California Air Resources Board

Public Hearing to Consider the Proposed In-Use Locomotive Regulation

Final Statement of Reasons for Rulemaking, Including Summary of Comments and Agency Response

Public Hearing Date: April 27, 2023
Agenda Item No.: 23-4-1

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List of Abbreviations and Acronyms

Acronym	Definition
AAR	Association of American Railroads
ACF	Advanced Clean Fleets
ACT	Advanced Clean Trucks
ACP	Alternative Compliance Plan
AESS	Automatic Engine Stop/Start
AFMO	Alternative Fleet Milestone Option
ATCM	Airborne Toxic Control Measure
BNSF	BNSF Railway
CAA	Clean Air Act
CARB	California Air Resources Board
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CGFA	California Grain and Feed Association
CMTA	California Manufacturers & Technology Association
CRISI	Consolidated Rail Infrastructure and Safety Improvements
CORE	Clean Off-Road Equipment
DERA	Diesel Emissions Reduction Act
DOE	Department of Energy
DPM	Diesel Particulate Matter
Draft EA	Draft Environmental Analysis
EA	Environmental Analysis
Final EA	Final Environmental Analysis

FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FSOR	Final Statement of Reasons
FY	Fiscal Year
GHG	Greenhouse Gas
GTI	Gas Technology Institute
Hardship Extension	Small Business Hardship Extension
ICCTA	Interstate Commerce Commission Termination Act
ICT	Innovative Clean Transit
ISOR	Initial Statement of Reasons
IUOR	In-Use Operational Requirements
LCFS	Low Carbon Fuel Standards
LIA	Locomotive Inspection Act
LNG	Liquefied Natural Gas
MWh	Megawatt-hour
NAAQS	National Ambient Air Quality Standards
NG	Natural Gas
NOx	Oxides of Nitrogen
OAL	Office of Administrative Law
OEM	Original Equipment Manufacturer
PM	Particulate Matter
PM2.5	PM that is 2.5 microns or less in diameter
PTC	Positive Train Control
RD	Renewable Diesel

RNG	Renewable Natural Gas
RPS	Rail Propulsion Systems
SA	Spending Account
SCAB	South Coast Air Basin
SCAQMD	South Coast Air Quality Management District
Sierra	Sierra Railroad Company
SIP	State Implementation Plan
SRIA	Standardized Regulatory Impact Assessment
STB	Surface Transportation Board
TAC	Toxic Air Contaminant
TIRCP	Transit and Intercity Rail Capital Program
UP	Union Pacific Railroad
U.S. EPA	United States Environmental Protection Agency
VERA	Voluntary Emission Reduction Agreement
VMT	Vehicle Miles Travelled
VW Program	Volkswagen Environmental Mitigation Trust
ZE	Zero Emission
ZEV	Zero Emission Vehicle
VOC	Volatile Organic Compounds
1998 MOU	1998 Locomotive NOx Fleet Average Emissions Agreement in the SCAB

I. General

The Staff Report: Initial Statement of Reasons (ISOR) for the Proposed In-Use Locomotive Regulation, released September 20, 2022, is incorporated by reference herein. The staff report contained a description of the rationale for the Proposed Regulation. On September 20, 2022, all references relied upon and identified in the staff report were made available to the public.

As described in the staff report, the Proposed Regulation will reduce emissions from locomotives operating in California by requiring locomotive operators to fund a Spending Account (SA) based on the public health costs to Californians from locomotive emissions and activity levels. Locomotive operators may use funds held in the SA to purchase cleaner locomotive technologies. The Proposed Regulation would prohibit locomotives with engine build dates 23 years and older from operating in California starting in 2030. The Proposed Regulation, starting in 2030, also requires that switcher, industrial, and passenger locomotives with original engine build dates of 2030 or later operate in a zero emission (ZE) configuration in California. Additionally, in 2035, freight line haul locomotives with original engine build dates of 2035 or later will need to operate in a ZE configuration in California. The Proposed Regulation would also require locomotive operators to limit locomotive idling to 30 minutes, unless a specified exemption applies. Operators must report to CARB information necessary for CARB to better track and understand locomotive emissions throughout the state; operators are also required to report certain information related to operators' specific compliance pathways.

The Proposed Regulation will achieve emission reductions that will reduce health risk associated with exposure to toxic and criteria pollutants, help meet federal air quality standards, and support the greenhouse gas (GHG) reduction goals of California. The Proposed Regulation would also increase the use of ZE technology in the off-road sector and support the goals of Executive Order N-79-20.

On November 28, 2022, following a 45-day comment period, the California Air Resources Board (CARB or Board) held the first public hearing to consider the Proposed Regulation, as described in the staff report and associated Notice of Public Hearing (45-Day Notice). A total of 38 individuals or organizations submitted written comments during the 45-day comment period. Oral comments were provided by 43 individuals during the public hearing. Seven individuals submitted written comments at the hearing. After the public hearing, staff proposed modifications to the originally Proposed Regulation.

Staff published the text of the proposed modifications to the originally Proposed Regulation and supporting documents for the first supplemental 15-day comment period through a "Notice of Public Availability of Modified Text and Availability of Additional Documents and Information" (First 15-Day Notice). The First 15-Day Notice, modified regulatory language, and additional supporting documents were posted on March 1, 2023, on the In-Use Locomotive Regulation rulemaking webpage *https://ww2.arb.ca.gov/rulemaking/2022/locomotive*, accessible to interested parties. The comment period began on March 1, 2023, and ended on March 16, 2023. All modifications to the regulatory language were clearly indicated in the First 15-Day Notice. During this 15-day comment period, 12 individuals or organizations submitted comment letters. (CARB received one duplicate letter, for a total of 13).

Staff posted the written responses to the Draft Environmental Analysis (Draft EA) and the Final Environmental Analysis (Final EA) on April 14, 2023, for public review. Staff presented to the Board the Final EA, Response to Comments, Final Regulation Order, and Proposed Resolution 23-12 on April 27, 2023. Oral comments were provided by 41 individuals during the April public hearing. Also, during the April hearing, 9 individuals submitted written comments at the hearing, 7 individuals submitted letters to the comment docket, and 2 individuals submitted comments through Zoom. The Board adopted Resolution 23-12, approving written responses to the Draft EA, certifying the Final EA, and approving the Proposed Regulation.

On June 9, 2023, CARB submitted the rulemaking package to the Office of Administrative Law (OAL) for review. On July 21, 2023, CARB withdrew the rulemaking package from OAL to make changes to the proposed regulatory text. On August 8, 2023, staff posted a Second Notice of Public Availability of Modified Text and Availability of Additional Documents and Information (Second 15-Day Notice) and the second Proposed 15-Day Modifications to the Proposed Regulation Order (Second 15-day Changes) for a public review and comment period through August 23, 2023.

This Final Statement of Reasons (FSOR) updates the staff report by identifying and providing the rationale for the modifications made to the originally proposed regulatory text, including text circulated for public comment during the 15-day comment periods. The FSOR also contains a summary of the comments received during the formal comment periods during the rulemaking process on the Proposed Regulation and CARB responses to those comments.

A. Mandates and Fiscal Impacts to Local Governments and School Districts

The Board has determined that this regulatory action will result in costs and cost-savings to local agencies affected by the mandate. However, the Board finds that that these costs are not reimbursable pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code, because costs associated with the Proposed Regulation apply generally to all locomotive operators, including local agencies and school districts. Therefore, the Proposed Regulation does not constitute a Program imposing any unique requirements on local agencies or school districts as set forth in Government Code section 17514.

The Proposed Regulation would cost local government agencies that own locomotives (e.g., Metrolink, Caltrain) approximately $515 million. Using the locomotive inventories created for the Proposed Regulation, staff calculated direct costs incurred by local government locomotive owners. In attributing costs for local government, based on data from the Federal Transit Administration (FTA) National Transit Summaries and Trends 2019,[1] staff allocated local governments a 46 percent share of capital costs and 69 percent of maintenance costs associated with the Proposed Regulation. State funding provided 23 percent of capital costs and 0 percent of maintenance costs, and federal funding providing 31 percent of both capital costs and maintenance costs.

[1] Federal Transit Administration, National Transit Summaries and Trends 2019, accessed August 2, 2022. (weblink: *https://www.transit.dot.gov/funding/grants/urbanized-area-formula-grants-5307*).

Several cities and counties in California levy a utility user tax on electricity usage. This tax varies from city to city and ranges from no tax to 11 percent. For this analysis, staff used a value of 3.53 percent, representing a population-weighted average. Because switcher locomotives are modeled to transition to battery-electric operation within California and therefore increase the amount of electricity used, there would be an increase in the amount of utility user tax revenue collected by cities and counties. Freight line haul and passenger locomotives are assumed to be hydrogen fuel cell, and therefore do not affect utility user taxes.

Off-road diesel locomotive use is exempt from on-road diesel taxes, but it does incur sales tax. Displacing diesel with electricity or hydrogen would decrease the total amount of diesel fuel dispensed in the State, resulting in a reduction in tax revenue collected by local governments. For this analysis, staff used the combined state and local sales tax rate of 8.6 percent, which is a weighted average based on county-level output, with 3.94[2] percent going towards state sales tax and 4.67[3] percent going towards local sales tax.

Sales tax is levied in California to fund a variety of programs at the local and state levels. The Proposed Regulation will result in the sale of more expensive locomotives and infrastructure in California, which will result in a direct increase in sales tax revenue collected by local governments. However, overall, local sales tax revenue may increase less than the direct increase from locomotive and infrastructure sales if overall business spending does not increase. Staff used a combined state and local sales tax rate of 8.6 percent, which is a weighted average based on county-level output, with 3.94 percent going towards state sales tax and 4.67 percent going towards local sales tax.

From 2023 to 2050, staff estimated the cost to local governments due to the Proposed Regulation to be $515 million, resulting from locomotives operated by local governments. Local governments will also see a direct increase in utility user and local sales tax revenue of $220 million and a decrease in sales tax from diesel fuel of $490 million. Staff estimated the total fiscal cost to local governments to be $1.0 billion from 2023 to 2050.

B. Consideration of Alternatives

For the reasons set forth in the Staff Report, in staff comments and responses at the hearings, and in this FSOR, the Board determined that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulatory action was proposed, or would be as effective and less burdensome to affected private persons, or would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provisions of law than the action taken by the Board.

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[2] California Department of Tax and Fee Administration, Detailed Description of the Sales & Use Tax Rate, accessed August 2, 2022. (weblink: *https://www.cdtfa.ca.gov/taxes-and-fees/sut-rates-description.htm*).
[3] California Department of Tax and Fee Administration, California City & County Sales & Use Tax Rates, accessed August 2, 2022. (weblink: *https://www.cdtfa.ca.gov/taxes-and-fees/sales-use-tax-rates.htm*).

II. Modifications Made to the Original Proposal

A. Modifications Approved at the Board Hearing and Provided for in the First 15-Day Comment Period

Modifications approved at the Board Hearing and provided for in the first 15-day comment periods after the April 27, 2023 Board hearing are discussed below. Modifications to the original proposal were made at Board direction and to address comments received at the hearing and during the 45-day public comment period. Staff released the first 15-Day Notice on March 1, 2023, which notified the public of additional documents added into the regulatory record and presented additional modifications to the regulatory text. The following provides a general overview of the modifications, their purpose, and the reasons for making them. This overview does not address non-substantive modifications to correct typographical or grammatical errors, changes in numbering or formatting, addition of or edits to internal regulatory cross-references, or similar revisions that improve clarity.

1. Additional Extensions for Equipment Manufacture and Infrastructure Installation Delays and for Unavailability of Compliant Equipment

Section 2478.6 was modified to include additional extensions. Staff added extensions for equipment manufacture and infrastructure delays and for unavailability of compliant equipment. The additional extensions were included to address cases where a regulated party is prevented from complying due to circumstances beyond their control. The extensions prescribe the application process and include timelines for approval and reapplication in cases where delays or unavailability continue beyond the limit of a single extension. Note that locomotive operators must continue to report the activity of locomotives operating under extensions and must operate their locomotives included under an extension abiding by the 30-minute idling limit. This change was necessary to provide locomotive operators additional time to comply with the requirements of the Proposed Regulation due to delays related to supply chain issues, etc.

2. Alternative Fleet Milestone Option

As directed by the Board during the November 18, 2022, Board hearing, staff continued to work with passenger operators to find a compliance pathway that would work with the unique way passenger operators are funded and operated in California. In collaboration with passenger operators, staff developed an Alternative Fleet Milestone Option (AFMO) that could be used in place of directly complying with the SA and In-Use Operational Requirements (IUOR). The AFMO can be found in section 2478.8.

Although staff recognizes the unique funding challenges of passenger operators, as well as the substantial proportions of Tier 4 locomotives currently in operation and the forward-looking ZE plans the passenger operators have adopted, it is critical to include passenger operators in the Proposed Regulation because of the unique harm diesel passenger locomotives pose to passengers and the residential communities in which passenger locomotives often operate.

The AFMO could be used by any locomotive operator in lieu of directly complying with the SA and IUOR. The AFMO is a fleet option, meaning all locomotives operated by the operator

in California must be enrolled in the AFMO. The AFMO has the annual fleet usage requirements listed below, with usage in units of megawatt-hour (MWh) of locomotive activity. ZE provisions are also listed.

- Beginning in 2030, at least 50 percent of annual fleet usage in California must be from Tier 4 (or cleaner) locomotives.
- Beginning in 2035, 100 percent of annual fleet usage in California must be from Tier 4 (or cleaner) locomotives.
- Beginning in 2042, 50 percent of annual fleet usage in California must be ZE operation.
- Beginning in 2047, 100 percent of annual fleet usage in California must be ZE operation (no exceptions).
- ZE locomotive or ZE rail equipment provision: Each MWh of ZE locomotive or ZE rail equipment activity in the California fleet allows equivalent usage for the following other locomotives to be counted as Tier 4 locomotives:
    - Two (2) MWhs from Tier 2 or 3 locomotives, or
    - One and a half (1.5) MWhs from Tier 1 locomotives, or
    - One (1) MWh from Tier 0 locomotives, or
    - Half (0.5) MWh from pre-Tier 0 locomotives.

As previously mentioned, the AFMO could be used by any locomotive operator. However, staff anticipates that passenger operators are more likely than other locomotive operators to adopt the AFMO. Passenger operators currently have a large number of Tier 4 locomotives as a percentage of their fleet, which would allow them to more easily achieve the 2030 and 2035 Tier 4 milestones compared to other locomotive operators. Class I, Class II, Class III, and Industrial operators currently have less than six percent of their California operations completed by Tier 4 locomotives, making the 2030 and 2035 Tier 4 milestones harder to achieve. Thus, while other locomotive operators are free to choose the AFMO, the proposed deadlines may be more difficult to meet, depending on individual current fleet makeup. Additionally, as part of the AFMO requirements, operators are required to write detailed plans on how they will achieve each milestone, including how operators will reach the 2042 and 2047 milestones. Many non-passenger operators have voiced resistance to adoption of ZE operation; whereas most passenger operators have board-adopted plans on ZE operation goals. If all passenger operators in the State opted to use the AFMO, overall emission reductions of the Proposed Regulation could be decreased by approximately one percent for particulate matter (PM) and oxides of nitrogen (NOx), and GHGs.

3. Addition of an Alternative Compliance Plan Application Fee

In Section 2478.12, staff included an application fee for Alternative Compliance Plan (ACP) applications submitted to CARB. The fee would be used to recover the cost of implementation of ACPs. The application fee is based on locomotive fleet sizes and would be as follows:

- $200 for 1 to 5 locomotives
- $500 for 6 to 50 locomotives
- $1,000 for 51 to 100 locomotives
- $2,500 for 101 or more locomotives

To evaluate ACP applications, staff must review documentation such as locomotive fleet data, emission reduction projections, and procurement schedules. Analysis may also include review of specific equipment duty cycles, load factors, and fuel types, as well as projected usage levels. The ACP application processes will require close coordination between CARB and locomotive operators and will result in increased CARB staffing time compared to the conventional compliance pathways (i.e., the SA and IUOR).

The amount of time required to review and validate a single plan is projected to require a minimum of two days of staff time for fleets of 1 to 5 locomotives, increasing to 20 or more staff days for 101 or more locomotives, including meetings and management review hours. The cost per unit of staff person years is described in the Standardized Regulatory Impact Assessment (SRIA).

B. Updates to the Emission Reduction Analysis as a Result of the First 15-Day Changes.

Updates to the emissions analysis from the modifications included in the first 15-day package (First 15-day changes) on March 1, 2023, was needed to reflect emissions benefits from adopting the Proposed Regulation. As described in the 15-day changes documents, if all California passenger operators opted to use the AFMO in lieu of directly complying with the SA and IUOR, the cumulative emission reductions of the Proposed Regulation could be reduced by one percent for PM, NOx, and GHGs compared to the emission reductions projected in the ISOR. This is mainly due to the near-term emission reductions realized by turning over locomotives to Tier 4 prior to 2030 under the SA. The AFMO allows more flexibility for operators to operate older locomotives longer than would be required under the IUOR, but operators must operate as fully-ZE sooner than would be required if directly complying with the SA and IUOR. The updated analysis does not alter the determinations that alternatives should still be rejected.

C. First 15-Day Changes Non-Substantial Modifications

Subsequent to the first 15-day public comment period mentioned above, staff identified the following additional non-substantive changes to the Proposed Regulation:

1. Section 2478.1
    - Corrected the NOTE: Authority cited to change italicized letter “s”, include an “and” between numbers 43013 and 43018 and capitalized second “Sections.”
2. Section 2478.2.
    - Corrected the NOTE: Authority cited to change italicized letter “s”, include an “and” between numbers 43013 and 43018 and capitalized second “Sections.”
3. Section 2478.3.
    - Moved quotation mark on definition of Greenhouse Gases to include acronym.
    - Removed stray “hp” in Table 1 of the Usage definition.
    - Corrected the NOTE: Authority cited to change italicized letter “s”, include an “and” between numbers 43013 and 43018 and capitalized second “Sections.”
4. Section 2478.4.
    - In 2478.4(h), added non-breaking space to date to keep date together and removed unnecessary comma.

- In 2478.4(h)(4) and 2478.4(h)(5), capitalized "Credit" to be consistent with capitalizing defined terms.
- Corrected the NOTE: Authority cited to include an "and" between numbers 43013 and 43018 and capitalized second "Sections."

5. Section 2478.5.
   - In 2478.5(c)(1), corrected grammar by adding comma.
   - Corrected the NOTE: Authority cited to include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
6. Section 2478.6.
   - In 2478.6(b)(2), removed unnecessary spelling of "ninety" to be consistent with how 90 is presented throughout the rest of the regulatory text.
   - In 2478.6(b)(4)(G), corrected grammar by adding comma after "accurate."
   - Corrected the NOTE: Authority cited to include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
7. Section 2478.7.
   - In 2478.7(a), added "section" before 2478.5 to improve clarity.
   - In 2478.7(b)(1)(b) and 2478.7(d)(8), removed hyphen in between "five years" to indicate a timeframe and not the defined term "Five-Year Verification Period."
   - In 2478.7(g)(5), corrected grammar by removing unnecessary comma.
   - In 2478.7(i)(3), corrected grammar to state "sections" rather than "section."
   - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
8. Section 2478.8.
   - In 2478.8(c)(2), corrected "MWh" to "MWhs" to be plural.
   - In 2478.8(e), removed stray "the."
   - In 2478.8(e)(3), changed uppercase "Fleet" to lowercase because it is not part of a defined term.
   - In 2478.8(j)(2)(B), corrected grammar in sentence to be singular rather than plural.
   - 2478.8(m), corrected formatting.
   - Added missing text, "NOTE: Authority cited: sections 38560, 39600, 39601, 39658, 39659, 39666, 41511, 43013, and 43018, Health and Safety Code. Reference: sections 39650, 39659, 41511, 43013, and 43018, Health and Safety Code."
9. Section 2478.9.
   - Corrected the NOTE: Authority cited to include an "and" between numbers 43013 and 43018 and capitalized second "Section."
10. Section 2478.10.
    - In 2478.10(a)(2)(P), removed extra "and" from sentence.
    - In 2478.10(a)(2)(Q), added "subsections" in front of 2)(A)-(I) to add clarity.
    - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
11. Section 2478.11.
    - In 2478.11(c)(5), removed "and" and replaced with a period to match with formatting style of other sections.
    - 2478.11(c)(6), corrected grammar by removing and adding commas and capitalized ZE Credit because it is a defined term.
    - In 2478.11(g), corrected grammar to say "a" rather than "an."

- Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."

12. Section 2478.12.
    - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
13. Section 2478.13.
    - 2478.13(g), corrected capitalization error on the word "exemption."
    - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
14. Section 2478.14.
    - In 2478.14(g), corrected capitalization error on the word "application."
    - In 2478.14(h), corrected capitalization error on the word "application"
    - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
15. Section 2478.15.
    - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018, capitalized second "Section" and make it plural by adding an "s."
16. Section 2478.16.
    - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."
17. Section 2478.17.
    - Corrected the NOTE: Authority cited to change italicized letter "s", include an "and" between numbers 43013 and 43018 and capitalized second "Sections."

The above-described modifications constitute non-substantial changes to the regulatory text because they correct spelling and grammatical errors and other non-substantive changes to improve consistency, but do not materially alter the requirements or conditions of the proposed rulemaking action.

D. Modifications Provided for in the Second 15-Day Comment Period

1. Staff adjusted the effective date of the Regulation to January 1, 2024, to allow appropriate time for OAL to review the regulatory package and for operators to prepare to meet regulatory requirements. Staff adjusted dates throughout the regulatory language to reflect the change.

2. Staff updated section 2478 to specify that the Locomotive Regulation encompasses sections 2478 through 2478.17. Staff also added an "authorities cited" note, which had been inadvertently left out previously.

3. Staff added dates and "herein incorporated by reference" to all Code of Federal Regulations (CFR) citations in the Regulation to indicate that the specific federal language, effective as of that date, should be incorporated by reference.

