%	
AfraMax	Steam	7%	57.37	31%	38%	31%	100%	100%	63%	33%	100%	33%	
SuezMax	Steam	30%	28.09	0%	63%	37%	100%	100%	69%	45%	100%	37%	
Averages		100%	40.90	27%	46%	27%	82%	100%	60%	77%	100%	74%	

Table 2-2: Emission Inventory Comparison for RLW – Chevron vs. CARB values.

Vessel Type	Engine Type	Energy Used (kWh)		NOx (tpy)		PM10 (tpy)		PM2.5 (tpy)		DPM (tpy)		SOx (tpy)		CO2eq (tpy)	
		Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB	Chevron	ARB
SeaWayMax	Auxiliary	7,088,183	10,003,056	98.84	138.07	2.03	2.01	1.88	1.85	2.03	2.01	3.91	4.68	5,429.0	7,451.4
	Boiler	1,360,426	32,994,774	2.98	72.56	0.21	5.96	0.19	5.49	-	-	0.90	21.33	1,409.5	33,978.7
PanaMax	Auxiliary	1,144,086	1,175,238	15.39	15.81	0.33	0.24	0.30	0.22	0.33	0.71	0.63	0.55	876.3	875.5
	Boiler	1,084,622	6,147,537	2.33	13.52	0.16	1.11	0.15	1.02	-	-	0.70	3.97	1,098.5	6,330.9
AfraMax	Auxiliary	956,242	1,046,180	12.36	13.69	0.27	0.21	0.25	0.19	0.27	0.21	0.53	0.49	732.4	779.3
	Boiler	951,820	7,268,350	1.84	15.98	0.13	1.31	0.12	1.21	-	-	0.55	4.70	867.5	7,485.1
SuezMax	Auxiliary	1,411,786	5,702,957	19.53	69.76	0.40	1.15	0.37	1.05	0.40	1.15	0.78	2.67	1,080.4	4,248.1
	Boiler	6,909,414	13,281,139	11.42	29.21	0.80	2.40	0.74	2.21	-	-	3.43	8.59	5,394.6	13,677.2

Chevron will transmit the underlying data and calculations to CARB as confidential business information, however, the main drivers for the differences are likely due to the following:

a. Chevron's estimate is based upon (discharge pumping rate) x (discharge time plus hoteling load) x (hoteling time plus ballasting load) x (ballasting time) because vessels are not continuously pumping, sometimes they are simply idle, and some vessels load via gravity feed from shore tankage for a longer duration than they pump while at berth.
b. ARB uses same boiler and auxiliary loads for steam and diesel pumpers which were most likely measured (or determined through interviews) on steam pumpers at berth in Starcrest's Vessel Boarding Program while pumping. Almost all SeawayMax vessels and a large portion of PanaMax vessels that stop at RLW are diesel pumpers.
c. The ratio of crude versus product carriers is incorrect for SeawayMax and PanaMax vessel types.
d. Boiler emissions are lower because the vessels are not pumping the entire time at berth.
e. SuezMax auxiliary engine emissions are lower because of Chevron-owned lightering vessels, which use the boilers and turbogenerators to deliver electricity and account for 70% of refinery crude feedstock deliveries. No DPM is emitted and NOx emissions are lower than Tier III diesel auxiliaries.
f. For all crude carriers, 25% of boiler exhaust is pumped into cargo tanks as inert gas and not released at berth during discharge. When these vessels lighter with the VLCC in Southern California, they vapor balance with the VLCC ship. The inert gas in the SuezMax vessel is pumped into the VLCC as inert gas.

Vessel Activity Databases

San Francisco Marine Exchange is a suitable database and would use assumptions/processes consistent with those employed in South Coast area, but it needs supplemental data from Chevron to estimate at berth activities. Chevron will transmit its operational summary tables as confidential information for at berth activity as an output from our proprietary database.

3.1. Base Year Vessel Visits and Time At Berth

The inventory updates for vessel visits and time at berth are based on:

- 2016 IHS-Markit Vessel Registry data for vessels that visited California
- 2016 IHS-Markit at berth times for California
- 2016 South Coast Marine Exchange Arrival and Departure Data

The IHS-Markit data is used for the majority of California territorial waters, and the South Coast Marine Exchange is used specifically for the Ports of LA/LB.

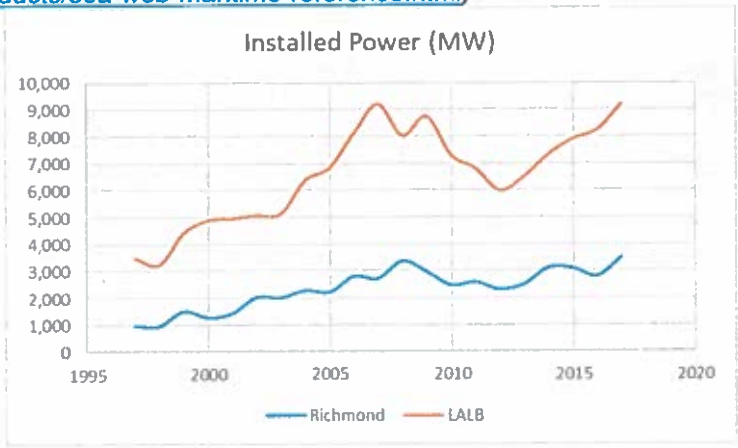
3. Comparison of POLA/POLB to RLW

As discussed on January 24, 2019 with CARB, there are significant differences between the vessels calling at POLA/POLB and those calling at RLW. Because of the significant differences in vessel particulars and operations, the data from POLA/POLB cannot be used to accurately represent operations or emissions at RLW and other Northern California marine terminals.

a. Installed Power

The installed power (determined from the U.S. Army Corps of Engineers Foreign Vessel Entrances and Clearances data as calls time propulsion power in MW) for vessels calling at POLA/POLB is nearly a factor of 3 greater than RLW.

Figure 3-1: Installed power comparison between vessels calling at RLW and POLA/POLB 1997-2017
(Source: U.S. Army Corps of Engineers Entrances and Clearances data from 1997 to 2017 (https://publibrary.planusace.us/#/series/vessel%entrances) and IHS Sea-Web data on ship characteristics (https://ihsmarkit.com/products/sea-web-maritime-reference.html)



b. The Vessel Distribution at POLA/POLB is Significantly Different than RLW

Table 3-1: Summary comparison of POLA/POLB to RLW vessel characteristics and calls
[Source: 2014 LA/LB Marine Exchange Data vs. 2016 RLW San Francisco Marine Exchange – previously purchased data sets]

	Calls		Percent Steam		Ave Hotel (hrs)	
Ship Type	LALB	RLW	LALB	RLW	LALB	RLW
SeaWayMax	205	212	9%	3%	39.7	43.0
PanaMax	221	27	77%	63%	51.4	62.9
AfraMax	96	25	100%	100%	62.2	57.4
SuezMax	83	114	100%	100%	82.1	28.1
VLCC	47	0	100%		71.5	
ULCC	12	0	100%		95.6	

The key points to recognize are:

1. Suezmax spend 3 times longer at POLA/POLB than they do at RLW.
2. RLW receives nearly 90% fewer Panamax vessels than POLA/POLB, and nearly 75% fewer Aframax.
3. The percent of vessels with steam auxiliaries is different at POLA/POLB for both SeaWayMax and Panamax.
4. Unlike POLA/POLB, RLW and other Bay Area marine terminals, are not physically configured to accept VLCCs and ULCCs.

4. Freight Analysis Framework (FAF) Forecast for Future Vessel Traffic Growth is Unrealistic

As mentioned during the January 24, 2019 in person meeting, Chevron stated that a 46.5% growth rate by 2050 is not feasible and does not reflect the mass balance and operational constraints that exist for Richmond Refinery.

Any small growth in marine traffic is likely to be in way of product leaving the facility which does not require vessels to pump, so additional at berth emissions would be limited to hotel and ballast water treatment loads, significantly less than pumping loads.