4. In section 2478.3, staff deleted the definition of California Air District. Staff have become aware that Air District level reporting is inconsistent with reporting requirements of other CARB regulations. Although Air District level reporting would provide precise locomotive emissions throughout the State, it is not necessary at this time for CARB to project emissions for individualized districts using State level data.

5. Staff revised the definition of "Operate" for clarity by specifying the definition is inclusive of the terms "Operation," "Operated," "Operating," and "Operations," which are also used in the Regulation.

6. Staff revised the definition of "Usage" to describe how any operator may choose to determine usage in either megawatt-hours (MWh) or by using fuel consumption and the formula provided in section 2478.3(a), to provide operators more reporting flexibility.

7. Staff changed the implementation date for section 2478.4 from the effective date of the Regulation to January 1, 2026. Recently, an unprecedented amount of grant and incentive funding has been made available to locomotive operators. Delaying the SA deposit requirements will allow operators the time needed to secure funding and begin operations of cleaner locomotives before incurring costs in the SA.

8. Staff revised section 2478.4 so that the funds that are required to be deposited into a SA are consistently referred to as the "Spending Account Funding Requirement." This change was necessary to provide consistency and clarity.

9. Staff added subsection 2478.4(a)(1) to explain that locomotive operator that holds sufficient ZE and SA deposit credits to offset their entire SA Funding Requirement would not need to establish a SA until such time as their SA Funding Requirement exceeds their available credits.

10. Staff revised subsection 2478.4(b) to modify the implementation date of the SA Funding Requirement from the July 1, 2024 to July 1, 2026 to be consistent with the change in the SA implementation date. This subsection was also modified to include a statement explaining that the SA Funding Requirement is only necessary if an operator's SA Funding Requirement is greater than zero.

11. Staff modified subsection 2478.4(c) to provide additional details on the SA Funding Requirement.

12. Staff deleted the original subsection (e) from section 2478.4 to allow for grant funds to be used toward SA funding requirements. The intent of the regulation is to reduce emissions from locomotives; staff determined that disallowing grant funds did not align with the overall intent of the Regulation. This change was also necessary to better align SA implementation with the new subsection (h), described below, which provides credits against the SA funding requirements for qualifying purchases. It would be counterproductive and difficult to enforce if Operators could not use grant funds for such early purchases. Removal of this subsection renumbers subsequent subsections.

13. Staff revised subsection (f) of section 2478.4 to explain that the SA Funding Requirement is calculated using calendar years, which is a defined term.

14. Staff revised the equation in subsection of 2478.4(f)(1) to include the term Spending Account Calculation Per Locomotive for accuracy of the equation.

15. Staff deleted the original subsection 2478.4(h) to remove the per-Air-District-level reporting requirement, for the reasons described in #4, above.

16. Staff created a new subsection (h) in section 2478.4 to remove the need for operators to make a deposit in the SA account prior to using funds, to avoid the need to arbitrarily put in funds and withdraw them immediately for use. This change also avoids a perverse

incentive whereby operators might choose to delay purchase of cleaner technology in order to have it count toward their SA funding requirement. The new subsection outlines how operators may use early qualifying SA purchases to receive credit towards their SA funding requirement. Purchases of (zero emission [ZE]) ZE locomotives, ZE rail equipment, and ZE infrastructure will result in credit that can be banked for subsequent years to benefit early adopters of ZE rail technologies and those involved in critical pilot and demonstration projects needed for the advancement of ZE rail technologies. This addition aligns with the SA's intent, which is to encourage the early adoption of cleaner technologies.

17. Staff added subsection 2478.4(j) to allow operators to close their SA if it has a zero balance, but will need to reopen the SA if needed for a future deposit. Staff made this change to remove the need for operators to keep a SA open if there is no balance, which is a possibility given the new credit system introduced in subsection 2478.4(h).

18. Staff revised Subsection 2478.5(a)(2) to add subsection (C), which describes how locomotives older than 23 years, that meet the cleanest current United States Environmental Protection Agency Tier and emission standards, can continue to operate in some cases. Staff made this change because it is possible that under some circumstances an operator could have had to unnecessarily cease operation of a 23-yearold locomotive and replace it with operations from a newer locomotive of the same Tier.

19. Staff revised subsections 2478.5(b) and (c) to clarify that even with the addition of subsection 2478.5(a)(2)(C), locomotives older than 23 years will need to be operated in a ZE configuration while in California as required under the provisions of (b) and (c).

20. Staff revised subsections 2478.5(b)(1) and (c)(1) to add that CARB intends on reviewing safety improvements needed for the operations of ZE as part of the 2027 and 2032 assessments on the progress made in ZE locomotive and ZE rail equipment technologies.

21. Staff deleted the original subsection 2478.6(a)(4) Notice of Deficiency to streamline the extension review process. A notice of disapproval indicating the reasons for disapproval serves the same purpose as a notice of deficiency.

22. Staff deleted subsection 2478.6(a)(5) Notice of Approval or Disapproval and replaced it with two new subsections: (a)(4), which describes the approvals process, and (a)(5) which describes the disapproval process. This change was necessary to streamline the extension review process. A notice of disapproval indicating the reasons for disapproval serves the same purpose as a notice of deficiency. In all cases, Operators are free to re-apply after receiving a notice of disapproval if they so choose.

23. In subsection 2478.6(b)(1)(C) and (2)(C), staff removed the word "timely" and instead used "in the 12 months preceding." This change provides more transparency on the requirements operators must meet.

24. In subsection 2478.6(b)(3), staff added the word "business," indicating that an Operator must submit an application for a compliance extension at least 90 business days prior to the requested start date. This is needed to provide the Executive Officer with sufficient time to review the application in all cases, and to clarify how the "90 days" are to be measured.

25. Staff deleted the original subsection 2478.7(f) Deficiency, to streamline the application process. A notice of disapproval indicating the reasons for disapproval serves the same purpose as a notice of deficiency.

26. Staff deleted subsection 2478.7(f)(2) and combined requirements with subsection 2478.7(f)(1) to simplify language.

27. Staff modified subsection 2478.7(g) to remove disapproval language and created subsection 2478.7(h) which describes the disapproval process. These changes were necessary to define specific approval and disapproval processes.

28. Staff added subsection 2478.7(i)(2)(D) to clarify that operators that do not comply with other applicable portions of the Regulation can have their Alternate Compliance Plan (ACP) revoked. Staff added this to indicate to operators that an ACP is valid only for the SA and/or IUOR and not Idling, Recordkeeping, Registration, or Reporting.

29. Staff deleted the original subsection 2478.8(f) Notice of Deficiency, to streamline the application process. A notice of disapproval indicating the reasons for disapproval serves the same purpose as a notice of deficiency.

30. Staff modified subsection 2478.8(g) to remove disapproval language and created subsection 2478.8(h) which describes the disapproval process. These changes were necessary to define specific approval and disapproval processes.

31. Staff revised 2478.8(j)(1)(A) from 2025 to 2026 to harmonize with other reporting deadlines.

32. Staff modified the language in subsection 2478.8(l) to remove disapproval language and created a new subsection 2478.8(m) which describes the disapproval process. These changes were necessary to define specific approval and disapproval processes.

33. Staff changed the implementation date for section 2478.10 from July 1, 2024, to July 1, 2026. This change was necessary because registration information is primarily required to monitor compliance and conduct enforcement in the event of a violation of the Regulation. Since the first SA deposit and first reports are not required until July 1, 2026, registration information is not necessary until July 1, 2026. Idling does not require individual locomotive information to be enforced.

34. Staff deleted subsections 2478.10(a)(2)(O) and (P). Staff deleted subsection (O) because it was duplicative of information already requested in section 2478.14. Staff deleted subsection (P) because staff has become aware some locomotives may not be able to provide this data.

35. Staff deleted subsection 2478.10(d) requiring a properly functioning MWh meter on locomotives because it is not necessary. Operators can calculate usage using fuel consumption in addition to having a MWh meter.

36. Staff changed the first reporting deadline from July 1, 2024, to July 1, 2026. This change was made to align reporting with the first SA deposit and SA reports, which are also now first due on July 1, 2026. While staff acknowledge that there would be value in obtaining earlier emission and idling reports, staff wished to streamline administration of the reporting requirements for both CARB and operators, and thus chose to keep a consistent start date for all reporting requirements.

37. Staff added language to subsection 2478.11(a)(6) to explain that the July 1, 2026, reporting deadline is the default, but that operators may be required to submit some reports sooner. Reporting related to flexibility options—exemptions, extensions, the alternative compliance plan, or the alternative fleet milestone—is tied to that specific option selected by the operator. Thus, a specific report may be required before July 1, 2026, if the operator chooses to apply for a specific flexibility option.

38. Staff deleted subsection 2478.11(b)(2)(A) because it is duplicative of information already provided in the definition of usage.

39. Staff deleted subsection 2478.11(b)(3) because engine hours are not necessary to determine compliance and to reduce reporting burden on operators.

40. Staff revised subsection 2478.11(c) to include the reporting requirements for the newly developed SA Deposit Credit. This includes information that is necessary to verify credit amounts such as receipts for locomotives, contract documents showing pilots and demonstration costs, and proof of deliveries for purchased equipment.

41. Staff revised subsection 2478.11(d)(1) to explain total MWhs since the original build date is only necessary when requesting to operate for longer than 23 years as allowed under section 2578.5(a)(2)(A).

42. Staff revised language in subsection 2478.11(e)(7) to remove language in parentheses which was unnecessary and redundant.

43. Staff revised subsection 2478.11(h) to remove duplicative requests for information and to include a requirement for gross annual revenue, which is needed for CARB to verify that a business has stayed below the revenue threshold for a Small Business Hardship Extension.

44. Staff changed the implementation date for subsection 2478.12(a) from July 1, 2024, to July 1, 2026. This change was required to align with the new implementation dates for the SA, Registration, and Reporting requirements.

45. Staff deleted the original subsection 2478.13(d) Notice of Deficiency to streamline the review process. Staff believes a notice of disapproval indicating the reasons for disapproval serves the same purpose as a notice of deficiency. Additionally, staff revised subsections (d)–(e) to make all application processes for the Regulation consistent.

46. Staff deleted subsection (e) of 2478.14 because it was duplicative.

47. Staff revised subsections 2478.14(f)–(h) to streamline the review process and make it consistent with all other Regulation application processes.

48. Staff revised subsection 2478.14(h)(2)(A) to clarify what requirements fall under section 2478.14(a)(1).

49. Staff revised subsection 2478.14(h)(2)(B) and subsection 2478.14(h)(2)(C) to more clearly explain the other requirements of the Regulation that will need to be fulfilled to prevent a revocation.

50. Staff revised subsection 2478.16(c)(4) to specify that, when assessing penalties for violation of the AFMO, the Executive Officer shall account for the statutory factors that CARB is directed to consider under Health & Safety Code § 42403(b).

51. Staff revised section 2478.17 to shorten and simplify the severability provisions.

E. Updates to the Emission Reduction Analysis as a Result of Second 15-Day Changes

Staff determined no updates to the emissions analysis from the modifications included in the second 15-day (second 15-day changes) on August 8, 2023, were needed to reflect emissions benefits from adopting the Regulation because of minimal emissions impacts.

The changes may increase emissions from 2024–2030 by up to one percent for PM, NOx, and GHGs compared to the emission reductions projected in the first 15-day changes. This slight increase is due to the postponement of Spending Account funding requirements from 2024 to 2026. The updated analysis does not alter the determinations that alternatives should still be rejected.

F. Updates to the Cost Analysis as a Result of Second 15-Day Changes

CARB staff expect that the second 15-day changes will have negligible impact on the total costs of the Regulation but may affect the year-over-year costs found in the Standardized Regulatory Impact Assessment due to the delay of the implementation dates for the SA, Registration, Reporting and Administrative Payment requirements.

G. Non-substantial Modifications

1. After the April 27, 2023, Board Hearing

The non-substantial modifications described below clarify and do not materially alter the requirements, rights, responsibilities, conditions, or prescriptions contained in the Proposed In-Use Locomotive Regulation, as approved for adoption by CARB. (See Cal. Code Regs., tit. 1, § 40). After the April 27, 2023, board hearing, the following non-substantial modifications were made to the Final Regulation Order:

Throughout the Regulation:

- Unavoidable subsection numbering adjustments have been automatically updated to reflect all modifications made to the regulatory language and are not implicitly listed.
- In subsections 2478.4(c), 2478.4(f)(1), 2478.4(f)(2), 2478.4(g)(5), 2478.11(c)(2), and 2478.11(c)(3), capitalized “funding requirement” to improve clarity.
- In subsections 2478.6(a)(3)(A), 2478.6(b)(4)(A), 2478.7(d)(1), 2478.8(e)(1), 2478.10(a)(1)(A), 2478.11(c)(1), 2478.11(e)(1) and 2478.13(c)(1), removed “company” for conciseness.
- In subsections 2478.4(c), 2478.4(g)(4), 2478.11(c)(8)(A)(4), 2478.11(c)(9), and 2478.16(c)(4), updated subsection references due to changes in numbering within section 2478.4.
- In subsections 2478.4(b), 2478.4(g)(3)(B)(2), 2478.4(g)(4), 2478.4(i), 2478.7(b)(1)(A), 2478.8(j)(2), 2478.11(c)(2), 2478.11(c)(3), 2478.11(c)(5), 2478.11(c)(8), 2478.11(c)(8)(B),

2478.11(d)(2), 2478.11(g)(2), and 2478.12(b), replaced "previous" with "immediately preceding" for clarity.

- In subsections 2478.4(f), 2478.11(a)(5), 2478.11(c)(8)(A), 2478.11(e)(2), 2478.11(e)(3), 2478.11(e)(4), 2478.11(f)(1)(C), and 2478.11(g)(1), replaced "prior" with "immediately preceding" for clarity. In subsections 2478.11(c)(7), replaced "prior to" with "immediately preceding" for clarity.

1. Section 2478
   - Replaced "Section" with "Sections."
   - Corrected the NOTE: Authority cited to change italicized letter "s."
2. Section 2478.1
   - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
3. Section 2478.2
   - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
4. Section 2478.3
   - Added ".1" to specify more clearly what sections definitions apply to.
   - Capitalized lists in the definition of "Person."
   - Removed unnecessary comma in the "Spending Account" definition.
   - Replaced "accurately" with "accurate" in the definition of "Verifiable Emission Reductions."
   - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
5. Section 2478.4
   - In 2478.4(a), moved the placement of the word "instead" to improve readability and deleted unnecessary "2478.4."
   - In 2478.4(b), added "deposited."
   - In 2478.4(c), updated "using the total per Locomotive funding requirement as set forth in subsection (g) and" to "from the total Spending Account Calculation, as set forth in subsection (f), for an Operator's Locomotive fleet" for clarity and consistency.
   - In 2478.4(d)(3), added parentheses added for consistency with previous subsections.
   - In 2478.4(f), removed reference to the effective date. Replaced "the funding requirement" with "the Spending Account Calculation Per Locomotive."
   - In 2478.4(f)(3), used the abbreviation for emission factor.
   - In 2478.4(f)(5), Table 2, removed the rows for 2023 and 2024 because they were no longer necessary.
   - Removed 2478.4(f)(6) because it was redundant to language in section 2478.3.
   - In 2478.4(g), replaced "the effective date of this Locomotive Regulation" with "January 1, 2024" for clarity. Replaced "deposit" with "Funding Requirement" for consistency. Added a comma after "Wayside Power."
   - In 2478.4(g)(2), updated ZE credits reporting start date to from 2024 to 2026.
   - In 2478.4(g)(3), replaced pictured formula for better image resolution.
   - In 2478.4(g)(3)(B)(1), replaced "The total MWh operated in California for the previous Calendar Year" with "Usage as defined in section 2478.3" for conciseness and rearranged the provision's syntax for readability.
   - In 2478.4(g)(4), capitalized "credit."

- In 2478.4(g)(5), capitalized "credits" and "credit."
- In 2478.4(g)(7), inserted "ZE" before "Credits" for clarity.
- In 2478.4(i), removed "2478.4" because it was unnecessary.
- In the authority cited, added "and" for grammar and capitalized "sections" for consistency.

6. Section 2478.5
   - In 2478.5(a)(2)(B) added "or" and removed period in list.
   - In 2478.5(d), removed parentheses and "2478.5" because they were unnecessary. Added "in" and a comma for clarity.
   - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
7. Section 2478.6
   - In 2478.6(a)(1)(A), added "(a)" before "(3)" for clarity.
   - In 2478.6(a)(1)(C), added "(a)(1)" before "(D)" for clarity.
   - In 2478.6(a)(2)(A), added "(a)" before "(3)" for clarity.
   - In 2478.6(b)(1)(A), added "(b)" before "(4)" for clarity.
   - In 2478.6(b)(2), removed "in this Locomotive Regulation" because it was unnecessary. Deleted "ninety" and parentheses for consistency.
   - In 2478.6(b)(2)(A), added "(b)" before "(4)" for clarity.
   - In 2478.6(b)(3), removed "in this Locomotive Regulation" because it was unnecessary.
   - In 2478.6(b)(3)(A), added "(b)" before "(4)" for clarity.
   - In 2478.6(b)(4)(B) and 2478.6(b)(4)(G), added commas for grammar.
   - Deleted the original subsection 2478.6(b)(5) Notice of Deficiency.
   - Deleted 2478.6(b)(6) Notice of Approval or Disapproval and replaced it with two new subsections: (b)(6), which describes the approvals process, and (b)(7) which describes the disapproval process.
   - In 2478.6(b)(8), removed "2478.6" because it was unnecessary.
   - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
8. Section 2478.7
   - In 2478.7(a), removed "2478.7" because it was unnecessary.
   - In 2478.7(b)(1)(A), deleted "in MWh" to remove redundancy.
   - In 2478.7(b)(1)(B), added "(b)(1)" in front of "(A)" for clarity.
   - In 2478.7(b)(2)(A), replaced "funding obligation" with "Spending Account Funding Requirement" for consistency.
   - In 2478.7(b)(2)(B), removed the plural "s" from "Locomotives."
   - In 2478.7(b)(2)(C), added "A" and removed the plural "s" from "Locomotives" for consistency.
   - In 2478.7(b)(3)(C), removed typographical error at the end of the sentence.
   - In 2478.7(c), removed "(c)" because it was unnecessary.
   - In 2478.7(d)(2), removed "(section 2478.4)" and "(section 2478.5)" because they were unnecessary.
   - In 2478.7(d)(3)(E), capitalized "emission reductions."
   - In 2478.7(g), corrected "as" to "has" and replaced "calendar" with "business" for consistency with other submission requirements in the Regulation.

- In 2478.7(h)(2), removed "(section 2478.4)" and "(section 2478.5)" because they were unnecessary.
- In 2478.7(i)(2)(A), added "any of" before "the requirements" for clarity and removed "2478.7" because it was unnecessary.
- In 2478.7(i)(2)(B), added "any of" before "the requirements" for clarity.
- In 2478.7(j)(2), added "this" and removed "2478.7" for conciseness.
- In the authority cited, added "and" for grammar and capitalized "sections" for consistency.

9. Section 2478.8
   - In 2478.8(c)(1) through 2478.8(c)(5), added "of Usage" in order to reference the "Usage" definition in section 2478.3, for clarity.
   - In 2478.8(c)(5), added "(c)" before "(1)" and "(4)" for clarity. Deleted "one" for conciseness and added "in California" for clarity.
   - In 2478.8(e), removed extra "the."
   - In 2478.8(e)(3), replaced "Fleet" with "fleet."
   - In 2478.8(g), corrected "as" to "has" and replaced "calendar" with "business" for consistency with other submission requirements in the Regulation.
   - In 2478.8(j)(2)(B), replaced "have" with "has" and "are" with "is."
   - In 2478.8(l), replaced "calendar" with "business" for consistency with other submission requirements in the Regulation.
   - In 2478.8(n)(2), removed unnecessary reference to "2478.8."
   - In 2478.8(n)(3), removed unnecessary reference to "2478.8."
   - In 2478.8(o)(1)(A), added "any of" before "the requirements" for clarity.
   - In 2478.8(o)(1)(B), removed unnecessary reference to "2478.8."
   - In 2478.8(o)(1)(E), added "any" before "other applicable Requirements" for clarity. Staff added ", Registration," for consistency with other provisions in the Regulation.
10. Section 2478.9
    - In 2478.9(e), removed "2478.9" because it was unnecessary.
    - In the authority cited, added "and" for grammar and capitalized "sections" for consistency and corrected typographical error.
11. Section 2478.10
    - In 2478.10(1), removed redundant portion of the sentence.
    - In 2478.10(a)(2), moved up the original subsection (Q) by two letters for continuity after substantial modifications.
    - In 2478.10(a)(2)(O), replaced "Locomotive operators shall submit photographic" with "Photographic" for grammar.
    - In 2478.10(b), updated subsection references to account for the removal of the original subsections 2478.10(a)(2)(O) and 2478.10(a)(2)(P).
    - In 2478.10(c), added "calendar" to clarify submittal timeline requirements. Updated "2024" to "2026" and added a comma to be consistent with the new registration implementation date.
    - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
12. Section 2478.11
    - In 2478.11(a)(1), deleted "unless another timeframe is provided herein" because it is unnecessary language.
    - In 2478.11(a)(3), corrected grammar.