Table 4-1: Richmond Forecasted Vessel Growth Rates per CARB Emission Inventory (from FAF, 2017), Emission Inventory Appendix C

Richmond

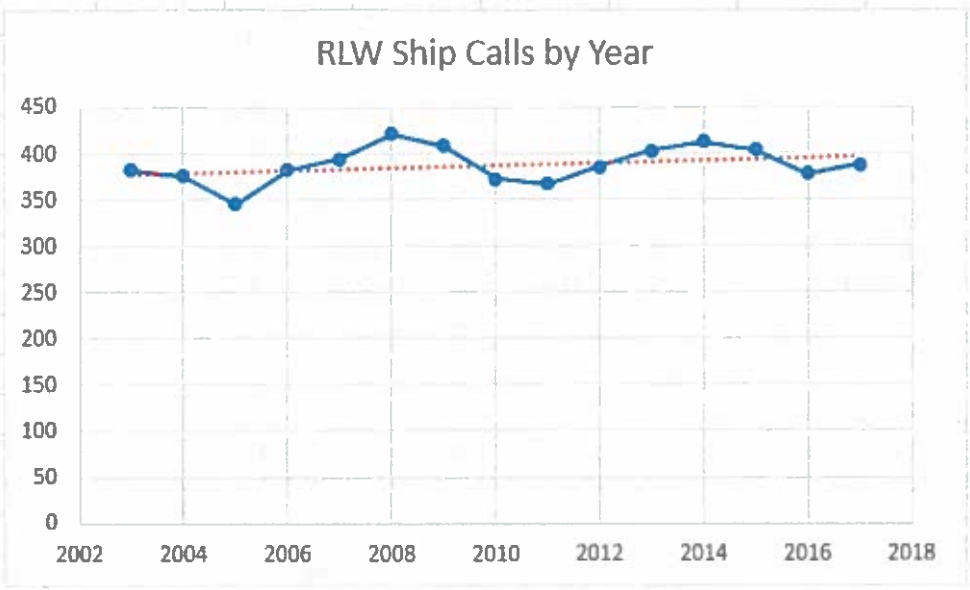
Vessel Type	Vessel Size	2016	2017	2018	2019	2020	2025	2030	2035	2040	2045	2050
Auto		1.000	1.033	1.067	1.103	1.139	1.289	1.458	1.663	1.929	2.192	2.491
Bulk		1.000	1.010	1.021	1.031	1.042	1.164	1.282	1.422	1.618	1.807	2.018
Tanker	Seawaymax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465
Tanker	Panamax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465
Tanker	Aframax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465
Tanker	Suezmax	1.000	0.993	0.987	0.980	0.973	1.006	1.077	1.162	1.258	1.357	1.465

Figure 4-1, below, demonstrates that RLW historical 2007-2017 vessel calls did not escalate continuously, but rather are cyclical, and primarily driven by operational and maintenance activities within the refinery itself.

Consequently, CARB should not rely upon the FAF Report as a future forecast for vessel activity for RLW and the Richmond Refinery. Based on our past 10 years operation, we would not expect greater than 1% growth over a 10-year period. Forecasting it to 2040, that would equate to a vessel growth rate of 1.03 (3% relative to 2016).

Chevron will transmit the underlying historical vessel call data to CARB as confidential information.

Figure 4-1: Richmond Actual Vessel Calls By Year, 2007-2017



5. Health Risk Assessment Comments

Although the HRA methodology appears sound, the underlying emissions data inputs are incorrect. This results in incorrect estimates of health risks.