- In 2478.11(a)(5), deleted "Unless otherwise specified," because it is unnecessary language and capitalized "the" for grammar.
- In 2478.11(a)(6), deleted "Unless otherwise specified," because it is unnecessary language and capitalized "the" for grammar.
- In 2478.11(b), shifted the original subsection (4) up one number for continuity after substantial modifications.
- In 2478.11(b), deleted "name or company" to remove redundancy.
- In 2478.11(b)(2), changed the requirement to report usage so that it is reported for all California operations instead of by Air District. Added "immediately preceding" for clarity.
- In 2478.11(c), shifted the original subsections (4) through (7) down by two numbers for continuity after substantial modifications.
- In 2478.11(c)(5), replaced a comma with a period for grammar.
- In 2478.11(c)(6)(A), replaced a semicolon with a period for grammar.
- In 2478.11(c)(7), replaced a semicolon with a period.
- In 2478.11(c)(6)(B), deleted "and" and replaced a semicolon with a period for grammar.
- In 2478.11(c)(8)(A)(3) and 2478.11(f)(1)(C), replaced "Total MWhs Operated" with "Usage" for conciseness.
- In 2478.11(c)(8)(A)(3), changed the requirement to report usage so that it is reported for all California operations instead of by Air District.
- In 2478.11(d)(2)(A) and 2478.11(d)(2)(B), replaced "The total MWh of Operation" with "Usage" to be more concise.
- In 2478.11(d)(2)(B), changed the requirement to report usage so that it is reported for all California operations instead of by Air District.
- In 2478.11(e)(7), removed "that is" because it was unnecessary.
- In 2478.11(f)(3), removed "2478.11" because it was unnecessary.
- In the authority cited, added "and" for grammar and capitalized "sections" for consistency.

13. Section 2478.12
    - In 2478.12(a), removed "2478.12" because it was unnecessary.
    - In 2478.12(c), added "subsection" before "(a)" for clarity.
    - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
14. Section 2478.13
    - Added subsection 2478.13(f) to describe the disapproval process consistent with all other Regulation application processes.
    - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.
15. Section 2478.14
    - In 2478.14(a), removed "of an average" for clarity.
    - In 2478.14(c)(2) corrected grammar.
    - In 2478.14(d)(1), replaced "prior to" with "preceding" for clarity.
    - In 2478.14(f)(1)(A), replaced "funding obligation under the Spending Account section" with "Spending Account Funding Requirement" for consistency.
    - In 2478.14(h)(3), replaced "calendar" with "business" for consistency with other regulatory timelines.

- In the authority cited, added "and" for grammar and capitalized "sections" for consistency.

16. Section 2478.15
    - In 2478.15(b), corrected "section" with "Locomotive Regulation" for clarity.
    - In the authority cited, added "and" for grammar and capitalized "sections" for consistency. Removed "; 2015.5, Code of Civil Procedure" as it was not a correct reference.
17. Section 2478.16
    - In 2478.16(a)(3), added "of any requirement" for clarity.
    - In 2478.16(c), change font to not be italicized.
    - In 2478.16(c)(4), added "Spending Account" before "Funding Requirement" for consistency.
    - In the authority cited, added "and" for grammar and capitalized "sections" for consistency. Added a missing reference to section 42403, Health and Safety Code.
18. Section 2478.17
    - In the authority cited, added "and" for grammar and capitalized "sections" for consistency.

2. After the September 15, 2023, Resubmittal to the Office of Administrative Law

The non-substantial modifications described below clarify and do not materially alter the requirements, rights, responsibilities, conditions, or prescriptions contained in the Proposed In-Use Locomotive Regulation, as approved for adoption by CARB. (See Cal. Code Regs., tit. 1, § 40). After the September 15, 2023, resubmittal to OAL, the following non-substantial modifications were made to the Final Regulation Order:

- In section 2478.3, removed ".1" to improve consistency.
- In subsection 2478.6(b)(1), added "Locomotive" prior to "Operator." This change was made throughout the regulation order for consistency.
- In subsection 2478.7(a), added "section" for consistency.
- In section 2478.8, moved from subsection (l) to subsection (m) the sentence "If the Detailed Timeline Report is disapproved, the Locomotive Operator may resubmit an amended Detailed Timeline Report." This modification was made to improve organization.
- In subsection 2478.8(m), corrected the phrase "an AFMO application" to "a Detailed Timeline Report" for consistency.
- In subsection 2478.14(f), replaced "business" with "calendar" for consistency with language in the second 15-day changes.

III. Reference Corrections

A. Initial Statement of Reasons

143. Cal. Code Regs., tit. 13, § 2449 et seq.; CARB, Final Regulation Order, In-Use Off-Road Diesel-Fueled Fleets, 2011. (weblink: https://ww2.arb.ca.gov/sites/default/files/classic/msprog/ordiesel/documents/finalregorderdec2011.pdf).

The publish date was corrected. The information relied upon has not changed.

145. Cal. Code Regs., tit. 13, § 2449 et seq.; CARB, Final Regulation Order, In-Use Off-Road Diesel-Fueled Fleets, 2011. (weblink: *https://www.ecfr.gov/current/title-40/chapter-I/subchapter-U/part-1033/subpart-J/section-1033.901*).

The publish date was corrected. The reference format was updated to be consistent with reference 143, which is the same document. The information relied upon has not changed.

202. Office of Environmental Health Hazard Assessment, CalEnviroScreen 4.0, October 20, 2021, accessed July 20, 2022. (weblink: https://oehha.ca.gov/calenviroscreen/report/calenviroscreen-40).

The access date was corrected. The information relied upon has not changed.

B. Appendix D, Attachment A: Environmental and Regulatory Setting

7. Ibid.

The reference was corrected such that it referenced the preceding Footnote 6. Previously, the reference incorrectly referred to the same document as Footnote 29. The information relied upon has not changed.

29. California Department of Fish and Wildlife, Summary of Natural Community Conservation Plans, June 2021.

The publish date was corrected. The information relied upon has not changed.

C. Second Notice of Public Availability of Modified Text and Availability of Additional Documents and Information

9. Casey, Tina, Wabtec Sends Electric Train Love Letter To World's Largest Iron Mine, CleanTechnica, accessed July 17, 2023. (weblink: *https://cleantechnica.com/2023/07/17/wabtec-sends-electric-train-love-letter-to-worlds-largest-iron-mine/*)

The access date was corrected. The information relied upon has not changed.

IV. Summary of Comments and Agency Response

Written comments were received during the 45-day comment period in response to the November 18, 2022, public hearing notice, and written and oral comments were presented at the Board Hearing. Listed below are the organizations and individuals that provided comments during the 45-day comment period:

Table 1. Written Comments Received During the 45-Day Comment Period

Commenter, Date	Affiliation	Commenter Code
Gene Kostruba, 09-23-2022	General Public	45-1

Commenter, Date	Affiliation	Commenter Code
Daniel Rice, 10-10-2022	Western Milling	45-2
Jed A. Hendrickson, 10-15-2022	General Public	45-3
Judith Johnson, 10-18-2022	General Public	45-4
Joseph Denton, 10-29-2022	General Public	45-5
Timothy French, 11-02-2022	Truck & Engine Manufacturers Association	45-6
Jay Fuhrman, 11-03-2022	LA Metro	45-7
Tracy Alves, 11-04-2022	Modesto and Empire Traction Company	45-8
Mariela Ruacho, 11-04-2022	American Lung Association	45-9
Jeffrey Dunn, 11-04-2022	Metrolink	45-10
Michael Pimentel, 11-07-2022	California Transit Association	45-11
Alex Khalfin, 11-04-2022	Amtrak	45-12
David Schonbrunn, 11-06-2022	Train Riders Association of California	45-13
Carter Glenn, 11-07-2022	Cornerstone Systems, Inc.	45-14
Brian Schmidt, 11-07-2022	San Joaquin Joint Powers Authority	45-15
Mary Dover, 11-07-2022	North County Transit District	45-16
Raymond W. Wolfe, 11-07-2022	San Bernardino County Transportation Authority	45-17
Darrin Peschka, 11-07-2022	Ventura County Transportation Commission	45-18
Anthony Molina, 11-07-2022	California Grain and Feed Association	45-19
Oscar Garcia, 11-07-2022	Neste	45-20
Yasmine Agelidis, 11-07-2022	Earthjustice	45-21
Nathan Crum, 11-07-2022	Valley Pacific	45-22
Theresa Romanosky, 11-07-2022	Association of American Railroads	45-23

Commenter, Date	Affiliation	Commenter Code
Alexis Leicht, 11-07-2022	Orange County Transit District	45-24
Paul Beard, 11-07-2022	FisherBroyles for the California Short Line Railroad Association	45-25
Devon Ryan, 11-07-2022	Peninsula Corridor Joint Powers Board	45-26
Yasmine Agelidis, 11-07-2022*	Earthjustice*	45-27* (Duplicate to 45-21)
Jennifer Shea, 11-07-2022	Wabtec Corporation	45-28
Heidi Swillinger, 11-07-2022	General Public	45-29
Joanne Parker, 11-07-2022	Sonoma-Marin Area Rail Transit	45-30
Sarah Yurasko, 11-07-2022	American Short Line and Regional Railroad Association	45-31
Graham Noyes, 11-07-2022	Noyes Law Corporation for Sierra Railroad	45-32
Steve Roberts, 11-07-2022	Rail Passenger Association of California and Nevada	45-33
Scott Myers, 11-07-2022	OptiFuel Systems LLC	45-34
Richard Chapman, 11-07-2022	Kern Economic Development Corporation	45-35
Andrew Sall, 11-07-2022	Riverside County Transportation Commission	45-36
Mark Twain, 11-07-2022	n/a	45-37
Lisa Colicchio, 11-08-2022	Metrolink	45-38

Table 2. Comments posted that were presented during the Hearing and Oral Comment Presented at the November 18, 2022, Board Hearing*

Commenter, Date	Affiliation	Commenter Code
Mike Hart, 11-18-2022	Sierra Energy	BH1-OT-1
Graham Noyes, 11-18-2022	Noyes Law Corporation for Sierra Railroad	BH1-OT-2 and BH1-1
Eddy Cumins, 11-18-2022	Sonoma Marin Area Rail Transit	BH1-OT-3

Commenter, Date	Affiliation	Commenter Code
Michael J. Rush, 11-18-2022	Association of American Railroads	BH1-OT-4
Lena Kent, 11-18-2022	BNSF Railway Company	BH1-OT-5
Lupe C. Valdez, 11-18-2022	Union Pacific	BH1-OT-6
Chuck Baker, 11-18-2022	American Short Line and Regional Railroad Association	BH1-OT-7 and BH1-2
Donald G. Norton, 11-18-2022	California Short Line Railroad Association	BH1-OT-8
Kennan H. Beard III., 11-18-2022	Sierra Northern Railway	BH1-OT-9
Andrew Antwich, 11-18-2022	Shaw, Yoder, Antwih, Schmelzer & Lange	BH1-OT-10
Matt Robinson, 11-18-2022	CA Transit Association	BH1-OT-11
Chris Orlando, 11-18-2022	North County Transit District	BH1-OT-12
Jan Victor Andasan, 11-18-2022	East Yard Communities for Environmental Justice	BH1-OT-13
Andrea Vidaurre, 11-18-2022	Peoples Collective for Environmental Justice	BH1-OT-14
Ma Carmen Gonzalez, 11-18-2022	Peoples Collective for Environmental Justice	BH1-OT-15
Yasmine Agelidis, 11-18-2022	Earthjustice	BH1-OT-16
Yassi Kavezade, 11-18-2022	Sierra Club	BH1-OT-17
Marcos Lopez, 11-18-2022	East Yard Communities	BH1-OT-18
Gem Montes, 11-18-2022	The Air I Breathe	BH1-OT-19
Benjamin Luna, 11-18-2022	Community	BH1-OT-20
Charlotte Mourad, 11-18-2022	Peoples Collective for Environmental Justice	BH1-OT-21
William Barret, 11-18-2022	American Lung Association	BH1-OT-22
Angie Balderas, 11-18-2022	Sierra Club	BH1-OT-23

Commenter, Date	Affiliation	Commenter Code
Bill Magavern, 11-18-2022	Coalition for Clean Air	BH1-OT-24
Daniel Barad, 11-18-2022	Sierra Club California	BH1-OT-25
Ian MacMillian, 11-18-2022	South Coast Air Quality Management District	BH1-OT-26
Adrian Rizzo, 11-18-2022	Common Ground California	BH1-OT-27
Cynthia Pinto-Cabrera, 11-18-2022	Central Valley Air Quality Coalition	BH1-OT-28
Teresa Bui, 11-18-2022	Pacific Environment	BH1-OT-29
Tracy Alves, 11-18-2022	Modesto and Empire M&ET	BH1-OT-30
Mark Mollineaux, 11-18-2022	Self	BH1-OT-31
Anthony Molina, 11-18-2022	California Grain and Feed Association	BH1-OT-32
Jason Jewell, 11-18-2022	Amtrak JPAs	BH1-OT-33
Mark Twain, 11-18-2022	Locomotive Emission Watchdogs	BH1-OT-34
Christopher Chavez, 11-18-2022	Coalition for Clean Air	BH1-OT-35
Steve Birdlebough, 11-18-2022	Self	BH1-OT-36
Marven Norman, 11-18-2022	Center for Community Action and Environmental Justice	BH1-OT-37
Beverly DesChaux, 11-18-2022	Electric Vehicle Association of California Central Coast	BH1-OT-38
Brian Yanity, 11-18-2022	Self	BH1-OT-39
Oscar Garcia, 11-18-2022	Neste	BH1-OT-40
Devon Ryan, 11-18-2022	Caltrain	BH1-OT-41
Bianca Lopez, 11-18-2022	Self	BH1-OT-42
Dave Cook, 11-18-2022	Rail Propulsion Systems	BH1-OT-43 and BH1-8
Gary Starre, 11-18-2022	Southern California Railway Museum	BH1-3

Commenter, Date	Affiliation	Commenter Code
Marty Westland, 11-18-2022	Carson and Colorado Railway	BH1-4
Robert Winn, 11-18-2022	Southern California Railway Museum	BH1-5
Sarah Yurasko, 11-18-2022	American Short Line and Regional Railroad Association	BH1-7

* BH6 was posted then deleted because it was unrelated to the Board item or it was a duplicate.

Table 3. Written Comments Received During the First 15-Day Comment Period

Commenter, Date	Affiliation	Commenter Code
Tandy Hill, 3-2-2023	Self	15-1
Richard C. Kellogg, Jr., 3-9-23	Pioneer Partners	15-2
Rob Spiegel, 3-15-23	California Manufacturers & Technology Association (CMTA)	15-3
Marty Westland, 3-15-23	Carson and Colorado Railway	15-4
Anthony Molina, 3-15-23	California Grain and Feed Association	15-5
Will Barrett, 3-15-23	American Lung Association	15-6
Devon Ryan, 3-15-23	Caltrain	15-7
Graham Noyes, 3-15-23	Sierra Northern Railway	15-8
Yasmine Agelidis, 3-15-23	Earthjustice	15-9
Sarah Yurasko, 3-15-23	American Short Line and Regional Railroad Association	15-10
Mark Twain, 3-15-23	Self	15-11
Michael Pimentel, 3-15-23	California Transit Association	15-12
Jeffrey Dunn, 3-15-23	Metrolink	15-13

Table 4: Comments posted that were presented during the Hearing and Oral Comment Presented at the April 27, 2023, Board Hearing

Commenter, Date	Affiliation	Commenter Code
William Barrett, 4-27-2023	American Lung Association	BH2-1
Graham Noyes, 4-27-23	Sierra Northern Railway	BH2-2
Nanette Diaz Barragán, 4-27-23	Member of Congress	BH2-3
Krystyna Kubran, 4-27-23	352 Innovation, LLC	BH2-4
Jessica Fleming, 4-27-23	Self	BH2-5
Kevin Hamilton, 4-27-23	Central California Asthma Collaborative	BH2-6
Devon Ryan, 4-27-23	Caltrain	BH2-7
Abby Swaine	EPA	BH2-1Zoom
Matthew Meyers	Self	BH2-2Zoom
Yasmine Agelidis, 4-27-2023	Earthjustice	BH2-OT-1
Cecilia Garibay, 4-27-2023	Moving Forward Network	BH2-OT-2
Cindy Donis, 4-27-2023	East Yard Communities for Environmental Justice	BH2-OT-3
Jocelyn Del Real, 4-27-2023	East Yard Communities for Environmental Justice	BH2-OT-4
Maravilla Guiles, 4-27-2023	Sierra Club	BH2-OT-5
Leonardo Penaloza, 4-27-2023	PC4EJ	BH2-OT-6
Gema Pena-Zaragoza, 4-27-2023	Sierra Club	BH2-OT-7
Julieta Fuentes, 4-27-2023	Warehouse Workers	BH2-OT-8
Adrian Guerrero, 4-27-2023	Union Pacific Railroad	BH2-OT-9
Jose Avalos, 4-27-2023	PCES	BH2-OT-10
Gem Montes, 4-27-2023	The Air I Breathe	BH2-OT-11

Commenter, Date	Affiliation	Commenter Code
Andrea Vidor, 4-27-2023	PCEJ	BH2-OT-12
Jamila Cervantes, 4-27-2023	East Yard Communities for Environmental Justice	BH2-OT-13
Noemi Bueno, 4-27-2023	PC4EJ	BH2-OT-14
Ivette Torres, 4-27-2023	PC4EJ	BH2-OT-15
Jennifer Cardenas, 4-27-2023	Sierra Club	BH2-OT-16
Josue Emmanuel Munoz, 4-27-2023	Sierra Club	BH2-OT-17
Vanessa Villanueva, 4-27-2023	Sierra Club	BH2-OT-18
Alberto Leon, 4-27-2023	People's Collective for Environmental Justice	BH2-OT-19
Graham Noyes, 4-27-2023	Sierra Northern Railway	BH2-OT-20
Benjamin Luna, 4-27-2023	PCES	BH2-OT-21
Heather Kryczka, 4-27-2023	NRDC	BH2-OT-22
Ma Carmen Gonzalez, 4-27-2023	PCEJ	BH2-OT-23
Angie Balderas, 4-27-2023	Sierra Club	BH2-OT-24
Christina Scaringe, 4-27-2023	Center for Biological Diversity	BH2-OT-25
Maria Arenas, 4-27-2023	No affiliation given	BH2-OT-26
Mariela Ruacho, 4-27-2023	American Lung Assoc.	BH2-OT-27
Jan Victor Andasan, 4-27-2023	East Yard	BH2-OT-28
Whitney Amaya, 4-27-2023	Coalition for Clean Air	BH2-OT-29
Bill Magavern, 4-27-2023	Coalition for Clean Air	BH2-OT-30
Sam Wilson, 4-27-2023	Union of Concerned Scientists	BH2-OT-31
Matt Robinson, 4-27-2023	CA Transit Assoc.	BH2-OT-32

Commenter, Date	Affiliation	Commenter Code
Elain Shen, 4-27-2023	SCAQMD	BH2-OT-33
Cynthia Pinto Cabrera, 4-27-2023	Central Valley	BH2-OT-34
Andrew K. Antwih, 4-27-2023	Metrolink	BH2-OT-35
Teresa Bui, 4-27-2023	Pacific Environment	BH2-OT-36
Dennis Albiani, 4-27-2023	CA Grain & Feed	BH2-OT-37
Joel Ervice, 4-27-2023	Regional Asthma Management and Prevention Program	BH2-OT-38
Christopher Chavez, 4-27-2023	Coalition for Clean Air	BH2-OT-39
Brian Yanity, 4-27-2023	Self	BH2-OT-40
Woody Hastings, 4-27-2023	Climate Center	BH2-OT-41

Table 5: Written Comments Received During the Second 15 Day Comment Period

Commenter, Date	Affiliation	Commenter Code
Jeffery Dunn, 8-22-2023	Metrolink	15-2-1
Bradley Dias, 8-22-2023	Self	15-2-2
Theresa Romanosky, 8-23-2023	Association of America Railroads	15-2-3
Robert S. Nicksin, 8-23-2023	Law Office of Robert S. Nicksin	15-2-4
Devon Ryan, 8-23-2023	Caltrain	15-2-5
Yasmine Agelidis, 8-23-2023	Earthjustice	15-2-6
Sarah Yurasko, 8-23-2023	ASLRRA and CSLRA	15-2-7

A. Comment Summaries and Reponses

A summary of comments on the Proposed Regulation received during the initial 45-day, subsequent 15-day comment periods, and at the first and second Board Hearings are categorized and listed by commenter code. Multiple part comments have been separated into individual comments and categorized based on subject matter.

1. Comments in Support

CARB received broad support from a range of organizations, locomotive operators, and community members. The following comments support the objectives and goals of the In-Use Locomotive Regulation: 45-1-1, 45-4-1, 45-5-1, 45-9, 45-21-1, 45-21-6, 45-29-1, BH1-OT-16-1, BH1-OT-16-2, BH1-OT-20-1, BH1-OT-22-2, BH1-OT-22-3, BH1-OT-24-1, BH1-OT-25-1, BH1-OT-26-1, BH1-OT-27-1, BH1-OT-28-1, BH1-OT-28-2, BH1-OT-29-1, BH1-OT-35-1, BH1-OT-37-1, 15-2, 15-6-1, 15-9-1, 15-12-1, 15-13-1, 15-13-2, BH2-1, BH2-3, BH2-5-1, BH2-6, BH2-7-1, BH2-1Zoom, BH2-OT-1, BH2-OT-6, BH2-OT-7, BH2-OT-10, BH2-OT-11, BH2-OT-12, BH2-OT-16, BH2-OT-17, BH2-OT-18, BH2-OT-19, BH2-OT-21, BH2-OT-22, BH2-OT-24, BH2-OT-126, BH2-OT-27, BH2-OT-30, BH2-OT-31, BH2-OT-32, BH2-OT-33, BH2-OT-38, BH2-OT-39, BH2-OT-41, 15-2-1, and 15-2-5.

> **Agency Response:** No changes were made in response to comments in support of the process, public engagement, or actions in the rulemaking. Staff appreciates the supportive comments.

2. Requests to Strengthen the Proposed Regulation

Several comments requested staff to consider strengthening the Proposed Regulation in three ways: 1) Require ZE switchers operate in California by 2027; 2) Include interim ZE deadlines to ensure operators are making necessary steps to transition to ZE operation; and 3) Reduce idling to no more than 15 minutes. The following comments requested one or more of the changes listed above: 45-5-2, 45-9-1, 45-21-2, 45-21-3, BH1-OT-13-1, BH1-OT-14-1, BH1-OT-15-1, BH1-OT-15-2, BH1-OT-16-3, BH1-OT-16-4, BH1-OT-17-1, BH1-OT-18-1, BH1-OT-21-1, BH1-OT-22-1, BH1-OT-25-2, BH1-OT-28-1, BH1-OT-29-2, 15-6-2, 15-9-4, BH2-5-2, BH2-OT-2, BH2-OT-3, BH2-OT-4, BH2-OT-5, BH2-OT-8, BH2-OT-13, BH2-OT-14, BH2-OT-15, BH2-OT-23, BH2-OT-25, BH2-OT-28, BH2-OT-29, BH2-OT-34, and BH2-OT-36.