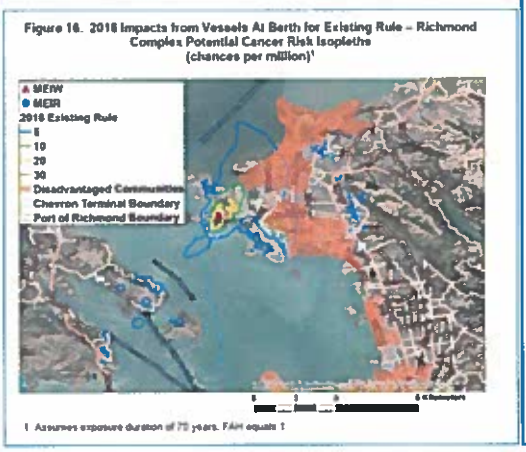


Figure 16. 2018 Impacts from Vessels At Berth for Existing Rule – Richmond Complex Potential Cancer Risk Isopleths (chances per million)[1]

1 Assumes exposure duration of 70 years. FAH equals 1

Figure 17 shows the risk isopleth for both the existing rule and Concept in 2025. The isopleth for the existing rule would continue to expand if the Concept was not implemented. Under the existing rule, the highest risk isopleth is 30 chances per million. With the Concept, the isopleth becomes smaller and the 20 chances per million isopleth and 30 chances per million isopleths would be eliminated. This is due to the emissions control requirement for vessel types that visit the Richmond Complex beginning in 2025.

Figure 17. 2025 Impacts from Vessels At Berth for Existing Rule and Concept – Richmond Complex Potential Cancer Risk Isopleths (chances per million)[1]

1. Assumes exposure duration of 70 years. FAH equals 1.

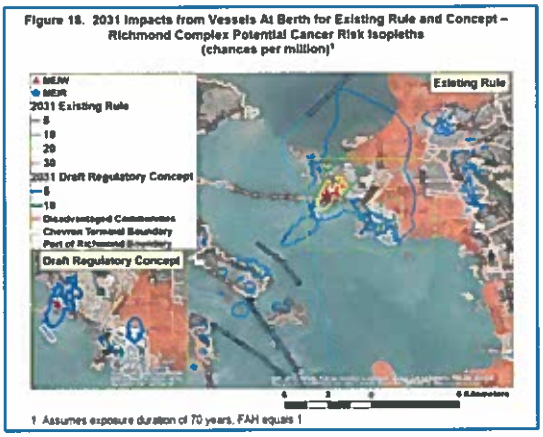


Figure 18. 2031 Impacts from Vessels At Berth for Existing Rule and Concept – Richmond Complex Potential Cancer Risk Isopleths (chances per million)[1]

1 Assumes exposure duration of 70 years. FAH equals 1

a. *Misrepresentation of Residential Cancer Risk Isopleths*

Health Risk Assessment Figures 16 through 18 illustrate the locations of the MEIR (based on a 30-Year exposure duration) and the MEIW (based on a 25-year exposure duration). The isopleth illustrating the extent of the cancer risks are based only on a 70-year exposure duration. This mixed presentation can be misleading to the general public. Using the 70-year exposure duration assumes that all populations would be living in this same location for 70 years. Although the Risk Management Plan Guidance (CAPCOA, 2015) states that for the population-based cancer risk calculations one should use a 70-year exposure duration, it also states that "studies show that a 30-year exposure duration is a reasonable estimate of the 90th and 95th percentile of residency duration in the population." A 30-year exposure duration isopleth figure should also be included to represent a more realistic spatial estimate of cancer risk. It is also recommended that separate isopleth figures be added to represent a 9-year exposure period and a 25-year worker exposure duration.

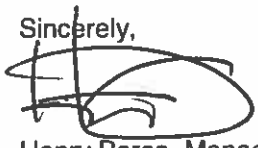
b. *Display the Chevron Industrial Facility Property Boundary*

The Chevron property boundary is not delineated on Figures 16 through 18. The Chevron RLW only serves activities for use explicitly by the Richmond Refinery. Chevron recommends that the refinery property boundary

be illustrated on these figures along with the RLW boundary as the RLW is part of the facility itself, which is an industrial facility and does not contain residential receptors. As such, risks should not be calculated within property boundaries of the facility sources.