> **Master Response 1**: No changes were made in response to these comments. As presented in ISOR Appendix F: Locomotive Technology Feasibility Assessment, research indicates operators may not be able to convert diesel locomotives to ZE operation on a large scale prior to the 2030 and 2035 start dates. To accelerate emission reductions to the greatest extent possible, should funding be available, CARB may continue to offer the regulated entities incentives for actions that create reductions that are surplus, early, or extra to the Proposed Regulation. The Proposed Regulation also includes assessments in 2027 and 2032 of the progress made in ZE locomotives, ZE rail equipment, and ZE infrastructure. If staff finds that the compliance deadlines under this Proposed Regulation need to be adjusted forward or backward in time, the report will include recommendations to initiate the development of potential formal regulatory amendments.
>
> While the Proposed Regulation anticipates that locomotive operators can comply by converting their existing diesel fleet to ZE operations without the purchase of new locomotives, the regulation does not preclude operators from purchasing new ZE locomotives if they so choose. Regardless, even if manufacturers were to voluntarily produce new ZE locomotives, staff anticipates that the quantities produced would may be insufficient to meet a start date prior to 2030/2035. As presented in ISOR Appendix F: Locomotive Technology Feasibility Assessment, ZE switchers may be

currently available for purchase, but research on deployment of ZE technologies indicates that equipment manufacturers may not be able to produce enough ZE equipment to meet a 2027 requirement or any other interim ZE deadline prior to the 2030 and 2035 start dates.

Regarding the request to reduce idling to no more than 15 minutes, CARB staff lacks sufficient data on the frequency of idling events that exceed 30 minutes, which would assist staff in determining if more stringent idling limits should be required. Staff will track reporting for idling and determine if additional amendments are necessary in the future, as directed by Regulatory Resolution 23-12.

a) Comment 45-5-2

Encourage CARB to consider the additional measure of even further scrutiny of these exercised exceptions to the idling limitations when the idling occurs within close proximity to residential properties. A rail operator claiming they need to maintain brake system functionality and idling a locomotive engine for 72 hours straight within 100 feet of my house may technically satisfy the federal regulations, but it does not mitigate the health risks imposed on my family.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 1. The reporting requirements of the Proposed Regulation specify that instances of idling over 30 minutes by locomotives equipped with Automatic Engine Stop/Start (AESS) must include a reason for each exceedance. In December 2020, the federal government increased the threshold that triggers a mandatory Class I brake test of a locomotive from four hours to twenty-four hours of the train being off-air. This update should substantially reduce instances where operators may claim they idled to maintain brake pressure.

b) Comment BH1-OT-19-1

We need your help. We need this rule to be put into place sooner than later. We can't hold our breath until the air is safe enough to breathe. Waiting for the railroads to do their part is not an option or we wouldn't be meeting here today.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 1. Staff agrees with the comment. The Proposed Regulation is anticipated to go into effect in the fall of 2023.

c) Comment BH1-OT-31-3

The main thread here is we have no excuses for not going to zero emissions at a much more just serious and fast timetable than we're proposing here, which will clean up our cities and just lead to a future that we need desperately. So thanks for your time.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 1.

d) Comment 15-2-6-1

We continue to strongly support the In-Use Locomotive Regulation, which will result in over 3,200 avoided premature deaths, 1,486 fewer emergency room visits, and almost $32 billion in health benefits. Yet we are extremely disappointed that the 15-day changes propose to delay implementation of this life-saving rule by two years. Frontline community members and advocates, many of whom are part of our organizations, have pushed tirelessly for decades to get relief from railyard toxic hotspots. We urge you to shift the timeline to the original start date.

Agency Response: No changes were made in response to this comment. The second 15-day changes resulted in a modest adjustment of the Regulation's effective date. The original effective date might have been as early as October 2023, depending on when the OAL process was complete; it has now been set to January 1, 2024. This will allow appropriate time for OAL to review the regulatory package. At most, this change could result in a three-month delay in the idling requirements. CARB staff do not anticipate this will result in a measurable increase in emissions, both because of the limited timeframe and because federal regulations specify a limit of 30 minutes for unnecessary idling.

The postponement of the first registration and reporting requirements from July 1, 2024, to July 1, 2026, will result in fifteen months less of data collected, which will not result in an increase in emissions and was changed to harmonize with the implementation date for the SA requirements. As stated in the Second 15-Day Notice, staff acknowledges that there would be value in obtaining earlier emission and idling reports, but wished to streamline administration of the reporting requirements for both CARB and operators, and thus chose to keep a consistent start date for reporting requirements.

Staff acknowledges that postponement of SA funding requirements from July 1, 2024, to July 1, 2026, may increase emissions from 2024–2030 by up to one percent for PM, NOx, and GHGs compared to the emission reductions projected in the first 15-day changes. As noted in the Second 15-Day Notice, this change was made largely considering the unprecedented amounts of locomotive and infrastructure funding that have recently become available. Some grant awards have recently been announced which will allow operators to acquire cleaner locomotive, and other grant processes are underway which may produce similar results. Operators who apply for and receive grants or other funding and use that funding for cleaner locomotives could reduce emissions more quickly than if they waited until they accumulated enough SA funds. Given the unprecedented amount of funding available, and the potential for that funding to result in earlier emission reductions, CARB staff concluded that operators should have more time to pursue these funds, plan for their use, and assess their compliance strategies for this Regulation. Staff has begun the initial outreach to operators to offer help with incentive and grant program applications and while doing so emphasize the benefits of converting locomotives to ZE earlier than is required by the Proposed Regulation. While it is impossible to project how many more operators will decide to utilize grant funding with additional time, the potential for cleaner locomotives and earlier ZE locomotive adoption was consistent with the policy direction, especially considering the relatively small increase in emissions compared to the first 15day changes.

The postponement of implementation will also allow operators ample time to analyze all compliance pathways, including the AFMO, which was initially posted March 1, 2023, relatively recently in the regulation development process.

Finally, staff notes that the timeframes for the In-Use Operating Requirements remain unchanged.

e) Comment 15-2-6-2

We strongly oppose this additional two year delay. Over a decade ago, CARB studied existing railyards in California and found that there are unacceptable cancer risks for residents living in close proximity to these facilities. Unfortunately, still today, there are far too many decades-old, toxic diesel locomotives operating in these communities. As CARB staff and board members heard from the dozens of community members who attended the April hearing on the In-Use Locomotive Rule, there is an urgency to clean up this industry as quickly as possible. Communities have been left gasping for breath for decades while the industry has gone largely unregulated.

CARB must reinstate the requirements for railroads to report on their operations and make investments in life-saving technologies over the next few years. These are important first steps to addressing these longstanding pollution burdens, and to set the groundwork for railroads to achieve zero emission operations.

Agency Response: No changes were made in response to this comment. See response to Comment 15-2-6-1.

f) Comment 15-2-6-3

A two year delay in the Spending Account requirements would cost the State near-term opportunities to advance zero emission technology and infrastructure adoption. History has shown that the railroads will not clean up their operations voluntarily – Tier 4 locomotives make up less than 5% of all Class I locomotives today, and more than 75% of Class I switchers remain at Tier 0. This glacial pace of progress is unacceptable, especially given that zero emission systems are available today. Catenary technology is widely used all over the world, and battery-electric technologies are now on cost parity with diesel. Rule implementation would require that the industry begins investing in these much-needed technologies.

Agency Response: No changes were made in response to this comment. See response to Comment 15-2-6-1 for discussion on the delay of Spending Account requirements and Master Response 2 for discussion on ways operators may continue to use their existing locomotives to comply with the Proposed Regulation. Staff agrees that the pace of adoption of cleaner locomotive technology is unacceptably slow. Staff want to clarify that the Proposed Regulation does not require the purchase of new ZE locomotives; operators are free to use their existing, older, locomotives in a ZE configuration. Staff agrees with the commenter that operators could use catenary or battery technologies today. As discussed in Master Response 2, operators may choose to utilize batteries or hydrogen fuel cells in lieu of the diesel engine as the source of electricity; the Proposed Regulation does not regulate the design. Operators could also choose to utilize overhead catenary or a "third rail" to power a locomotive using electricity.

g) Comment 15-2-6-4

An unprecedented amount of public funding for rail modernization is currently available. Rule implementation is needed to guide how both public and private investments will be applied. In the immediate term, it is critical to ensure that investments are directed to advancing the cleanest, zero emission technologies, and prioritizing relief for the most overburdened environmental justice communities. Implementation of the rule is needed to help guide these investments and lay the groundwork for achieving air quality and public health goals.

> **Agency Response**: No changes were made in response to this comment. This response incorporates the response to Comment 15-2-6-1.

h) Comment 15-2-6-5

The 15 day changes also propose delaying implementation of Registration and Reporting requirements by two years. This delay would deprive CARB and the public of two years of data on locomotive engines, emissions, and idling. Collecting this data in the near-term is essential to informing both implementation of the In-Use Locomotive rule, and identifying enforcement measures, policies, and additional interventions that may be needed to protect public health. Given the strong public interest in implementing the rule as quickly as possible, we urge CARB to reinstate the 2024 implementation dates for the Spending Account, Registration, and Reporting requirements.

> **Agency Response**: No changes were made in response to this comment. See response to Comment 15-2-6-1. In the period before the Registration and Reporting requirements take effect, CARB will continue to use existing locomotive data and community experience to inform planning efforts. The dates for Registration and Reporting requirements align with the implementation of major parts of the regulation and will adequately support those efforts.

i) Comment 15-2-6-6

Staff deleted subsection (e) from section 2478.4 to allow for grant funds to be used toward locomotive operators' Spending Account funding requirements. While we sincerely appreciate that local, state, and federal authorities are beginning to pay more attention to addressing rail pollution, we firmly believe that the railroad industry should front the costs of the transition to zero-emissions. The railroads consist of multi-billion and -million-dollar companies and can afford to invest in clean technology. For too long, it has been community members living and working near railyards and rail lines that have had to pay the costs of locomotive operators continuing to use outdated, diesel technology, even though locomotive operators have the means to remove this burden. It is upsetting that CARB is now allowing the railroads to continue to rely on taxpayers to support this long overdue regulatory change.

We urge CARB to limit this flexibility by only allowing locomotive operators to use grant funds once they have exceeded their regulatory commitment under this or any other rule.

> **Agency Response**: No changes were made in response to this comment. As described in the Second Notice of Public Availability of Modified Text and Availability of Additional Documents and Information, the intent of the regulation is to reduce emissions from locomotives. That goal is advanced by spending *any* funds on cleaner

locomotives and related infrastructure, and staff determined that disallowing grant funds did not align with the overall intent of the Regulation. This change was also necessary to better align SA implementation with the new subsection (h) in 2478.4, which provides credits against the SA funding requirements for qualifying purchases. Subsection (h) removes the need for operators to make a deposit in the SA prior to using funds, so they may avoid the need to arbitrarily put in funds and withdraw them immediately for use. This change also avoids a perverse incentive whereby operators might choose to delay purchase of cleaner technology to have it count toward their SA funding requirement. It would be counterproductive and difficult to enforce if operators could not use grant funds for such early purchases.

j) Comment 15-2-6-7

The 15-day changes would amend sections 2478.3 and 2478.4(h) to remove Air-District-level reporting. We oppose these changes.

Air District level reporting is important to inform progress toward attaining federal air quality standards, and to provide regional pollution and public health information. Importantly, the South Coast and San Joaquin Valley air basins are in nonattainment of ozone and fine particulate matter standards. These districts have a tremendous need to address air pollution from rail. Providing district level data would allow CARB and the Air Districts to track progress toward attainment, as well as to identify where additional measures are necessary to get the districts on track.

Additional information about where the oldest and dirtiest locomotives are operating is also needed to identify hotspots and disclose where locomotive operations pose the greatest potential health risks. Likewise, reporting is necessary to identify where idling is occurring and where additional enforcement action is needed.

We urge that all Annual Reports should be made available to the public. This information is critical to inform residents living near railyards and rail corridors about the potential health risks they are facing, and to allow for informed decision-making at the local level.

Agency Response: No changes were made in response to this comment. Staff has become aware that Air District level reporting is inconsistent with reporting requirements of other CARB regulations. CARB can project emissions for individual districts using State level data. CARB's emissions inventory, EMFAC, provides the emissions from locomotives operating in California down to county level, and it is available to the public. Section 2478.11 allows CARB to ascertain emission reductions under the Regulation, including date, location, and duration of idling exceedances. State progress toward attainment of federal ambient air quality standards is described in the State Implementation Plan (SIP).

Moreover, the Proposed Regulation focuses on reducing emissions from all locomotives operating in California regardless of their location because communities near tracks and railyards can be heavily impacted by these emissions in any air district. Staff will continue to provide the most granular data possible to inform residents living near rail activities to allow for informed decision-making at the local level.

3. Authority to Regulate Locomotives in California

Master Response 2: Clean Air Act (CAA)

The Clean Air Act (CAA) provides that states and their subdivisions shall not adopt any standard or other requirement relating to the control of emissions from "*[n]ew* locomotives or *new* engines used in locomotives." 42 U.S.C. § 7543(e)(1) (emphasis added). In contrast, the United States Environmental Protection Agency (U.S. EPA) is required to authorize California regulations of non-new locomotives if the statutory requirements for authorization are met. The CAA requires the U.S. EPA Administrator to authorize California to enforce standards and other requirements relating to the control of emissions from all other nonroad vehicles, including non-new locomotives. *Id*. § 7543(e)(2)(A).

To the extent that the Proposed Regulation imposes standards or other requirements on non-new locomotives subject to authorization, CARB anticipates seeking, and receiving, authorization from U.S. EPA. Nothing in the Proposed Regulation imposes standards or requirements on *new* locomotives.

The Proposed Regulation permits operators to use SA funds to purchase new locomotives, but they are under no obligation to do so. SA funds are not restricted only to new locomotive purchases. Operators may also use SA funds to lease or rent cleaner locomotives or rail equipment, remanufacture or repower existing locomotives to cleaner locomotives or rail equipment, purchase ZE infrastructure for ZE locomotives, ZE capable locomotives, or ZE rail equipment, and fund pilots or demonstrations of ZE locomotives, ZE rail equipment, and conversion of existing locomotives to ZE capable or ZE.

Staff disagrees that the IUOR will require operators to purchase or operate new ZE locomotives. Rather, the Proposed Regulation imposes on non-new locomotives operating in California, such that locomotive emissions are meaningfully reduced relative to business-as-usual. One of these requirements is that locomotives operating in California be less than 23 years old based on their original engine build date, except for locomotives that are remanufactured or repowered to Tier 4 prior to 2030, which may operate for an additional 23 years from the date of remanufacture or repower. Staff acknowledges that locomotive manufacturers may well choose to build fully ZE locomotives in response to the Proposed Regulation, but that would be a voluntary choice not mandated by the Proposed Regulation.

At any time, any operator may convert a locomotive to a ZE configuration. Nearly every locomotive in operation today uses electric motors to drive the wheels, with a diesel engine providing electricity to the motors. Operators may choose to utilize batteries or hydrogen fuel cells in lieu of the diesel engine as the source of electricity; the regulation does not regulate the particular design. Operators could also choose to utilize overhead catenary or a "third rail" to power a locomotive using electricity. There is operational precedent of switching the locomotive source of electricity. Locomotive operators today will sometimes power the electric motors of two neighboring locomotives using the diesel engine from one of the locomotives, to increase traction and fuel efficiency. Thus, nearly every locomotive today has the ability to run in a ZE configuration, provided the locomotive can access an adequate ZE electrical power source. The staff report for the Proposed Regulation and cited

references detail how hydrogen (using hydrogen fuel cells) or electrical battery storage could be used as this ZE electrical power source. Neither option would require the manufacture or purchase of new ZE locomotives.

Staff acknowledges that locomotive manufacturers may choose to build fully ZE locomotives in response to the Proposed Regulation, but that would be a voluntary choice not mandated by the Proposed Regulation. Regardless of whether manufacturers choose to build and sell fully ZE locomotives, staff forecast that every operator of locomotives in California would nonetheless be able to meet the IUOR by using hydrogen or battery-electric tender cars linked to locomotives currently in operator fleets or available for sale today under the U.S. EPA Tier 4 locomotive standard.

Master Response 3: Interstate Commerce Commission Termination Act (ICCTA)

The preemption statute contained in the Interstate Commerce Commission Termination Act (ICCTA), 49 U.S.C. § 10501(b), is not "'intended to interfere with the role of state and local agencies in *implementing Federal environmental statutes*, such as the Clean Air Act….'" (*BNSF Railway Company v. Clark County, Washington* (9th Cir. 2021) 11 F.4th 961, 966–967, quoting *Boston & Maine Corp. & Town of Ayer, MA*, 5 S.T.B. 500, 2001 WL 458685, at *5 (2001).) As discussed in Master Response 2, California is specifically authorized by the CAA to regulate emissions from non-new locomotives.

Comments have stated that the regulations would create a "patchwork," which is factually incorrect. Under the CAA, only U.S. EPA and California have authority to promulgate these types of regulations—which does not create a "patchwork." Commenters have also erroneously argued that the Proposed Regulation would require them to switch locomotives at the border. As discussed in Master Response 2, the Proposed Regulation would permit operators to continue to operate nearly all locomotives in operation today so long as they operate in a ZE configuration. When doing so, switching locomotives at the border would be unnecessary.

Staff has formulated the IUOR to provide flexibility to railroad operators. Operators may seek a Small Business Hardship Extension (Hardship Extension) to allow continued operation of a locomotive in a non-compliant configuration. Operators may seek compliance extensions to operate a locomotive in a non-compliant configuration for a variety of reasons, including emergency events and compliant equipment manufacturer delays, installer delays, or unavailability. Operators may also take advantage of either of two distinct alternative compliance paths in lieu of the IUOR, the ACP or the AFMO. As further detailed in the ISOR and the Notice for 15-day, staff believes locomotive operators can comply with the Proposed Regulation without burdening or interfering with rail transportation.

Master Response 4: Dormant Commerce Clause

Staff does not believe that the requirements of the Proposed Regulation violate the dormant Commerce Clause under the U.S. Constitution. Some comments appear to conflate doctrinal threads of dormant Commerce Clause jurisprudence without acknowledging they are doing so, much less explaining why that would be justified. CARB responses to those comments with those considerations in mind.

The Proposed Regulation would not control the operations of locomotives outside California. Indeed, the Proposed Regulation says nothing about which locomotives are operated, and how, in other states. Moreover, as discussed in Master Response 2, under the Proposed Regulation, any locomotive can operate in California if it is running in a ZE configuration and would be free to run in a diesel mode when operating outside of California.

The CAA anticipates myriad state emission regulations that differ from federal law. *E.g.,* 42 U.S.C. § 7543(d), (e)(2)(A). State regulations, when authorized by Congress or federalized by U.S. EPA, do not violate the dormant Commerce Clause.

Certain comments raise the balancing test applied by the courts under *Pike v. Bruce Church, Inc.*, 397 U.S. 137 (1970). But the possibility that locomotive operators may choose to change to non-ZE operation outside of California is not the kind of burden on interstate commerce that implicates *Pike*. And, even if it were, that burden is incidental and modest. In contrast, the substantial air quality benefits from the Proposed Regulation, as set forth in the 15-Day Changes Summary document published on March 1, 2023, and the substantial state interest in protecting air quality and the health of its residents, would easily support upholding the Proposed Regulation.

a) Comment 45-6-1

The Proposed Regulation appears to establish emissions-related ZE-locomotive purchase mandates that amount to federally preempted emission standards for new locomotives.

Mobile source emissions-related purchase mandates—mandates that allow for the purchase of only certain types of new mobile sources based on emissions-related design or operational criteria—amount to standards or other requirements relating to the control of emissions that may be preempted under the federal Clean Air Act (CAA). In this case, since the emissions-related purchase mandates established under the proposed regulations apply to new locomotives from and after 2030 or 2035, they are absolutely preempted. In that regard, CARB's designation of the regulations as "in-use" requirements ultimately amounts to an exercise in semantics, since the scope and effect of the proposed regulations allow for the purchase and deployment of only new ZE locomotives after the regulations' specified effective dates.

CAA section 209(e)(1) prohibits states, without any exceptions, including for California, from adopting or attempting to enforce "any standard or other requirement relating to the control of emissions from… [n]we locomotives or new engines used in locomotives." 42 U.S.C. §7543 (e)(i). The proposed regulations amount to such emissions-related standards or other requirements, and, in effect, apply those ZE mandates to the purchase and sale of new locomotives after the regulations' specified dates. As a result, the proposed regulations are fully preempted.

It is no defense that the proposed regulations, on their face, apply to the owner/operators of locomotives, as opposed to OEMs. As a practical matter, the only way for owner/operators to comply with the proposed regulations as they apply to new locomotives is to acquire only ZE or ZE-capable switch, passenger, and industrial locomotives from and after January 1, 2030, and only ZE or ZE-capable line-haul locomotives from and after January 1, 2035. Similarly, the only way that locomotive OEMs will be able to sell any new

locomotives into the California market from and after the operative dates of the proposed regulations will be to ensure that those new locomotives are designed and built as ZE or ZE-capable locomotives. Thus, it is clear that the intended operation and effect of the proposed regulations are preempted, notwithstanding their camouflage as "in-use" regulations directed at the owners and operators of locomotives.