Chevron appreciates this opportunity to provide comments relating to the CARB At Berth and At Anchor Regulation draft emission inventory and health risk assessment methodologies and results. Separately, we will transmit supporting data as Confidential Business Information.

Sincerely,



Henry Perea, Manager
CA/OR/WA Government Affairs
Chevron Corporation

cc:

Chris Brown, Chevron Shipping
Brian Hubinger, Chevron PGPA

Technical Appendix

(Supporting data to be transmitted separately as Confidential Business Information)

References:

CAPCOA, 2015. Risk Management Guidance for Stationary Sources of Air Toxics.

OEHHA, 2015. Risk Assessment Guidelines Guidance Manual for Preparation of Health Risk Assessments. Air Toxics Hot Spot Program.

Starcrest, 2014. 2014 Port of LA/LB Vessel Boarding Program – Auxiliary and Boiler engine power

Starcrest, 2017. POLA/POLB Bay Wide Ocean-Going Vessel International Maritime Organization Tier Forecast 2015-2050. San Pedro Bay Ports Clean Air Action Plan.

Exhibit 9: Memo from Gary Rubenstein to WSPA Re: Review of CARB Health Analyses (November 26, 2019)

Foulweather Consulting
Sacramento, CA
916.802.1375

November 26, 2019

To: Tom Umenhofer, Vice-President
Western States Petroleum Association

From: Gary Rubenstein

Subject: Review of CARB Health Analyses in Support of Proposed Modifications to the At-Berth Regulation

This is in response to your request for a review of the methodology used by the California Air Resources Board (CARB) to calculate the health benefits ascribed to the proposed modifications to CARB's Control Measure for Ocean-Going Vessels at Berth. My review, presented below, is based on CARB's Health Analyses document, which is included as Appendix G to CARB's Staff Report/Initial Statement of Reasons for the rulemaking.[1]

1. **CARB's assumption that DPM health values can be assigned to emissions from marine engines operating on MGO, MDO, or HFO is inappropriate and unfounded.**

At page 3 of the Health Analyses document (Appendix G), CARB assumes that the cancer potency factor (CPF) and chronic reference exposure level (REL) for Diesel Particulate Matter (DPM) are applicable to the particulate emissions from ocean-going vessel marine engines fueled with marine gas oil (MGO), marine diesel oil (MDO) and marine heavy fuel oil (HFO). The original DPM CPF and REL established by CARB were based largely on health effects studies looking at the exposure of railway workers to locomotive Diesel engine exhaust in the 1960s. Despite this limitation, CARB applies the same CPF and REL to all compression ignition engines using Diesel fuel, including those compression ignition engines equipped with Diesel oxidation catalysts and Diesel particulate filters – both of which have been documented to fundamentally change the chemical nature of DPM.[2] In the instant rulemaking, CARB assumes that the same CPF and REL that were developed based on DPM emissions from 1960s vintage locomotives operating on Diesel fuel are now applicable to modern-day Diesel engines operated on demonstrably different fuels (MGO, MDO and HFO) when used in auxiliary engines on ocean going vessels. Instead of continuing to expand the applicability of health-effects data based on 50-year-old technologies and fuels, ARB should assess the health impacts of auxiliary engines operated on fuels other than Diesel fuel based on speciated composition of the exhaust for these engines, as CARB does in its risk assessments for engines using other fuels (such as gasoline, ethanol, and natural gas).

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[1] https://ww3.arb.ca.gov/regact/2019/ogvatberth2019/appg.pdf

[2] See, e.g., *Advanced Collaborative Emissions Study (ACES): Lifetime Cancer and Non-Cancer Assessment in Rats Exposed to New- Technology Diesel Exhaust*. Health Effects Institute. Research Report 184. (January 2015)

2. The results of the Health Analyses should be properly placed into context.

In ARB's 2015 Risk Management Guidance, ARB warns that changes to risk assessment methodologies have resulted in increased calculated risk values, even though a facility has not changed its operations in a way that negatively affects public health.