Significantly, the U.S. Supreme Court has directly ruled on a similar set of emissions-related purchase mandates and has confirmed that those types of mandates are preempted under the CAA. More specifically, in EMA v. SCAQMD, 541 U.S. 246 (2004), the Court was asked to consider whether regulations that allowed only for the purchase of natural-gas fueled trucks after certain dates amounted to preempted standards relating to the control of emissions. The Court ruled that such purchase mandates are, in sum and substance, preempted standards. In reaching its decision, the Court broadly defined the scope of the types of standards preempted under the CAA, as follows:

> The criteria referred to in §209(a) ["standards relating to the control of emissions"] relate to the emissions characteristics of a vehicle or engine. To meet them, the vehicle must not emit more than a certain amount of a given pollutant, must be equipped with a certain type of pollution-control device, or must have some other design feature related to the control of emissions. This interpretation is consistent with the use of "standard" throughout Title II of the CAA (which governs emissions from moving sources) to denote requirements such as numerical emission limits with which vehicles or engines must comply, or emission-control technology with which they must be equipped. 541 U.S. at 253.

Here, the proposed regulations mandate that locomotive owners and operators can only put ZE-capable locomotives into service in California—i.e., locomotives that "never emit any criteria, toxic or GHG pollutant from any onboard source of power at any power setting, "and that do not utilize "combustion engines"—after certain specified dates. Thus, the proposed regulations clearly seek to establish standards and other requirements relating to the control of emissions, which are preempted under the CAA. Further, the only practical means for compliance with the mandated standards and requirements is for locomotive owner/operators in California to buy or lease, and for OEMs to build and sell, ZE or ZE-capable locomotives. Thus, as a practical matter, the mandated emissions-related standards and requirements inherently apply to the purchase and sale of new locomotives after the specified dates. As such, the ZE locomotive mandates that would be established under the proposed regulations are absolutely preempted under CAA section 209(e)(1).

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2.

b) Comment 45-12-1

Amtrak incorporates by reference the comments of the Association of American Railroads, specifically noting that CARB's proposed In-Use Locomotive Regulation would be preempted by federal law as it applies to Amtrak.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4. The commenter did not elaborate on why it believed the Proposed Regulation "would be preempted by federal law *as it applies to Amtrak*" (emphasis added). The commenter

stated that Amtrak is a national rail operator but did not explain whether that was significant for purposes of the Proposed Regulation. The commenter did state that "Amtrak has established and is implementing a commitment to net-zero GHG emissions by 2045." Staff applaud Amtrak's efforts in this area, but note that the Proposed Regulation would achieve substantial reductions in PM and NOx from locomotive operation in the state along with GHG co-benefits—the commenter did not mention any commitment with regard to reducing either of these pollutants.

c) Comment 45-23-6

Contrary to CARB's assertions that "the Proposed Regulation does not conflict with or duplicate any current federal regulations," CARB's entire proposed regulation is preempted by federal laws and regulations. Indeed, the Ninth Circuit Court of Appeals has held that similar efforts within California to impose state- or district-specific regulations on rail operators are preempted by multiple federal statutory and regulatory programs. CARB's Proposed Rule is unlawful.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4.

d) Comment 45-23-7

The Proposed Rules are not generally applicable laws but rather specifically target the operation of railroads, which subjects them to categorical preemption as efforts to manage or govern rail transportation.

> **Agency Response:** No changes were made in response to this comment. In recent years, CARB has adopted a variety of regulations aimed at eliminating harmful PM and NOx pollution from heavy-duty diesel trucks, transit fleets, and passenger cars, to name just a few. In addition, as described in the CARB 2022 Scoping Plan, CARB is also adopting a variety of measures to reduce GHG emissions. CARB cannot, in light of its overall air pollution goals, simply ignore the contribution of locomotives to California air pollution. The Proposed Regulation is part of a much larger suite of regulations meant to limit harmful air pollution. To the extent the comment is referring to preemption under ICCTA, the Proposed Regulation is not preempted by the CAA, as discussed in Master Response 2 and Master Response 3.

e) Comment 45-23-5

The Proposed Regulation would effectively block locomotives from entering California, severely harming the interoperability of the national rail network.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 3.

f) Comment 45-23-8

[T]he Supreme Court has held that the LIA preempts state laws purporting to regulate "the design, the construction, and the material of every part of the locomotive and tender and of all appurtenances."

Agency Response: No changes were made in response to this comment. Staff disagrees with the implication that this quotation is relevant to the Proposed Regulation. Nowhere in the Proposed Regulation does it impose requirements on the design, construction, or material of locomotives. This response incorporates Master Response 2.

g) Comment 45-23-9 & Comment 45-23-63

Following *Napier*, lower courts consistently have held that attempts by states, through either common law or enactment of positive law, to impose requirements for equipping locomotives are preempted. *See, e.g., Ogelsby v. Delaware & Hudson Ry. Co.*, 180 F.3d 458, 461 (2d Cir. 1999) (holding that to allow states to regulate instructional labels on locomotives would "undermine the goal of the [Locomotive Boiler and Inspection Act], which is to prevent 'the paralyzing effect on railroads from prescription by each state of the safety devices obligatory on locomotives that would pass through many of them.'") (internal citation omitted).

Agency Response: No changes were made in response to this comment. Staff disagrees with the commenter's statement. *Ogelsby* concerns state regulation of locomotive safety; the Proposed Regulation does not concern locomotive safety. *Napier* concerns the design, the construction, and the material of locomotives; nowhere in the Proposed Regulation does it impose requirements on the design, construction, or material of locomotives. As discussed in Master Response 2, nearly all locomotives in operation today can be operated in a ZE configuration and the CAA allows for California to regulate operation of locomotives within the State.

h) Comment 45-23-10

Section 2478.5 of CARB's Proposed Rule would ban the operation of federally certified locomotives that comply with all federal requirements but that have been in operation for more than 23 years. The proposed ban is preempted by both ICCTA and the CAA.

With respect to ICCTA, the proposed ban targets a core aspect of railroad operation and would interfere with the free flow of interstate commerce by creating a complicated and expensive patchwork of regulation requiring railroads to switch out otherwise compliant locomotives at the California State lines. This is precisely the type of state regulation of railroads that Congress sought to disallow with ICCTA because it would have "the effect of unreasonably burdening or interfering with rail transportation." Because ICCTA "preempts all state laws that may reasonably be said to have the effect of managing or governing rail transportation," ICCTA preempts regulations such as CARB's Proposed Rules…

CARB's proposed age cap on locomotives operating in the State is not only preempted by ICCTA, but also conflicts with EPA's authority under the CAA. As expressly conceded by CARB, the EPA has already promulgated nationwide regulations regarding the remanufacture of locomotives, and Congress has expressly prohibited states from promulgating their own conflicting regulations. In CAA section 209(e), Congress preempted state and local governments from adopting or enforcing "any standard or other requirement relating to the control of emissions from . . . new locomotives or new engines used in locomotives." EPA's definition of a "new locomotive" includes a "locomotive or locomotive engine which has been remanufactured" that was built after January 1, 1973. Because EPA's

regulations address not only newly built, but also remanufactured engines, they establish the national standards with respect to the remanufacture of, and emissions requirements for, all locomotives operating in the United States.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2 and Master Response 3. Staff is aware, as the comment points out, that U.S. EPA includes remanufactures of locomotive engines in its definition of "new." Staff is also aware that U.S. EPA in fact imposes emission standards on manufacturers and remanufacturers of locomotives. However, CARB may impose additional requirements on operations of equipment in the field. For example, some diesel truck operators are required to maintain diesel particulate filters on diesel trucks, and sometimes CARB has required operators to retrofit emission control systems. Such retrofits and maintenance requirements are distinct from emission standards that CARB or U.S. EPA may impose on manufacturers. Thus staff, relying on lengthy CARB experience with setting emission standards for both on-road and nonroad engines in other contexts, believes that U.S. EPA intended to prevent states from imposing emission standards on manufacturers and remanufacturers. The Proposed Regulation, in contrast, imposes no requirements on manufacturers or remanufacturers of locomotives.

i) Comment 45-23-12

The Proposed Rules directly conflict with these federal regulations and would interfere with rail transportation. By inventing a unique and novel definition of "useful life" and other provisions that differ from EPA regulations, the Proposed Rule would create a separate California certification system for all U.S., Canadian, and Mexican locomotives that happen to cross California's state lines. Such an outcome is unacceptable given the interconnected nature of the U.S. and North American rail network and the federal regulatory framework that exclusively governs it.

> **Agency Response**: No changes were made in response to this comment. The Proposed Regulation does not define nor otherwise use the term "useful life." As for "other provisions that differ from EPA regulations," the comment does not identify any such provisions and staff does not believe the Proposed Regulation conflicts with existing U.S. EPA regulations.
>
> The Proposed Regulation does not attempt to modify the U.S. EPA definition of "useful life." Nor is the Proposed Regulation at all relevant for certifying locomotive engine emissions. Staff expects U.S. EPA to continue to certify newly manufactured locomotives as it always has, with no consideration at all to California operational restrictions on locomotives operating within the state. Nor does the Proposed Regulation empower CARB to question the validity of U.S. EPA certification of locomotives that enter the state. The Proposed Regulation would not create a separate California certification system.

j) Comment 45-23-13

In its regulatory package, CARB states that "the Proposed Regulation does not prescribe any emissions standards for new locomotive engines but instead only requires that locomotive operators meet certain operational requirements." This statement cannot be reconciled with

the plain text of the proposed regulation, which proposes to prohibit the operation of any non-zero-emission locomotive within the state after a certain date. The Proposed Rule also expressly bans the operation of any locomotive, regardless of its emissions, 23 years after its manufacture, unless it is zero-emission. These proposed regulatory provisions unquestionably qualify as a "standard or other requirement relating to the control of emissions." Banning the operation of a locomotive without certain characteristics is legally indistinguishable from requiring locomotives to have those characteristics. The STB has held in the past that states are prohibited from attempting to "influence the railroads' choice of equipment and how to configure that equipment." This is a direct attempt to regulate the rail industry and impose emissions standards for new and modified locomotives, in blatant violation of federal law.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2 and Master Response 3.

k) Comment 45-23-14

[T]he proposed age cap on locomotives operating in the State also violates the Dormant Commerce Clause. This is so for two reasons. First, "the Commerce Clause protects against inconsistent legislation arising from the projection of one state regulatory regime into the jurisdiction of another State." Because the railroad system is interstate by its very nature, and because California is a major hub of the national transportation network, "the practical effect" of banning certain locomotives from use in California "is to control conduct beyond the boundaries of the State" and transform CARB into a de facto nationwide locomotive regulator.

Second, "the burden imposed on interstate commerce is clearly excessive in relation to the putative local benefits." The burden is obvious: the rail industry across the country, and the enormous segment of the national economy that depends on it, will be forced to comply with CARB's ban on certain locomotives in California. This will include inefficient rerouting of locomotives and, in all likelihood, delays and backlogs while waiting for California-compliant locomotives to carry the freight. And CARB severely overestimates the purported benefits to air quality from this regulation, as explained below. The result is that CARB's proposed ban cannot satisfy the dormant Commerce Clause's balancing test.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 4.

l) Comment 45-23-15

CARB's Proposed Rule to impose upon railroads an obligation to shut off AESS equipped main locomotive engines within 30 minutes of the locomotive becoming stationary (with limited exceptions) is preempted by ICCTA, the LIA, and EPA's regulations under the Clean Air Act. EPA currently mandates all new locomotives (as explained above, the term "new locomotive" is defined to include remanufactured locomotives) "be equipped with automatic engine stop/start devices" that "shut off the main locomotive engine(s) after 30 minutes of idling (or less)."

CARB staff assert that the regulations are "consistent with" EPA's existing regulations and the ISOR concedes that "U.S. EPA enforces the federal rule." Even if the CARB regulations actually did perfectly parallel EPA regulations, the State's attempt to encroach upon federal enforcement authority in a field reserved for federal law would be preempted. But in fact,

there are significant differences between federal law and the Proposed Rule. The ISOR's statement that the Proposed Rule "includes idling requirements to strengthen enforcement and limit unnecessary locomotive idling" belies any suggestion that CARB is simply attempting to adopt regulations that mirror those of EPA. Regardless of CARB staff's opinion that federal regulations "do not provide adequate direction to CARB for enforcement purposes," CARB is preempted from adopting, "modifying," or otherwise tinkering with federal regulations.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2. The locomotive idling requirement does not modify, or even tinker with, the federal regulations. Manufacturers will remain subject to U.S. EPA federal requirements and will not be subject to any California requirements.

m) Comment 45-23-16

CARB's draft regulatory language places onerous burdens on locomotive operators that do not exist in the federal regulations. For example, the existing Federal rule obligates the original equipment manufacturer ("OEM") or remanufacturer of the locomotive to install an anti-idling device on a locomotive. The federal rules prohibit the owner or operator of the locomotive from installing a "defeat device" to circumvent the manufacture's anti-idling technology, with certain exemptions provided. CARB's Proposed Rule ignores the federal regulations and would seek to impose additional affirmative requirements on the locomotive owner or operator.

> **Agency Response**: No changes were made in response to this comment. The idling requirements of the Proposed Regulation only apply to locomotives equipped with AESS and requires locomotive operators to make certain that the AESS is functional. This is not burdensome, because an AESS in fact shuts off the locomotive engine within 30 minutes.

n) Comment 45-23-17

CARB's Proposed Rule seeks to bypass aspects of the federal idling regulation that it deems undesirable, while purporting to parallel the federal rules and jurisdictional limitations. Circumventing federal laws and jurisdictional limits is not so easily accomplished. As the STB has previously stated with respect to this type of regulation, CARB does not have authority to "decide for the railroads what constitutes unnecessary idling." Indeed, a federal district court held, and the Ninth Circuit affirmed, that similar rules proposed by the SCAQMD related to idling were preempted by ICCTA. The Ninth Circuit specifically stated that because the "rules apply exclusively and directly to railroad activity, requiring the railroads to reduce emissions and to provide, under threat of penalties, specific reports on its emissions and inventory," they were preempted. If CARB wishes to see federal regulations modified, it must push that agenda through EPA and the federal administrative process; the agency lacks authority to impose its own parallel set of standards, which would subject railroads to an unacceptable patchwork of different state rules and enforcement authorities.

> **Agency Response**: No changes were made in response to this comment. The Proposed Regulation does not decide what constitutes unnecessary idling. That decision was already made by U.S. EPA when it implemented its federal idling rule.

The Proposed Regulation simply acknowledges that the exceptions named by U.S. EPA apply, and allows the operator to rely on any of these exceptions when applicable. See also the response to comment 45-23-60.

o) Comment 45-23-18

[T]o the extent that CARB seeks to prohibit the use of a locomotive with a non-functioning AESS device, as proposed in § 2478.8, this rule directly conflicts with EPA's regulations and is prohibited by the LIA. Under the LIA, the federal government has exclusive authority to regulate the design, the construction, and the material the material of every part of the locomotive." CARB's efforts to dictate what devices must be installed on a locomotive is thus plainly impermissible. This prohibition applies as well to the imposition of requirements to install additional hardware and/or software to implement CARB's extensive idle reporting requirements.

Agency Response: No changes were made in response to this comment. The Proposed Regulation does not dictate that any specific device be installed on a locomotive. It acknowledges that federal law requires an AESS to be installed on new or remanufactured locomotives and imposes requirements only on operations of those AESS-equipped locomotives.

p) Comment 45-23-19

In its Proposed Rules, CARB is proposing both a locomotive charge (referred to by the agency as a "Spending Account"), which imposes charges on federally certified locomotives based on the operation of a locomotive within California and its emissions tier, and a yearly administrative fee that must be paid for by the operator of a locomotive. Both elements of the Proposed Rules are preempted.

Section 2478.4 et. seq. of the Proposed Rule lays out CARB's convoluted system of charges based on the tier of the locomotive operated within the state. As an initial matter, regardless of whether they are considered "taxes" or "fees," such charges levied directly and exclusively against the railroads for their rail operations within California are unquestionably preempted under ICCTA as state laws that directly target rail transportation. And the degree of interference is substantial: the proposed rule would require railroads to place billions of dollars into trust accounts to be used only as dictated by CARB to purchase zero emissions locomotives (which are not commercially viable), zero emissions capable locomotives (which are not commercially viable), zero emission rail equipment, or infrastructure.

Put differently, the Proposed Regulation would require railroads to set aside massive quantities of money for the sole purchase of locomotive and other assets which may not be needed, are not commercially viable and have not been proven to be safe, reliable, maintainable, or operable. The sheer costs of these proposed fees and charges would "unreasonably burden interstate commerce," and are therefore prohibited by ICCTA. Based on preliminary calculations, AAR estimates that a railroad operating a Tier 4 locomotive would be forced to deposit tens of thousands of dollars per year, per locomotive, for operating the best available technology with the lowest possible emissions available on the commercial market. Indeed, AAR estimates that between just Union Pacific and BNSF, the two Class I railroads that operate in California, an annual deposit into CARB's "spending

account" of more than $1.4 billion would be required in the rule's initial year if this regulation is finalized as proposed.

There is no question that such a regulation would unreasonably "burden interstate commerce" by mandating the diversion of resources away from necessary expansion and safety-related maintenance projects and towards the purchase of assets that may not be needed and are not viable. Indeed, the proposed operation tax and "spending account" is exactly the type of local regulation that the STB has ruled is preempted because "allowing states and localities to create a variety of complex regulations governing how an instrument of interstate commerce is operated, equipped, or kept track of (even if federalized under the CAA) would directly conflict with the goal of uniform national regulation of rail transportation." CARB's proposed locomotive charge structure (requiring funds to be set aside, and then requiring that it be spent only for defined expenses) is a direct economic regulation of the railroads and, as such, it is categorically preempted by ICCTA. Moreover, CARB's Proposed Rule applies to the rail industry, but does not apply to the trucking industry, despite the fact that both industries transport goods in interstate commerce and may impact air quality and emit greenhouse gases. ICCTA preempts laws that "discriminate against rail carriers."

Setting aside the perversity of a regulatory system that would punish a regulated entity by imposing excessive charges for successfully adopting the best available technology, section 209(e)(1) of the CAA expressly preempts CARB's proposed ban on using "Spending Account" funds to purchase new locomotives or engines that do not meet specific emissions criteria. Proposed Section 2478.4(d) restricts the use of "Spending Account" funds to four types of expenditures, all of which must fall within the Proposed Rule's various zero emissions criteria.

Because this proposed section would prohibit the use "Spending Account" funds new locomotives or engines unless they meet specific zero emission criteria, it is plainly a "standard or other requirement relating to the control of emissions" within the meaning of Section 209(e). Such a requirement runs headlong into Supreme Court and Ninth Circuit precedent explaining that the CAA expressly preempts restrictions on purchases that do not satisfy "particular emission characteristics." Accordingly, the proposed "Spending Account" restrictions are preempted as applied to "new locomotives or new engines used in locomotives," as those terms are defined by federal regulation.

Finally, CARB's proposed locomotive charges are also prohibited by Section 306 of the 4-R Act. The 4-R Act prohibits states from imposing taxes that "discriminate[] against" rail carriers. In enacting the 4-R Act, Congress sought to "restore the financial stability of the railway system of the United States." After forbidding certain types of property taxes, the 4-R Act broadly prohibits "another tax that discriminates against a rail carrier." The Supreme Court has stated that the phrase "another tax" means "any other tax," and has described subsection (b)(4) as a "catch-all" provision that "encompass[es] any form of a tax a State might impose." Under this broad understanding of the prohibitions imposed by the 4-R Act, CARB's proposed locomotive charges and fees are forbidden.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2 and Master Response 3. The SA funding requirements can be easily summarized: An operator must pay into a SA an amount equal to the estimated public health harm to Californians from their locomotive

emissions. Staff acknowledges that estimating the harm of locomotive emissions is a complex task, but the ISOR already describes that estimation.

For purposes of implementing the SA, operators need only know the usage (in MWhs) and tier of each locomotive operating in California, which is then input into the equation at section 2478.4(g)(2). The underlying concept is not "convoluted": Locomotives emit harmful pollutants; older locomotives emit more; operators with any locomotive that emits harmful pollutants in California must set aside funds in proportion to the harm. As noted in Section 3.2 of the SRIA, Class I operators had an annual revenue of $20 billion. If the initial SA deposit was in fact $1.4 billion, this would represent less than 10 percent of their annual budget. As the operators use their SA funds to reduce emissions, their SA obligation would dramatically decrease. Additionally, operators could recover some costs from sale or scrappage at a rate of 5 to 20 percent of the original purchase price.[4]

Staff disagrees that the SA will require purchase of non-commercially viable locomotives. Until 2030, the SA allows purchase of Tier 4 locomotives, which are commercially available today. The SA also permits use of funds to install various ZE infrastructure—including infrastructure that would enable existing locomotives to run in a ZE configuration—and for pilot projects. SA funds could also be used to install overhead catenary or third-rail to deliver electrical power to locomotives where that makes commercial sense—technology that is a century old and well-established. Locomotive operators also could use hydrogen or battery tender cars today to start powering locomotives without emissions. As presented in the Technical Feasibility Assessment submitted with the ISOR, several types of these ZE locomotives are available today and will be commercialized soon. Finally, under the Proposed Regulation, staff will evaluate the technological development and commercial availability of ZE locomotives and related ZE technologies in the 2027 and 2032 assessments and could propose amendments as necessary at those times.

The comment also notes that the Proposed Regulation only applies to the rail industry, not the trucking industry. To the extent the commenter is suggesting that CARB has unfairly singled out the railroad industry for regulation, this is untrue. *Executive Order N-79-20* requires CARB to propose strategies to achieve 100 percent ZE from medium and heavy-duty vehicles by 2035 for drayage trucks and 2045 for others. Pursuant to the Executive Order, the Board recently adopted the Advanced Clean Trucks (ACT) and Advanced Clean Fleets (ACF) regulations. ACT will accelerate a large-scale transition of ZE medium-and heavy-duty vehicles by requiring manufacturers who certify medium- and heavy-duty trucks to sell ZE trucks as an increasing percentage of their annual California sales from 2024 to 2035. By 2035, ZE sales would need to be between 55 and 45 percent depending on truck class.

The primary goal of the ACF regulation is to accelerate the market for ZE trucks, vans, and buses by requiring fleets that are well suited for electrification, to transition to ZE where feasible. The Board directed CARB staff to prompt fleets, businesses, and

[4] CARB, Standardized Regulatory Impact Assessment, May 26, 2022. (weblink: *https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/locomotive22/appb.pdf*).

public entities that own or direct the operation of medium- and heavy-duty vehicles in California to purchase and operate ZEVs to achieve a smooth transition to ZE fleets by 2045 everywhere feasible. Specifically, staff was directed to reach:

- 100 percent ZE drayage trucks, last mile delivery, and government fleets by 2035
- 100 percent ZE refuse trucks and local buses by 2040
- 100 percent ZE capable utility fleets by 2040

It is true that staff has not proposed a SA for heavy-duty trucks, because staff believe there are sufficient differences between a locomotive and a trucking fleet to warrant the use of a SA for locomotive operators, to prompt progress toward ZE operation. A single train might be comprised of four locomotives pulling 130 double-stacked containers, compared to 260 trucks each pulling a container.[5] By necessity, locomotives draw much more power than a given truck. Unsurprisingly, the higher power demands results in more expensive prices for locomotives. For example, as shown in the SRIA, one Tier 4 diesel powered freight line haul locomotive is approximately $3.1 million whereas a Class 8 heavy-duty diesel truck is estimated to cost around $120,000. In 2035, a hydrogen fuel cell freight line haul locomotive is estimated to cost $5.25 million[6] and a new heavy-duty hydrogen fuel cell truck is estimated to cost $190,155.[7] In addition, the railyard model and the use of tracks mean ZE range is easier to estimate for locomotives, and the charging or hydrogen fueling locations are obvious, but the amount of charging or fueling required is substantial. Thus, a SA provides industry and CARB with assurance that funding for necessary technology upgrades will be available.

4-R Act

Staff disagrees that the SA funds are either taxes or fees. The SA funds are also still owned by, and can be used by, the locomotive operator, unlike a tax or a fee. Furthermore, locomotive operators have "no vested right to pollute the air at any particular level." *Communities for a Better Env't v. SCAQMD* (2010) 48 Cal. 4th 310, 324. Requiring that locomotive operators account for the value of the harm of their air pollution does not amount to a prohibited or discriminatory tax.

Staff further disagrees that the SA discriminates against a rail carrier. Assuming, for purposes of argument, that the SA even qualified as the sort of "tax" for which the 4-R Act applied, it is not discriminatory. It accounts for the health impacts caused by locomotives that are emitting pollution in California, and neither the SA nor the administrative payment provides more favorable treatment for similarly situated or competing businesses.

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[5] CARB Draft Truck vs. Train Emissions Analysis, September 2020, accessed July 15, 2022. (weblink: *https://ww2.arb.ca.gov/resources/fact-sheets/draft-truck-vs-train-emissions-analysis*).
[6] CARB, Standardized Regulatory Impact Assessment, May 26, 2022. (weblink: *https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2022/locomotive22/appb.pdf*).
[7] CARB, Advanced Clean Trucks, Regulatory Documents, Initial Statement of Reasons, October 22, 2019. (weblink: *https://ww2.arb.ca.gov/rulemaking/2019/advancedcleantrucks*)

q) Comment 45-23-24

CARB's proposed rules imposing extensive reporting obligations are designed to implement provisions like the operation tax and spending account that are preempted by federal law. Thus, if those provisions are properly rescinded, there is no conceivable basis for subjecting railroad operators to the burdensome reporting obligations contemplated by the Proposed Rule.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4 to discuss preemption. The reporting requirements are an important part of the Proposed Regulation. As described in section III of the Staff Report, reporting requirements are necessary for CARB to quantify emissions from locomotives in California, in order to track progress towards achieving the planned emission reductions called for in the SIP and to establish attainment of the federally-required NAAQS. To quantify emissions from locomotive activity statewide, CARB needs to identify each individual locomotive and review the report on locomotive usage and emission levels on an annual basis. Additionally, reporting is necessary to better understand how locomotive emissions are tied to regional health outcomes, and to assess the effectiveness of policies to reduce pollution.

r) Comment 45-23-25

[T]he extensive reporting obligations are preempted by ICCTA because they target and impose a burden upon railroad operations.

Indeed, previous rules adopted by the SCAQMD purporting to "only" impose recordkeeping and reporting requirements on locomotives operating in the district were held to be preempted by ICCTA. Upon review of the reporting rules, the STB found that "allowing states and localities to create a variety of complex regulations governing how an instrument of interstate commerce is operated, equipped, or kept track of (even if federalized under the CAA) would directly conflict with the goal of uniform national regulation of rail transportation." In response to claims from SCAQMD that the proposed reporting requirement was "merely a record-keeping requirement and thus does not impede the flow of transportation," the STB found that the requirement "would potentially create a patchwork of localized, operational recordkeeping requirements that would likely affect railroad operations. The STB noted multiple times that because more than 100 CAA nonattainment areas exist in the United States, if the recordkeeping rule were implemented, "other nonattainment districts across the country could, and likely would, implement their own, unique recordkeeping requirements," resulting in "an unworkable variety of regulations."

CARB's Proposed Rules are strikingly similar to the reporting provisions adopted by the SCAQMD that the STB found were preempted by federal law. Thus, the same analysis applies to CARB's proposed reporting requirements, in which CARB is proposing to require railroads to record and report, for each locomotive operated in California at any time during a given year, among other things, total megawatt-hours operated or total fuel used throughout the year in California (broken down by air district) and the total engine hours throughout the year in California (again broken down by air district). The administrative effort involved for all railroads to track this information for each of the 35 California air districts the

locomotives operate in is immense and would require significant investment in both hardware and software. This effort would involve not only railroads that operate primarily in California, but locomotive owners whose locomotives are sometimes used in California but primarily operate in other areas of North America. This level of reporting is both burdensome and unworkable and would greatly interfere with the operation of the nation's rail network. As such, the Proposed Regulations are preempted by ICCTA.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 13 to discuss reporting burden and Master Response 3 to discuss ICCTA preemption.
>
> Staff disagrees that the Surface Transportation Board (STB) analysis of South Coast Air Quality Management District (SCAQMD) rules in the STB Decision bear on the Proposed Regulation.[8] The rules discussed in the STB document referenced here were adopted by SCAQMD and proposed for inclusion in the California SIP. STB concluded that the rules would likely be preempted even if included in the SIP "because of the potential patchwork of regulations that could result, contravening the purpose of Congress in enacting §10501(b)[]" of ICCTA.[9]
>
> Unlike the SCAQMD rules, CARB will adopt the Proposed Regulation, and seek U.S. EPA authorization, pursuant to the authority for California to adopt and enforce standards and other requirements relating to the control of emissions from non-new locomotives under section 209(e)(2)(A) of the CAA. This does not have potential to lead to the "patchwork of regulations" that formed the basis for STB analysis because, under section 209(e), other states have only two options: follow the federal regime or adopt the California regime. (42 U.S.C. § 7543(e)(2)(B)(i).) As U.S. EPA currently does not require reporting of locomotive emissions, there would be only one set of reporting requirements: California requirements.
>
> The SCAQMD rules referenced by the comment were not promulgated under the section 209(e) authority, and further, SCAQMD is not responsible for tracking and addressing mobile source air pollution throughout the state. Staff also notes that the quoted portions of the STB decision referenced by the commenter were "guidance" and were not a part of the STB decision. STB denied the U.S. EPA request for a declaratory order, calling it "premature."

s) Comment 45-23-26

[C]ompliance with the proposed reporting requirements would require the addition of new hardware and software to thousands of locomotives, and thus would conflict with the restrictions of the LIA.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 13. Nowhere in the Proposed Regulation does it impose requirements on the design, construction, or material of locomotives and, therefore, does not conflict with the Locomotive Inspection Act (LIA). Staff

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[8] U.S. EPA—Petition for Declaratory Order, Surface Transportation Board Decision, 2014 WL 7392860 (S.T.B. Dec. 29, 2014), Docket No. FD 35803.

[9] *Id.* at p. *8.

assumes for the Proposed Regulation that locomotives that do not currently have tracking capabilities would choose to install hardware or software to streamline reporting requirements. However, the reporting can be done manually. For example, the Proposed Regulation allows for locomotives not equipped with MWh meters to use fuel usage as a surrogate.

t) Comment 45-23-60

As AAR (and others) have briefed CARB repeatedly in the past, CARB does not have the legal authority to regulate locomotive emissions. Indeed, based on the Ninth Circuit Court of Appeals decision in the SCAQMD case, CARB's efforts to impose state-specific regulations on rail operators are preempted by multiple federal regulatory programs. CARB's Proposed Rules are unlawful.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4. Presumably, the Ninth Circuit decision referenced in the comment is *Association of American Railroads v. South Coast Air Quality Management Dist.* (9th Cir. 2010) 622 F.3d 1094. This decision is inapposite. As noted in the response to Comment 45-23-25 and Master Response 2, the CAA expressly anticipates state standards and other requirements that control emissions from *non-new* locomotives, as the Proposed Regulation does. The cited case did not consider state regulations of this type or, indeed, any type of regulation with federal authorization.

u) Comment 45-23-61

Rail operations are not a discrete activity which may be confined within the boundaries of a single state. Rather, the nation's rail transportation system is an integrated network in which over 500 railroad companies participate, operating nearly 140,000 miles of track in 49 states. Given these characteristics, "the Federal Government has determined that a uniform regulatory scheme is necessary to the operation of the national rail system." *United Transp. Union v. Long Island R.R. Co.*, 455 U.S. 678, 688 (1982). In recognition of this need for uniformity, Congress has enacted multiple statutes that preclude CARB from promulgating its Proposed Rules, including the Interstate Commerce Act, 49 U.S.C. § 10501(b), as amended by the ICC Termination Act of 1995 ("ICCTA"), the Railroad Revitalization and Regulatory Reform Act of 1976 ("the 4-R Act"), 49 U.S.C. § 11501, and the Locomotive Inspection Act ("LIA"), 49 U.S.C. § 20701.

Agency Response: No changes were made based on the comment received. This response incorporates Master Response 3 for discussion on ICCTA, the response to comment 45-23-19 for discussion on the 4-R Act, and the responses to comments 45-23-8, 45-23-15, 45-23-18, and 45-23-26 for discussion on the LIA.

v) Comment 45-23-62

State laws and regulations that specifically target the operation of railroads, like the Proposed Rules here, are subject to categorical preemption without any need to evaluate the extent of their burdens because state or local efforts to manage or govern rail transportation are *per se* improper. See, e.g., *Delaware v. Surface Transp. Bd.*, 859 F.3d 16, 19 (D.C. Cir. 2017) (describing "categorical" preemption under ICCTA).

Agency Response: No changes we made in response to this comment. This response incorporates Master Response 3.

w) Comment 45-23-69

CARB has not proposed, and has no legal authority to require, a railroad participating in interstate commerce to purchase new locomotives simply because CARB commands the operator to do so[.]

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 2.

x) Comment 45-23-71

Even if a locomotive owner were to purchase a new locomotive with funds from the locomotive charge account, CARB cannot require that that the higher tier locomotive be operated within California[.]

Agency Response: No changes were made in response to this comment. For a new locomotive partially or fully purchased with funds from the SA, the Proposed Regulation does not require operation within California.

y) Comment 45-23-82

The proposed Spending Account provision in § 2478.4 also runs afoul of the Takings Clause. See U.S. Const. amend. V. This provision requires Locomotive Operators to contribute funds annually to a Spending Account, the contents of which shall be used only to acquire or repair the Cleanest Available Locomotives or for a small number of related zero-emissions projects. §§ 2478.4(b)(1), (c). It also mandates that any interest or capital gains on the funds be used for the same purposes. d. § 2478.4(b)(2). Those funds are property of the railroad in question, not the government, and the Takings Clause does not tolerate a system in which the government, rather than the property owner decides how the property may be possessed and disposed of. That is because "property is more than economic value; it also consists of 'the group of rights which the so-called owner exercises in his dominion of the physical thing,' such 'as the right to possess, use and dispose of it." Phillips v. Washington Legal Found., 524 U.S. 156, 169–70 (1998) (citing Loretto v. Teleprompter Manhattan CATV Corp., 458 U.S. 419, 435 (1982), and quoting United States v. Gen. Motors Corp., 323 U.S. 373, 378 (1945)). Those rights would vanish—for vast amounts of railroad property—under the proposal.

Moreover, the Spending Account provision permits no variances for Locomotive Operators who (either now or in the future) are no longer legally required to spend their capital on the short list of allowed expenditures and who will receive no economic benefit from doing so. The proposed formula for determining the mandatory annual contribution to the Spending Account also ignores these realities. See § 2478.4(c)(1). As a result, the proposed Spending Account provision will force some Locomotive Operators to set aside funds every year for purposes from which they will derive no economic benefit. And courts have repeatedly recognized that when a law requires a property owner to "to sacrifice all economically beneficial uses in the name of the common good, that is, to leave his property economically idle, he has suffered a taking." Lucas v. S.C. Coastal Council, 505 U.S. 1003, 1019 (1992). For

a number of Locomotive Operators whose funds will be stranded in this way, the proposed Spending Account provision will result in just such a taking.

> **Agency Response**: Changes were made in response to this comment. To avoid funds unnecessarily retained in the SA, staff has included a provision in the Proposed Regulation that allows the withdrawal of SA funds as soon as an entire locomotive fleet operates in a ZE configuration. SA funds remain the property of the locomotive operator and the operator does not sacrifice all economically beneficial uses of those funds. There is no taking.

z) Comment 45-23-87

[T]he Proposed Rules are subject to preemption under at least the ICC Termination Act of 1995, the Railroad Revitalization and Regulatory Reform Act of 1976, the Locomotive Inspection Act, the Clean Air Act, and EPA regulations. See AAR Comments on Draft State Strategy for the State Implementation Plan submitted to CARB on March 4, 2022. CARB's proposed In-Use Locomotive Regulation is an unlawful state program.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 3 for discussion on the ICC Termination Act of 1995, the response to comment 45-23-19 for discussion on the Railroad Revitalization and Regulatory Reform Act of 1976, the responses to comments 45-23-8, 45-23-15, 45-23-18, and 45-23-26 for discussion on the LIA, and Master Response 2 for discussion on the CAA and U.S. EPA regulation.

a) Comment 45-25-14

The reporting requirements contained in the proposed Regulation have the effect of managing or governing federally regulated railroad transportation, which is within the STB's exclusive jurisdiction.

> **Agency Response**: No changes were made in response to this comment. This Response incorporates Master Response 3 and Master Response 4.

b) Comment 45-25-15

[T]he reporting requirements imposed on federally regulated railroads likely violate the Dormant Commerce Clause. As noted by the Supreme Court, a state regulation that even incidentally burdens interstate commerce is invalid if it is "clearly excessive in relation to [its] putative local benefits.

> **Agency Response**: No changes have been made in response to this comment. This response incorporates Master Response 4.

c) Comment 45-25-16

The [funding] requirements also conflict with ICCTA preemption and the Dormant Commerce Clause. Among other things, they unduly burden both the operations of short lines with the STB's exclusive jurisdiction and interstate commerce.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 3 and Master Response 4.

d) Comment 45-25-17

For federally regulated railroads, the same preemption and Dormant Commerce Clause objections described above apply [for the In-Use Life Limit] and for the same reasons. The forced disuse of locomotives of a certain vintage constitutes a substantial management of railroad operations and likely results in significant burdens on interstate commerce.

> **Agency Response**: No changes were in response to this comment. This response incorporates Master Response 4.

e) Comment 45-25-18

Here, section 2478.5 of the proposed Regulation risks taking property without payment of just compensation. Railroads make substantial investments in the purchase of locomotives, with the reasonable expectation that said locomotives will be in operation and use for the locomotives' full life. A regulation that cuts short that life and forces railroads to discard otherwise-useful locomotives may go too far and effectively destroy a property interest in those locomotives. A court would weigh various factors to determine whether the regulation effects a regulatory taking, including the economic impact of the regulation on the railroad and the extent to which the regulation undermines reasonable investment backed expectations. Penn Central, 438 U.S. 104. These factors would seem to weigh in favor of finding a compensable taking.

> **Agency Response**: No changes were made in response to this comment. Staff disagrees that the IUOR will shorten the useful life of a locomotive or destroy property interests in locomotives. As discussed in Master Response 2, nearly every locomotive today has the ability to run in a ZE configuration. If operated in a ZE configuration, locomotives older than 23 years will be able to continue operating in California. Operation of a locomotive in a different mode is not a taking.

f) Comment 45-25-19

For short lines within the STB's exclusive jurisdiction, this [idling] requirement is likely ICCTA-preempted. It is a blatant attempt to "manage[] or [g]overn rail transportation"—in a targeted fashion—in a way that invades the exclusive jurisdiction of the STB. Ass'n of Am. R.R., 622 F.3d at 1097.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2 as well as response to comments 45-23-15 through 45-23-18.

g) Comment 45-25-20

[F]or those same federally regulated railroads, the [idling] requirement also likely burdens interstate commerce in a way that violates the Dormant Commerce Clause (even without ICCTA).

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 4. See also responses to comments 45-23-15 through 45-23-18 for discussion of the idling provisions.

h) Comment 45-25-21

[T]he rule may violate the APA's prohibition on duplicative regulation, as the EPA has a rule requiring locomotives to "be equipped with automatic engine stop/start" devices that "shut off the main locomotive engine(s) after 30 minutes of idling (or less)." 40 C.F.R. 1033.115(g).

> **Agency Response**: No changes were made in response to this comment. The portion of the U.S. EPA rule quoted by the comment is directed at manufacturers; the Proposed Regulation pertains to locomotive operators, not manufacturers. The purpose of the Proposed Regulation is to clarify what is expected of locomotive *operators* and how CARB should enforce the 30-minute idling requirement in the field.

i) Comment 45-25-22

To the extent it applies to STB-regulated railroads, Section 2478.14 implicates ICCTA-preemption because it purports to manage or govern rail transportation by managing the acquisition and use of locomotives. Ass'n of Am. R.R., 622 F.3d at 1097.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 3.

j) Comment 45-25-23

The regulation also implicates the Dormant Commerce Clause because it imposes a substantial burden on interstate commerce by limiting the ability of railroads to freely access otherwise-operational locomotives for conducting interstate transportation, without cumbersome labeling and disclosure requirements.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 4. Staff is unclear on what labeling or disclosure requirements the comment is referring to and thus cannot properly respond. The Proposed Regulation does not require labeling nor does it have disclosure requirements.

k) Comment 45-25-24

Section 2478.16 authorizes CARB to inspect a railroad's private facilities, without the railroad's consent, without a demonstration of exigent circumstances, and without any pre-compliance review before a neutral decisionmaker. Thus, the inspection requirement likely is unconstitutional under the Fourth Amendment.

> **Agency Response**: No changes were made in response to this comment. CARB has long-standing authority to investigate emission sources and to enter private property to do so. This authority is based in administrative search and is comparable to inspection of other regulated facilities for health and safety, such as restaurants and oil refineries. Further, to the extent a court requires CARB to obtain an inspection warrant, CARB would do so.

l) Comment 45-28-2

As an original equipment manufacturer subject to U.S. EPA's locomotive regulations, Wabtec is concerned that CARB's Proposed Regulation would create an untenable patchwork of state and local regulatory requirements for locomotives. Pursuant to Section 209(e) of the Clean Air Act, Congress preempted state and local governments from adopting or enforcing "any standard or other requirement relating to the control of emissions from . . . new locomotives or new engines used in locomotives." Under its regulations, U.S. EPA established regulations implementing this preemption consistent with Congressional intent to prevent unreasonable burdens on interstate commerce. Moreover, U.S. EPA defined "new" locomotives to include both those newly manufactured and those existing locomotives that are remanufactured or rebuilt.

The North American railroad system is a complex and interconnected network that involves over 500 railroad companies operating over 180,000 miles of track in 49 states, Canada, and Mexico. Locomotive manufacturers and rail operators need the certainty of a uniform regulatory landscape to safely, efficiently, and sustainably move people and goods. Congress and EPA recognized the benefits of a strong federal program to address manufacturing, remanufacturing and in-use compliance of locomotive emissions.

Contrary to Congressional direction, U.S. EPA's implementing regulations, and the strong policy interests supporting a federal program for locomotive emissions, CARB's Proposed Regulation would create California-specific locomotive requirements. This would create an undue burden on locomotive manufacturers and rail operators.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4.

m) Comment 45-31-1

Short line railroads are an integral part of the national freight rail network and also benefit from federal preemption.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4, and response to Comment 45-23-19.

n) Comment BH1-OT-4-1

There could be no doubt that the staff proposals are preempted under federal law. The railroads have discussed the proposals with staff and explained why they are preempted. Were the Board to adopt these proposals, the inevitable result will be litigation and judicial decisions prohibiting the Board from proceeding.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4.

o) Comment 45-23-3

The proposed regulation is not a practical way to further reduce locomotive emissions in a manner that is consistent with the law. Instead, it proposes arbitrary and capricious targeting

of the railroad industry and attempts to exercise legal authority that CARB simply does not have.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2, Master Response 3, and Master Response 4.

p) Comment 45-23-11

CARB attempts to justify the proposed ban by claiming that that "[a]fter remanufacture, a locomotive will continue to operate at an emission level equivalent or nearly equivalent to the emission standard that applied to new locomotives at the time when the locomotive was originally manufactured." This statement provides no basis for CARB to interfere with such a fundamental aspect of railroad operations, creating an unworkable patchwork that would block federally authorized locomotives from entering California's borders. It also fails to account for advances in technology: as CARB staff is aware, the remanufacturing process affords railroads and original equipment manufacturers the opportunity to modernize locomotives to improve fuel efficiency, cut 350 tons of carbon per locomotive per year, recycle 70,000 tons of steel (equivalent to 51,000 passenger cars), while improving reliability and haulage ability. At a time when zero-emission locomotives are not commercially viable, efforts to bridge the gap in technology by reducing emissions and improving efficiency from the existing fleet should be universally encouraged by CARB.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 2 and Master Response 3. Staff agrees that remanufacturing can be an emission reductions solution under the Proposed Regulation, as long as the operational requirements are met. This response incorporates Master Response 16 to discuss ZE technology.

q) Comment 45-23-84

Because EPA's regulations address not only newly built, but also remanufactured engines, they establish the national standards with respect to the lifecycle and emissions requirements for locomotives operating in the United States.