> "One significant area of focus is how best to communicate what impact these methodology changes will have on health risk estimates, what those new risk estimates mean, and how best to manage sources and programs in a reasonable and health protective manner. The procedures in the new OEHHA Manual will typically result in a higher estimated cancer risk from a facility even though they [the facility] use control technology and are actually maintaining or reducing its emissions. As a result, it is a challenge to communicate the new information in a way that ensures the public's right to know but does not imply that the facility has changed its operations or emissions in a way that negatively affects public health."[3]

The Health Analyses document does not present this background information to help the public understand the implications of the calculated risk values.

In contrast to the 2015 Risk Management Guidance, at page VI-1 of the Initial Statement of Reasons (ISOR), ARB concludes that "Emissions from ocean-going vessels operating at berth and at anchor are a significant and growing contributor to community air pollution and the associated health impacts." However, nowhere does ARB compare the emissions, or potential health impacts, attributable to ocean-going vessels (OGVs) at-berth with other sources of criteria air pollutants or toxic air contaminants that Californians are exposed to each day. For example, the PRA indicates that baseline (2020) maximum exposed individual incremental cancer risk (MEIR) attributable to ships at-berth is 54-in-a-million at the Ports of Los Angeles and Long Beach (POLA and POLB), and 14-in-a-million at the Richmond Complex (the Port of Richmond and the Chevron refinery berths). While these incremental risks apply to individuals living within a relatively small distance from these two port complexes, ARB estimates that the average individual living in California is exposed to an incremental cancer risk attributable to diesel particulate matter (DPM) of approximately 520-in-a million.[4]

Furthermore, as the following graphic (from ARB's 2015 Risk Management Guidance) shows, ARB recommends development of a risk reduction plan if calculated risk levels exceed 100-in-a-million. The proposed rule amendment is inconsistent with these guidelines in that, in effect, it imposes a risk reduction plan on a collection of sources (such as a port complex) at much lower levels, when such a plan would not be required for an individual stationary source with the same calculated risk level.

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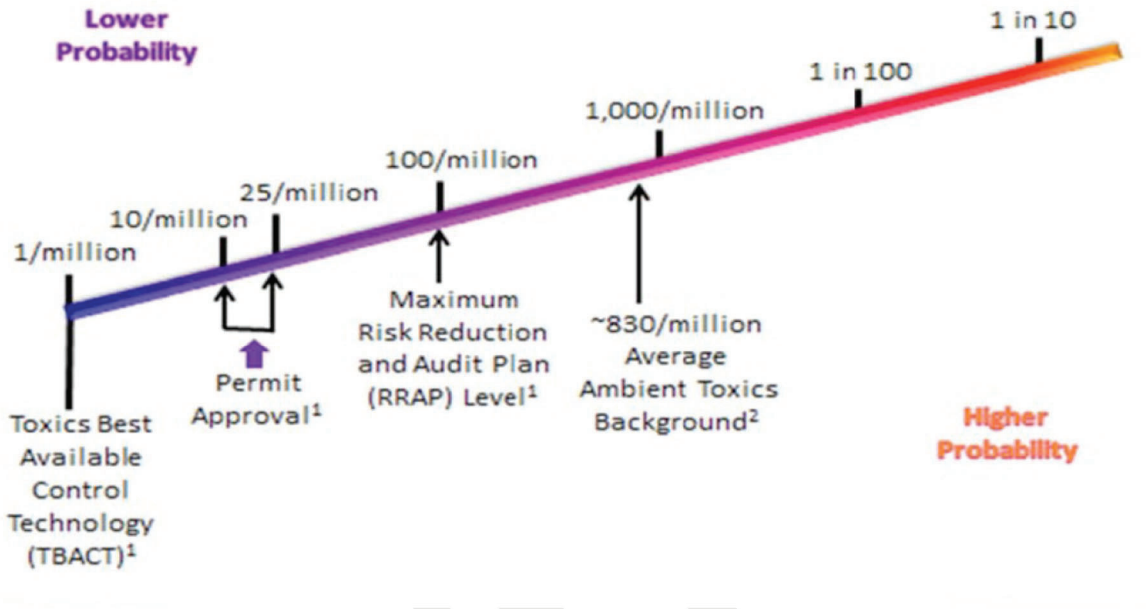
[3] *Risk Management Guidance for Stationary Sources of Air Toxics*, ARB and CAPCOA. July 23, 2015. pp. 2-3. https://www.arb.ca.gov/toxics/rma/rmgssat.pdf

[4] https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health . Accessed 11/7/2019.