CARB, acknowledging its lack of legal authority to impose different standards on its own, characterizes these lawfully promulgated federal regulations as a "loophole." In its Draft Plan, CARB incorrectly states that "[t]he result [of the federal regulations] is continued remanufacturing of old and polluting locomotives to the same pollution tier standards, and persistent pollution from these sources." CARB contemplates a petition to EPA to close this "loophole" by inventing a novel definition of "useful life" and other provisions that differ from current EPA regulations, thus altering the certification system for all U.S., Canadian, and Mexican locomotives.

CARB's proposal is an overly broad request, given the interconnected nature of the U.S. and North American rail network and the federal regulatory framework that exclusively governs it. But describing these regulations as a "loophole" is also inaccurate and misleading. The regulations governing the remanufacture of locomotive engines were promulgated in 1998 and were updated in 2008. 73 Fed. Reg. 37096. As with all lawfully promulgated regulations, EPA published its proposed rule for public comment prior to finalization. In the notice, EPA states that "[t]he near-term program [] includes new emission limits for existing locomotives and marine diesel engines that apply when they are remanufactured, and take effect as soon

as certified remanufacture systems are available, as early as 2008." Id. Put differently, the regulations governing emissions standards for remanufactured locomotive engines are a central feature of EPA's regulatory regime, not a "loophole."

EPA's approach to remanufactured locomotives makes sense – locomotives have lifecycles that can span many decades. EPA's regulations ensure that remanufactured locomotives meet emissions limits. Contrary to CARB's blanket assertion that the regulations allow older locomotives to be remanufactured to the "same pollution tier standard," EPA has required certain locomotives to be remanufactured to standards with lower emissions than when first manufactured. For example, remanufacturing a Tier 0 locomotive engine to a Tier 0+ reduces particulate and NOx emissions by 16 percent and particulate emissions by as much as 63 percent. By regulating the remanufacturing of locomotives, EPA regulates locomotives for much or all of their operational lives, not just the ten years or less for the initial manufacturing event. This provides nationwide benefits.

Notably, CARB supported EPA's adoption of these regulations on remanufactured locomotives when those regulations were developed and promulgated. CARB submitted comments on or related to the proposed regulations in 2004, 2006, and 2007. In its 2004 comment, CARB "fully support[ed] the direction that U.S. EPA is taking to control emissions from [locomotives] in the [Advanced Notice of Proposed Rulemaking on the Control of Emissions of Air Pollution from New Locomotive Engines]. A significant portion of that proposed regulation, which was later finalized and promulgated, related to the emissions standards for remanufactured locomotives. At no point during that rulemaking did CARB assert that the regulation created a "loophole" or that a limit should be imposed on the number of times a particular locomotive can be remanufactured.

> **Agency Response:** No changes were made in response to this comment. The Proposed Regulation makes no mention of a "loophole" nor does it define "useful life." See Master Response 2 and Master Response 3 for discussion on legal authority.
>
> In response to arguments about CARB's "Draft Plan," staff observes that the commenter appears to be referring to "California's Draft 2022 State Strategy for the State Implementation Plan." While this rulemaking references the Draft 2022 State Strategy, this rulemaking does not rely on the characterization of federal law therein. Staff further note that the Draft 2022 State Strategy predates this rulemaking and as such, does not contain an up-to-date description or analysis of this rulemaking. Staff disagree that CARB acknowledged a lack of legal authority relevant to this Proposed Rule in the Draft 2022 State Strategy; the commenter is taking statements in the Draft 2022 State Strategy out of context. In addition, the Draft 2022 State Strategy only describes "useful life" in the context of on-road heavy-duty vehicles and possible future regulatory measures for off-road new compression-ignition engine standards, with no mention of useful life in the context of locomotives.
>
> Staff also disagree with the commenter's implication that current federal regulations do not permit "continued manufacturing of old and polluting locomotives to the same pollution tier standards, and persistent pollution from these sources." As discussed in the Initial Statement of Reasons, page 19 and Table 2, "After remanufacture, a locomotive will continue to operate at an emission level equivalent or nearly equivalent to the emission standard that applied to new locomotives at the time when the locomotive was originally manufactured."

r) Comment 15-2-3-2

CARB has delayed the regulation's effective date as well as the timing of implementation for several of its provisions. However, the proposed changes do not meaningfully address the serious substantive problems with the rule, nor do they grapple with CARB's fundamental lack of authority to control railroad operations.

> **Agency Response:** No changes were made in response to this comment. This comment is not about the changes proposed in the Second 15-Day Notice and raises issues already addressed in previous responses to comments, including in Master Response 2, Master Response 3, and Master Response 4.

4. Overall Costs

Several general comments were made on the costs of the regulation including: (1) the cost of the Proposed Regulation when considering the impacts of the recent COVID-19 pandemic; (2) missing cost considerations of the SA in the cost assumptions; (3) failure to include the cost of hydrogen or other ZE national infrastructure when evaluating the costs of the Proposed Regulation; (4) concerns of insufficient funding to comply with the Proposed Regulation; (5) requests that CARB pilot and demo ZE locomotive technologies to reduce industry costs; and (6) concerns of insufficient justification for compliance costs.

> **Master Response 5**: As a result of the COVID-19 pandemic, passenger operators saw reduced ridership that resulted in decreased fare revenue. As directed by the Board at the November 18, 2022, Board Hearing staff collaborated with California passenger operators to develop the AFMO (section 2478.8) to be used in lieu of directly complying with the SA and IUOR. The AFMO option is available to all locomotive operators in the State, not just passenger rail operators. Operators who choose to comply with the Proposed Regulation by opting into the AFMO have added flexibility in when they procure and operate cleaner locomotive technologies. This additional timing flexibility would aid in operator ability to secure grant and other incentive funds as well as allow time for the effects the pandemic had on operators to dissipate. The AFMO addresses the concerns of passenger operators while still achieving emission reductions and transitioning locomotive operations in California to ZE. The ACP is another compliance option that adds flexibility and can be used in lieu of directly complying with the SA and IUOR. The ACP provides flexibility in timing while offering a different regulatory structure than the AFMO. The ACP and AFMO are compliance paths that do not require operators to set aside any funds in a SA. In response to comments stating staff did not include the costs of complying with the SA, the SRIA developed for the Proposed Regulation did include the lost opportunity costs of funding a SA, acknowledging that the funds held in the account could result in lower returns than if funds were invested into primary business. Staff assumes locomotive operators will expend funds held in their SA as soon as there is enough to purchase a new locomotive. This assumption primarily is used because as an operator replaces the operation of older locomotives with the cleanest available locomotive, the funding requirement for the SA is reduced. Therefore, in addition to opportunity costs the SA costs are represented as part of the annual equipment capital costs as seen in Table 3.15 of the SRIA (page 86). Section 3.1.7 Total Net Costs – Union Pacific and BNSF Railway Cost Including National Line Haul Fleet, outlines the assumed costs of California freight line haul operators if they were to transition their national fleet due

to the Proposed Regulation. The analysis includes costs but does not include the national health benefits that would be achieved if California Class I operators transformed to all ZE capable operations nationwide.

In response to comments stating staff did not consider the costs of national ZE hydrogen infrastructure, the Proposed Regulation does not mandate ZE locomotive use nationwide and does not require design or construction of a national infrastructure—the Proposed Regulation requires only that operators transition to use Tier 4 or (eventually) ZE capable locomotives when operating locomotives in California. In practice, nearly all existing locomotives in operation today could be converted by operators to operate in a ZE configuration when in California. This would not require national infrastructure changes because the locomotives could continue to use diesel when operating outside of California, if operators chose that compliance pathway.

In response to comments concerned with insufficient funding, staff understands cleaner locomotive technologies cost more than conventional technologies. This is often the case with cleaner technologies—at least at the outset. Throughout the regulatory process, which included over 300 individual meetings with locomotive operators, staff encouraged operators to research and apply for the multiple incentive programs available through federal, State, and local government agencies. In 2023, billions of dollars of incentive funding is available for operators. Federal funding is available through the Inflation Reduction Act and Consolidated Appropriations Act. At the State level, funding is available through programs such as the Transit and Intercity Rail Capital Program, Clean Transportation Incentives, and programs through other State agencies (California Energy Commission and the California Public Utility Commission). Carl Moyer funding will be available to fund locomotive technologies that result in emission reductions that are deemed surplus to the Proposed Regulation. While regulatory requirements do impact eligibility of some incentive programs, each incentive program has specific requirements that are subject to change over time. Specific eligibility questions for each incentive program will need to be directed to those programs. Additionally, funding program allocations can also change frequently due to various budget processes. Operators are encouraged to check with incentive programs regarding potential future funding allocations. For operator convenience, staff has developed an "Incentives for Locomotives" webpage (weblink: *https://ww2.arb.ca.gov/our-work/programs/reducing-rail-emissions-california/incentives-locomotives*) detailing potential funding programs, with links to program webpages. As mentioned at the November 18, 2022, Board hearing, in 2022 there was over $40 billion in incentive funding available for locomotive operators. Programs are competitive and operators are encouraged to apply. The Proposed Regulation also includes a Hardship Extension that can be used to delay the requirements of the Proposed Regulation if it can be shown that the requirements could put a small business in financial distress.

In response to requests that CARB pilot and demo ZE locomotive technology, CARB has grant programs to fund the pilot implementation of ZE locomotive and multiple-unit trains, as well as associated infrastructure, such as the Clean Transportation Incentives. Operators wishing to explore feasibility of new technologies have always been welcome to coordinate technology pilots. Such coordination does not require CARB intervention. The IUOR, with deadlines set in 2030 and 2035, give

locomotive technology time to develop while providing regulatory certainty for manufacturers; such regulatory certainty can help accelerate the development of technologies beyond what encouragement through grant funding provides. Operators are also able to utilize their SA funds on pilot and demonstration projects.

In response to comments concerned with insufficient justification for compliance costs, all locomotives operating in California need to comply with the Proposed Regulation due to the health issues associated with localized exposure to locomotive emissions. Permitting excessive pollution by a few businesses in California also harms the competitive nature of California industry by putting businesses that have committed to cleaner operations at a competitive disadvantage. In addition, the Proposed Regulation is a key measure in the 2022 State SIP Strategy for meeting National Ambient Air Quality Standards (NAAQS) and contributes to satisfying Executive Order N-79-20. Other emission sources in California, such as light-duty vehicles, and heavy-duty trucks are transitioning to ZE operation under CARB regulation. Locomotives must do the same.

CARB would like to emphasize the high health costs associated with locomotive emissions that locomotive operators currently do not internalize. Locomotive emissions lead to cancer risk, cardiopulmonary mortality, hospitalizations for cardiovascular illness and respiratory illness, and emergency room visits for asthma. For years, some locomotive operators in California have profited from continuing to use the oldest and dirtiest locomotives in the State, passing on the costs of that pollution to local residents and society as a whole. This is not a viable long-term business strategy for California residents, and reliance on such a strategy is not a sufficient reason to further delay regulation of such businesses. Based on Appendix H of the ISOR, the Proposed Regulation would reduce cancer risk significantly, with about a 90 percent decrease in cancer risk from an all Tier 4 locomotive fleet in 2045 alone, compared to 2020 levels. The Proposed Regulation is estimated to result in 3,200 fewer cardiopulmonary mortalities, 500 fewer hospitalizations for cardiovascular illness, 600 fewer hospitalizations for respiratory illness, and 1,500 fewer emergency room visits for asthma.

a) Comment 45-10-1

Metrolink and our fellow California passenger rail agencies remain deeply concerned about the financial impacts of this regulation at a time when ridership has far from fully recovered from pandemic-related historic lows.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 5, which discusses the AFMO staff added to the Proposed Regulation.

b) Comment 45-17-5

Operators would likely be unable to absorb the anticipated costs of the penalty provision without potentially impacting ridership, service, and/or public agency budgets, particularly considering steep ongoing COVID-19 related ridership declines at a time when the State is pushing for more mass transit to reduce greenhouse gas emissions.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 5, which discusses the AFMO staff added to the Proposed Regulation.

c) Comment 45-18-1

The proposed requirement of a spending account for zero-emissions equipment will require passenger rail agencies and transit agencies like VCTC to divert critical operating funds that are needed to maintain and expand service. The pandemic combined with the ability of more employees to work remotely or on hybrid schedules mean ridership and fare revenues have been greatly reduced. Many agencies have yet to restore service to prepandemic levels and already are experiencing higher costs to operate the service that remains. Requiring agencies to set aside operating funds undoubtedly will result in more service cuts and will eliminate the possibility of a return to prepandemic service levels, leaving riders with fewer public transit options such as passenger rail.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 5, which discusses the AFMO staff added to the Proposed Regulation.

d) Comment 45-20-3

The Initial Statement of Reasons (ISOR) supporting the draft proposal states that the direct costs of implementing the In-Use Locomotive Regulation will be offset by a number of benefits, one of which is LCFS revenue. It appears that this revenue is associated with LCFS credits generated through an approved pathway carbon intensity for ZE locomotive Energy Economy Ratios (EER). Recent decreases in the LCFS credit prices driven by significant increases in credit generation highlight a potential issue with the interaction of the In-Use Locomotive Regulation and LCFS. To the extent that opportunities for credit generation continue to be increased (e.g., for the installation of ZEV fueling/charging infrastructure that may or may not be fueling/charging vehicles) this puts downward pressure on credit prices and, therefore, on the potential for LCFS revenue to offset In-Use Locomotive Regulation implementation costs.

Agency Response: Staff did not make changes in response to this comment. Low Carbon Fuel Standard (LCFS) credits were not included in the Proposed Regulation cost calculations. As mentioned in section 3.1.2.4 of the SRIA (p. 77), staff expects that all parties eligible to generate LCFS credits will take advantage of the incentive. However, staff is unable to determine credit values because there are not approved application types or pathways for locomotives. Additionally, hydrogen credit values are undefined for locomotive operators due to the inherent uncertainty of LCFS credits being passed on to users from producers. Staff believes that it is uncertain whether LCFS credit prices will decrease with promulgation of the Proposed Regulation, as there are other market factors that determine credit prices, which may apply counterbalancing upward pressure on credit prices as well.

As background, the LCFS regulation, title 17 sections 95480 to 95503 of the California Code of Regulations (CCR), is designed to reduce GHGs associated with the life cycle of transportation fuels used in California. Individual businesses that operate ZE locomotives may also be able to lower their total cost of ownership with operational

and maintenance cost savings, and credits generated under the LCFS Regulation. For battery-electric charging or hydrogen fuel production, the owner of electric charging infrastructure or hydrogen production facilities where electricity or fuel is dispensed are eligible to generate LCFS credits. The LCFS also allows for flexibility of credit generation for novel ZE vehicle applications under bespoke fuel pathways.

e) Comment 45-23-29

The cost analysis prepared by CARB fails to include all the reasonably expected costs of compliance and, therefore, fails to satisfy the requirements imposed on CARB by California law. In particular, CARB's analysis fails to include (1) the costs imposed on railroads associated with depositing funds into a CARB-restricted "spending account" (which amounts to more than $1.4B per year); and (2) the costs associated with the design and construction of a national infrastructure to support CARB's mandated use of zero emission locomotives nationwide.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5.

f) Comment 45-23-30

Missing from the list of included elements are any costs associated with CARB -mandated deposits into the spending account. While CARB may assert that these are not costs attributable to the regulation because they remain within the control of the entity making the deposit (i.e., the railroads subject to the rule), this claim is demonstrably false. Although the railroads' names remain on the accounts, the railroads are constrained under the clear terms of the Proposed Rule from using capital funding for anything other than a very limited number of purposes. If a railroad does not have a CARB approved use for those funds in any particular year, no funds may be withdrawn from the account. Yet the Proposed Rule would mandate that the railroad had to contribute those funds – an expense clearly attributable to the regulation. If a railroad is able to comply with the rule by purchasing locomotives based on CARB's anticipated purchase schedule, but has funds remaining in the spending account, those funds remain restricted in terms of their use – prohibiting their use for necessary expansion projects intended to resolve supply chain congestion and safety --related maintenance projects. This latter scenario is, in fact, precisely what is predicted by CARB in their analysis.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 5. To address concerns of funds retained in the SA, in the 15-day change package released on March 1, 2023, staff added a provision in the Proposed Regulation that allows an operator to withdraw funds from their SA if all locomotives are operated in a ZE configuration in California.

g) Comment 45-23-31

In Appendix H of the ISOR, CARB estimates the avoided health costs associated with adoption and implementation of the proposed rule at $32.0 billion. In Appendix E of the ISOR, CARB indicates that the values used in the Spending Account formula are based on "the cost of negative health outcomes of using the locomotive." And in Table 19 of the ISOR, CARB indicates that the railroads would be required to spend $13.8 billion to achieve

compliance with the rule's requirements. By CARB's own calculations, this would leave approximately $19.2 billion unaccounted for in Appendix A in the spending accounts of the railroads subject to the rule. CARB does not address or attempt to defend this inconsistency. The true cost of compliance reflected in CARB's analysis must include the total funds required to be deposited into the spending account - $32.0 billion based on CARB's estimates.

> **Agency Response:** No changes were made in response to this comment. In accordance with U.S. EPA practice, staff monetized health outcomes by multiplying incidence by a standard value derived from economic studies. The $32.0 billion valuation for avoided premature mortality is based on willingness to pay for each life lost.[10] The $13.8 billion shown in Table 19 of the ISOR is the net cost for compliance with the Proposed Regulation, including the SA, and accounts for equipment costs, infrastructure costs, fuel costs, salvage revenue, and other cashflows. The difference between the two numbers is $18.2 billion (a small correction to the comment number of $19.2 billion) and can be explained by two factors.
>
> The first factor is the monetary benefits from complying with the Proposed Regulation. Table 19 of the ISOR shows that diesel fuel cost savings, salvage revenue, and sale revenue contribute $11.3 billion towards reducing the net cost.
>
> The second factor is that the cost of investing in cleaner locomotives is lower than the cost of negative health outcomes from continued use of dirty locomotives. The SA funding requirement calculation is based on the cost of negative health outcomes from emissions already emitted by a locomotive in a given year, and not based on emissions that would have been created throughout its lifetime. Replacing that locomotive with a cleaner locomotive reduces all future emissions that would have resulted in health costs. If locomotive operators continued only operating dirty locomotives as their business-as-usual, the cost of the negative health outcomes from the emissions would be $32 billion more than the cost of negative health outcomes under the Proposed Regulation.

h) Comment 45-23-32

CARB speculates that the use of hydrogen fuel cell locomotives is the most likely technology that will be used to comply with the rule's requirements for line-haul locomotives. CARB also indicates its expectation that line haul locomotives will continue to be used nationwide and could not feasibly be restricted to use within California. The logical conclusion of these two CARB assumptions is that hydrogen refueling infrastructure will need to be built on a nationwide basis in order for railroads subject to the Proposed Rule to support these locomotives. This infrastructure includes not only refueling stations but also production facilities and pipelines to transport the produced hydrogen and will require immense sums of public funding from the United States and individual states (including California) to be invested. CARB has failed to identify these costs in the analysis of the proposed rule's costs.

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[10] National Center for Environmental Economics et al., Appendix B: Mortality Risk Valuation Estimates, Guidelines for Preparing Economic Analyses (EPA 240-R-10-001), December 2010. (weblink: *https://www.epa.gov/sites/production/files/2017-09/documents/ee-0568-22.pdf*)

Notably, the Proposed Rule prohibits the use of spending account funds for refueling infrastructure outside of California, meaning that these costs would be in addition to the costs attributable to CARB's spending account requirements. This is not a minor cost – in 2019, railroads used 3.4 billion gallons of diesel fuel – which would amount to more than 3.8 Gkg of hydrogen to be produced and transported across the United States. The requisite infrastructure would cost hundreds of billions of dollars – a cost which cannot be borne by the rail industry.

CARB's failure to account for significant costs associated with its Proposed Rule violate California law. This deficiency must be rectified prior to its finalization to provide a true and honest accounting for the costs CARB proposes to impose on the rail industry and the overall U.S. economy.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5. SA funds can be used on refueling infrastructure outside of California. SA funds can be used for cleaner locomotives and infrastructure anywhere the operator chooses.

i) Comment 45-24-10

If OCTA were to commit more financial resources to Metrolink because of this proposed regulation, it would take away from other transit and transportation programs, including a reduction in Metrolink's overall operating budget and delaying capital and state good repair projects.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 5, which discusses the AFMO staff added to the Proposed Regulation.
>
> However, staff disagrees with the comment conclusions. Complying with the Proposed Regulation may reduce future operating costs due to reduced diesel fuel costs and maintenance costs of cleaner technology. Because passenger operators have separate funding for operations and for capital expenses, and capital expenses can be covered by grant funding, staff believes passenger operators could comply with the Proposed Regulation and that it would ultimately be beneficial for passenger operators.

j) Comment 45-25-1

The expenditures required by the proposed Regulation will lead to the insolvency of many of CSLRA's member railroads. Contrary to CARB Staff's estimates contained in the Standard Regulatory Impact Assessment (SRIA), CSLRA believes that the Spending Account deposit requirements contained in the Regulation will, by themselves, consume 80 percent or more of the annual net income of many of CSLRA's member railroads.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5. The SA funding requirement is based directly on the monetized health cost to Californians from diesel emissions that locomotives create in California. The dirtier the locomotive an operator operates, the higher the required deposit into the SA is, which will result in more funds available for cleaner locomotive technologies and faster reduction of emissions. Many CSLRA

member railroads operate the oldest and dirtiest locomotives, and thus will naturally see higher SA funding requirements as a result.

k) Comment 45-25-3

The purchase requirements are additive to other substantial new expenses, including: GPS tracking equipment for every locomotive to comply with the Regulation's reporting requirements ($45,000/locomotive to install plus $200/locomotive/month to operate); monthly maintenance costs per locomotive that in CSLRA's experience are 2x to 3x higher for a Tier 4 than a low Tier unit; periodic overhaul costs per locomotive that are about 2.9x greater for a Tier 4 unit than a low Tier unit; infrastructure costs for ZE locomotives which can easily exceed $500,000 per station for battery charging stations and supporting utility work (new substations) or mobile hydrogen refueling stations; and pending Air District regulations under the headings of Indirect Source Rules and locomotive shop exhaust capture equipment. In its 2021 Short Line Rail Improvement Plan, Caltrans summed up the Cost problem as follows (p.12): "…these new regulations could risk significantly destabilizing the state's short line railroad industry, which already operates on relatively small profit margins."