Figure II-2: Health Risk – A Relative Perspective



3. CARB's assertion that the proposed regulation would avoid "health impacts valued around $2.3 billion"[5] is not supported by sound science.

The Health Analyses ascribe a statewide benefit of $2.245 billion to the avoided adverse health outcomes attributable to the proposed regulatory program. 99.8 percent of this benefit is associated with avoided premature deaths, and 87 percent of the reduction in avoided premature deaths is associated with reductions in oxides of nitrogen (NOx) emissions. These avoided premature deaths attributable to NOx reductions are, in turn, attributed to the formation of particulate ammonium nitrate in a photochemical reaction that ARB acknowledges occurs well downwind of the emission source – and hence not in the communities nearest the ports, and only after the concentrations have been substantially reduced due to dispersion. Relatively little formation of ammonium nitrate occurs in close proximity to the emission source, where dispersion is relatively low. Formation of ammonium nitrate increases over time (and distance from the source), as does dispersion. CARB's analysis is not clearly presented, however CARB does not appear to address these factors in calculating reduced ambient concentrations of ammonium nitrate particulates and the associated avoided adverse health outcomes.

[5] CARB's Initial Statement of Rulemaking asserts that "Total costs for all entities exceeding $2.2 billion through 2032, with a statewide valuation of avoided health impacts valued around $2.3 billion." In fact, the actual values reported in CARB's report are $2,245,207,000 for avoided health impacts, and $2,164,319,000 for net costs.

4. CARB does not explain how they calculated they calculated the health benefits attributed to NOx emission reductions in the South Coast Air Basin.

At p. G-53, CARB indicates that they used the AERMOD model to estimate reductions in ambient concentrations of $PM_{2.5}$. However, AERMOD does not contain algorithms that model the photochemical reactions that convert oxides of nitrogen emissions to secondary ammonium nitrate. While the rulemaking document is silent as to exactly how CARB calculates the health benefits of NOx emission reductions, it appears (from the discussion at pp. G-53 to G-57) that CARB scaled the modeled $PM_{2.5}$ concentrations by the ratio of NOx emissions from sources subject to the proposed rule to modeled $PM_{2.5}$ emissions, with the further assumption that most, if not all, of the NOx emissions are converted into secondary ammonium nitrate because "[i]mpacts are assumed to take place over a wide geographic area". If this was, in fact, CARB's assumption, it is inconsistent with both the physical science and with the approach used by both CARB and California air districts to model ambient $PM_{2.5}$ concentrations for State Implementation Plan purposes.

5. CARB's assumption regarding the expected reduction in ambient nitrate concentrations attributed to the proposed rule is not based on a methodology consistent with current EPA guidance.

EPA guidance for addressing secondary nitrate formation in dispersion modeling analyses under the Prevention of Significant Deterioration (PSD) program[6] establishes a two-step process for evaluation:

- A simple screening tool based on the use of Modeled Emission Rates for Precursors (MERPs); or
- Direct analysis using a photochemical model such as CMAQ.

The fact that EPA's guidance on this point applies to a specific regulatory program (i.e., the PSD permit program) does not undermine the fundamental science – the methodology is applicable both to individual point sources and to "a group of sources in the area". The ports assessed in CARB's Health Analysis clearly fall within that second category. However, CARB's analysis of the potential health benefits of NOx emission reductions attributable to the proposed rule is not consistent with either of the two steps EPA recommends.

[6] Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier I Demonstration Tool for Ozone and $PM_{2.5}$ under the PSD Permitting Program (EPA 454/R-19-003). (April 2019)