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5. The direct cost analysis for the Proposed Regulation includes all relevant cost categories that the comment discusses. Specifically, in the Proposed Regulation SRIA, Section 3.1.1.3, the costs mentioned in the comment for GPS tracking equipment are incorporated into the staff direct cost analysis. In Section 3.1.2.2, Table 3.3 of the SRIA, staff detail the annual maintenance costs of locomotives included in the direct cost analysis. Staff agrees Tier 4 locomotives require more maintenance costs than older locomotives but disagrees with the comment on the extent that they are higher. Section 3.1.2.2, Table 3.4 through Table 3.6 of the SRIA discusses the overhaul assumptions incorporated into the direct cost analysis. Staff agrees with the comment that overhaul costs are higher for Tier 4 locomotives than older locomotives but disagrees with the extent that they are higher. Section 3.1.2.5 of the SRIA details ZE fueling infrastructure capital and maintenance cost assumptions that went into the direct costs analysis, calculated on a per locomotive basis to account for variation in fleet requirements. Pending Air District regulations are outside the scope of the Proposed Regulation, and thus staff did not include their costs in the cost analysis for the Proposed Regulation and will not discuss them further. The SRIA direct cost analysis also includes fuel costs, salvage revenue, sale revenue, reporting costs, administrative costs, and opportunity costs. Staff believes the direct costs analysis comprehensively covers all costs of the Proposed Regulation, based on the data and evidence available to staff. Staff is unable to analyze qualitative comments such as the quote from Caltrans and will instead rely on the robust SRIA analysis when discussing cost impacts of the Proposed Regulation on businesses (Section 3.2 and Section 3.3).

l) Comment 45-25-9

Having California short lines go out of business will have a number of serious consequences, including: loss of well-paying blue collar jobs with benefits not just at the railroad, but at railroad vendors/suppliers; loss of jobs at railroad customer facilities, some of which must

close or re-locate because without access to rail transportation their delivered cost per ton is no longer competitive in their national markets; and modal diversion of freight to truck by railroad customers who are able to continue operating without rail transportation.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5 for discussion of costs and Master Response 21 for discussion on mode shift.

m) Comment 45-25-11

Class 1 railroads will not step in and "rescue" short line trackage because in most cases the Class 1s know they can't operate the short line routes profitably, having spun them off to short line operators years ago for that very reason.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5. Staff does not assume Class I operators will be aiding short line railroads with compliance. Staff assumes each operator would be responsible for their own compliance with the Proposed Regulation and has evaluated the cost for different types of locomotive operators in the SRIA.[11]

n) Comment 45-25-12

On a cost-effectiveness basis, all of this damage to California jobs and the California supply chain is not justified in order to eliminate an emissions source (short line locomotives) that contributes only 2 percent of the PM2.5 and NOx produced by locomotives in California.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

o) Comment 45-26-29

Though the proposed regulation notes the cost of current passenger locomotives, the cost of ZE technology is not identified nor is there information on how passenger railroads would pay for the substantial capital cost increase over current options. Passenger equipment must provide additional functionality and comply with more requirements than freight equipment (e.g., fire safety requirements, Buy America, etc.). This additional complexity drives up the cost of equipment and requires additional engineering and production time to fulfil orders. A battery -equipped electric multiple unit for a pilot project with Caltrain would likely cost $60 million just for one train and five would be needed to provide a comparable service level to existing diesel from San Jose to Gilroy. This is significantly higher than diesel locomotives.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 5, which discusses the AFMO staff added to the Proposed Regulation. CARB disagrees with the comment that sufficient cost information was not provided by CARB. CARB provides the estimated cost of a ZE passenger locomotive in the Proposed Regulation SRIA, Section 3.1.1, Table 3.2. CARB assumes that passenger operators will purchase hydrogen fuel cell locomotives

[11] Although CARB staff count a single Class II railroad among the locomotive operators in California, there was not sufficient data to include operations of that railroad in the analyses for the Proposed Regulation.

for $13 million, though passenger operators are free to purchase whatever ZE technology they wish. As explained in the SRIA, hydrogen fuel cell locomotives were assumed for passenger operators due to the high power duty cycles and limited down time associated with passenger locomotives. As discussed in Appendix F of the ISOR, San Bernardino County Transportation Authority actually purchased hydrogen fuel cell multiple units in 2019, with operation anticipated in 2024. As noted in the November 18, 2022, Board Hearing presentation, Caltrans ordered up to 29 hydrogen multiple units in September 2022. In addition, in Section 3.4 of the SRIA, CARB provides a detailed list of potential incentive funding programs that locomotive operators may be interested in.

p) Comment 45-26-30

The proposed regulation does not acknowledge that both battery-electric and hydrogen technology would require the replacement of its battery and fuel cell systems multiple times within the normal expected economic life of a locomotive. Some manufacturers estimate that the current generation systems would require replacement within six to eight years. This represents a significant overhaul cost that will occur multiple times within the life of the unit in addition to the disposal of a significant portion of the locomotive's internal systems every six to ten years.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5. Section 3.1.2 Locomotive Operation and Maintenance, of the SRIA released with the ISOR as Appendix B, indicates the assumed maintenance and overhaul costs for diesel, battery-electric, and fuel cell locomotives. In Section 3.1.2.2, staff concluded that, based on trends in ZE buses (the most comparable commercialized ZE technology) and data from the National Renewable Energy Laboratory, overhaul costs of both hydrogen and battery-electric locomotives are estimated to be comparable to Tier 4 diesel overhaul costs. The analysis assumes that overhaul of locomotives occurs every six to fourteen years depending on the activity of each locomotive. This practice is not unique to battery or fuel cell locomotives, as diesel locomotives also require periodic overhaul.

q) Comment 45-26-31

The Technology Feasibility Assessment asserts that the maintenance of ZE technology will be lower than current diesel-electric technologies but provides no information or data for the regulated community to consider. While it is true that the costs associated with reciprocating engines would be eliminated, a large portion of rail equipment maintenance costs are tied with required tests and inspections, particularly as it relates to pneumatic braking systems. Further, both battery-electric and hydrogen technologies require sophisticated cooling, control, and monitoring systems which will require associated inspection, testing and maintenance. These costs where not analyzed and compared against the savings from current reciprocating engine options.

Agency Response: No changes were made in response to this comment. In the SRIA, section 3.1.2.2 Maintenance and Overhaul, found in ISOR Appendix B, staff specifies the assumptions for the costs of maintenance are based on trends in ZE buses (the most comparable commercialized ZE technology) and data from the National Renewable Energy Laboratory. ZE locomotive technologies are newly developing.

Staff made several efforts to reach out to locomotive operators and original equipment manufacturers (OEM) to obtain information on this subject. However, little information was provided. Staff encourages operators and OEMs to submit additional information on ZE locomotive maintenance, durability, and costs, for further evaluation. See Master Response 16 for discussion on how the 2027 and 2032 assessments may assist in determining if rule amendments will be necessary in the future.

r) Comment 45-31-2

The cost to comply with the proposed regulatory requirements would cripple and threaten to render a number of short line railroads financially insolvent. As discussed in comments provided by both the AAR and the CSLRA, CARB has dramatically underestimated the cost of the Proposed Rule.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5.

s) Comment 45-31-4

With a Tier 4 locomotive costing up to $5 million and new zero-emission "Tier 5" battery-hydrogen prototype locomotives costing at least $7 million each, these new regulations would significantly impact the financial health and sustainability of California's short line railroads. Combined with necessary infrastructure upgrades needed for things like hydrogen fueling or battery recharging, other regulations from local air districts in some parts of the state mandating additional improvements such as exhaust scrubbers in shop facilities, and new indirect emission source rules, these new regulations would significantly destabilize the state's short line railroad industry, which already operates on relatively small profit margins. The result of such a destabilization would be California shippers cut off from rail service, impacting their cost structure and ability to compete effectively in the U.S. and world economies.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 for discussion of costs and Master Response 21 for discussion on mode shift.

t) Comment 45-31-6

CARB erroneously suggests that short line railroads will be able to "pass on the costs" of the Proposed Rule to their customers. Short line railroads compete directly and aggressively with trucks for freight transportation and are also subject to product and geographic competition as their customers react to proposed increased transportation rates – given this reality, regulatory costs cannot reliably be passed on to the customer. If any short line railroad is eliminated because of its inability to comply with CARB's Proposed Rule, it will be to the detriment of the safety of the motoring public and the citizens and businesses of California.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 for discussion of costs and Master Response 21 for discussion on mode shift. Section 5.3.6 of the SRIA acknowledges that smaller locomotive operators may not be able to pass on the costs of the Proposed Regulation and explains that the Hardship Extension can assist such operators.

u) Comment 45-31-7

[Railroads] will have to make a choice to invest in normal safety and infrastructure maintenance and improvements or add these funds to the savings account. We simply cannot afford to do both.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

v) Comment 45-7-3

[W]e ask that CARB provide a sufficient level of funding required for the development of locomotive technologies as was provided to other public transit modes. There are mature commercial markets for hybrid and zero-emissions buses and personal vehicles in part because of decades of significant public investment at the Federal and State levels in alternative technologies in these sectors, in partnership with private industry. Rail will require the time and incentive pilot funding afforded to the development of other zero-emissions technologies.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 5. See Master Response 16 for further discussion on ZE technology development.

w) Comment 45-8-2

Our company is attempting to improve our operations, but financial assistance is necessary.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 5.

x) Comment 45-10-14

[W]e ask that CARB provide a commensurate level of incentive funding required for the development of locomotive and multiple unit technologies as was provided to other public transit modes. There are mature commercial markets for hybrid and zero-emissions buses and personal vehicles in part because of decades of significant public investment at the federal and state levels, often in partnership with private industry. Rail will require the time and incentive pilot funding afforded to the development of other zero-emissions technologies. Ultimately, the funding that will be required to implement this regulation will likely reach into the billions of dollars.

> **Agency Response**: No changes were made in response to this comment. This response also incorporates Master Response 5.

y) Comment 45-10-16

A funded pilot phase should be implemented before any penalties or purchase requirements are imposed. Such pilots will accelerate the development of technologies faster and in more coordinated manner than would otherwise be possible with operators pursuing pilots independently.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5.

z) Comment 45-12-10

CARB should provide a commensurate level of incentive funding required for the development of locomotive technologies as was provided to other public transit modes. There are mature commercial markets for hybrid and zero-emissions buses and personal vehicles in part because of decades of significant public investment at the federal and state levels in alternative technologies in these sectors, in partnership with private industry. Rail will require the time and incentive pilot funding afforded to the development of other zero-emissions technologies.

Agency Response: No changes were made in response to this comment. This response also incorporates Master Response 5.

aa) Comment 45-15-13

We also encourage CARB to provide a commensurate level of incentive funding required for the development of locomotive technologies as was provided to other public transit modes. There are mature commercial markets for hybrid and zero-emissions buses and personal vehicles in part because of decades of significant public investment at the federal and state levels in alternative technologies in these sectors, in partnership with private industry. Rail will require, and deserves, the time and incentive pilot funding afforded to the development of other zero-emissions technologies.

Agency Response: No changes were made in response to this comment. This response also incorporates Master Response 5.

bb) Comment 45-30-14

Provide a commensurate level of incentive funding required for the development of locomotive technologies as was provided to other public transit modes. There are mature commercial markets for hybrid and zero-emissions buses and personal vehicles in part because of decades of significant public investment at the federal and state levels in alternative technologies in these sectors, in partnership with private industry. Rail will require the time and incentive pilot funding afforded to the development of other zero-emissions technologies.

Agency Response: No changes were made in response to this comment. This response also incorporates Master Response 5.

cc) Comment 45-25-6

The Carl Moyer Program, one of the primary financial tools that has enabled the progress to date in getting short line locomotives to Tier 3 or better, will cease to be available to short lines if the proposed Regulation is enacted.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5.

dd) Comment 45-31-11

A great example of a successful California effort to reduce locomotive emissions is the Carl Moyer Memorial Air Quality Standards Attainment (Carl Moyer) Program, which has been one of the primary tools to enable smaller railroads to upgrade their locomotive fleet. Unfortunately, this program will be unavailable if the Proposed Rule is finalized as drafted. Instead of compelling short line railroads to comply with the Proposed Rule, CARB should promote the Carl Moyer Program, and other state and federal funding opportunities for small businesses to improve their locomotive fleets.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

ee) Comment 45-13-3

We believe that the demonstration of effective and reliable emissions-reducing remanufacturing is the key to solving the problem of locomotive emissions. We urge CARB to offer incentives to produce and rigorously test a diverse group of emissions reducing designs.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

ff) Comment 45-26-18

Caltrain requests that CARB and the state invest in demonstration and pilot projects that deliver near-term benefits to communities while helping to enable the broader industry transition to ZEV, as called for by the California Transit Association.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

gg) Comment BH1-OT-37-2

So it would great if CARB would start putting funding into, as others mentioned, the – a public corridor essentially of electrification, and especially salient with the addition of – of new railyards.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

hh) Comment 45-31-12

As aptly stated by Caltrans in its own "Short Line Rail Improvement Plan, which is being integrated into Caltrans' 2022 California State Rail Plan, "while environmental stewardship and sustainability is justifiably a top priority for the state of California, it is essential to ensure that short line railroads have access to the resources needed to not only survive but to be an active partner in reducing the emissions of the larger transportation sector as a whole.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

ii) Comment 45-19-25

CGFA recommends that CARB consider a provision for exemption for facilities for which the purchase of a new Tier 4 or ZE locomotive is not cost-effective, as cost-effectiveness is commonly understood in the air quality arena. CGFA believes that cost-effectiveness is a better measure of economic viability than hardship (as hardship is currently defined in the proposed rule), as cost-effectiveness takes into account the cost of compliance relative to the potential emission reductions from the equipment, and thus better reflects the goals of the regulation.

The 2016 CARB Technical Assessment identifies the cost-effectiveness of the proposed rule as $29,159/ton.

CGFA recommends that the rule be amended to include an exemption from regulation for operations for which locomotive replacement is not cost-effective. A cost-effectiveness threshold for NOx of $50,000 per ton is suggested as a conservative threshold that would ensure that program participation would exclude operators that contribute low levels of emissions to the regional inventory, and for which this regulation is not cost-effective.

The urgency of grain and feed operators to unload a train requires constant continuous power for 12-24 hours, the operational standard of zero-emission locomotives requires recharging or hydrogen refueling on site, which will necessitate additional downtime and/or additional locomotives (we estimate three or four for a single one) the cost-effective standard does not include the investment required in these additional locomotives to meet the operation requirements of the industry.

As an alternative to a cost-effectiveness calculation, it may be useful to back-calculate a fuel use value that would serve as a surrogate for cost-effectiveness. A threshold of 50,000 gallons per year of diesel is suggested. Fuel use is easier for the operator to track and for CARB to regulate and enforce.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 5. The costs of compliance are tied to the monetized mortalities created by emissions. To reduce the amount or the rate of cost would mean shifting the burden to the communities exposed to Toxic Air Contaminants (TAC) through the operation of diesel locomotives.

jj) Comment 45-33-7

RailPAC sees California pursuing experimental alternatives with undefined "off-budget" fuel source costs, when proven rail ZEV technology, electrification with catenary, is in use worldwide. It is off the shelf technology. The problem, all of its costs are "on-budget". CARB should work to bring balance to this issue by highlighting the off-budget costs of the production of alternative fuels and grid improvements needed to support high point demand of central charging facilities.

> **Agency Response:** No changes were made in response to this comment. In the Proposed Regulation SRIA, CARB considers the costs associated with alternative fuel production such as hydrogen and infrastructure, which the comment considers as off-budget costs, as infrastructure capital costs and is shown in SRIA Table 3.15. Under

the Proposed Regulation, operators can choose the technology that best suits their needs, including electrification by catenary.

kk) Comment 45-23-73

Numerous ambiguities in the cost assumption document make it difficult for the Associations to comment on the document in a meaningful way. For example, CARB assumes that "[l]ocomotive operators will use [locomotive charge] funds to purchase the cleanest available locomotives at any point where funds are sufficient for purchase" and that "funds will not be held unnecessarily." Preliminary Cost Document, Assumption 1. But CARB fails to explain what it means by "held unnecessarily." For example, if there are sufficient funds in the account, but there is no business need to purchase a new locomotive, are those funds being "unnecessarily held?" Moreover, at this point, the "cleanest available locomotive" is a Tier 4 locomotive. However, even with the purchase of a Tier 4 locomotive, CARB intends to charge the operator for using that technology. Would CARB consider holding funds in anticipation of newer technology in the form of a non-diesel engine "unnecessary?"

Agency Response: No changes were made in response to this comment. Assumed locomotive purchases are used to establish estimates for costs and emission reductions. The Preliminary Cost document released in March 2021 was a draft document shared with the public to allow for comment and corrections, if necessary. Indeed, the opening paragraph states, "This document is being released in advance of the SRIA and ISOR for the In-Use Locomotive Regulation to support stakeholder input and to provide the opportunity for staff to make revisions prior to publication of the SRIA and ISOR." The SRIA was released May 26, 2022, and included input from locomotive operators and OEMs.

More detailed information on SA purchase assumptions for Class I, Class III, industrial, and passenger operators can be found in section 3.1.5.1 Spending Account & Opportunity Cost, on pages 83-86 of the SRIA.[12]

ll) Comment 45-23-74

CARB asserts that "[t]o comply with the reporting requirements, applicable entities will not be required to install new hardware on the locomotive, but may need to establish or redesign reporting protocols and software." Id. At Assumption 2. This assumption is incorrect. Many, if not most, locomotive owners will be required to install new hardware on many, if not most, locomotives to comply with the proposed reporting requirements. Moreover, the effort involved in updating software and geofence technology is neither insignificant nor inexpensive and may be outside of the current capabilities of some railroads.

Agency Response: No changes were made in response to this comment. In section 3.1.1.3 Locomotive Tracking Hardware, Subscription, and Database Upgrades of the SRIA, CARB lists the cost assumptions for locomotive tracking needed for reporting requirements. These costs include upgrades to systems already installed, new

[12] Although CARB staff count a single Class II railroad among the locomotive operators in California, there was not sufficient data to include operations of that railroad in the analyses for the Proposed Regulation.

hardware, software upgrades and subscription, salary and benefits for additional personnel, and the CARB administrative charge.

mm) Comment 45-23-75

CARB has crafted assumptions based on information that cannot be provided by the Associations or their members. For example, CARB claims without supporting evidence that "[z]ero-emission (ZE) locomotives will be commercially available starting by no later than 2035. ZE locomotive costs within this document reflect estimates of commercial pricing." Id. At Assumption 7. CARB offers no support for this assumption. Proven zero-emission locomotive technologies do not yet exist and, due to the interrelated nature of the North American rail network, it is likely not possible to support multiple zero-emission locomotive technologies because the infrastructure required for each technology differs so widely. Similarly, the estimated commercial pricing of zero-emission locomotives does not appear to be supported by public OEM input. The Associations believe that CARB's estimated costs significantly underestimate what the overall costs will prove to be for these new technologies and find no support in the available real-world evidence in the market.

Agency Response: No changes were made in response to this comment. Fuel cell passenger locomotive, battery-electric freight line haul locomotive, and battery-electric switcher locomotive costs were based on confidential data obtained from industry sources that requested non-attribution due to the competitive nature between OEMs. The Preliminary Cost Document included a basis for fuel cell freight line haul locomotive, fuel cell switcher, fuel cell passenger multiple unit, battery-electric multiple unit, catenary freight, catenary passenger locomotive, and various battery charging and fueling infrastructure costs. These reference documents include CARB Technology Assessment: Freight Locomotives, a fuel cell switcher assessment report from Environment and Climate Change Canada, Detailed Evaluation of Battery and Hydrogen Technologies for the Arrow Service published by San Bernardino County Transportation Authority, Caltrain Modernization reports, and numerous other documents published by CARB, U.S. Department of Transportation, California Energy Commission, and U.S. Energy Information Administration.

On September 20, 2022, staff released the ISOR that included Appendix F, Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, for comment. This document outlines the state of locomotive technologies and provides further explanation on how staff established ZE locomotive commercial availability dates. The estimate is based on development timelines of past technologies, which can take 8 to 12 years from research and design to commercial production. Details are explained in CARB Technology Assessment: Freight Locomotives. Additionally, to confirm commercial availability, the Proposed Regulation includes two assessments in 2027 and 2032 to review the state of ZE locomotive technologies and infrastructure.

CARB does not require locomotive operators to use both battery and fuel cell technologies. Locomotive operators can choose to use only one technology if they find it more suitable for their operations. In Appendix F of the ISOR, staff assessed that the Class I ZE freight line haul locomotives might consist of both battery-electric locomotives and fuel cell locomotives, based on the current technology development trend and the advantages of each technology. However, it is certainly feasible for a

locomotive operator to utilize a single type of ZE technology, and the decision is up to the operators.

CARB disagrees that it is not possible to support multiple ZE technologies. CARB assessed the two most widely used ZE technologies, battery-electric and hydrogen fuel cell, and there is no evidence that suggests two different fuel systems are impossible to support. Battery-electric equipment needs charging infrastructure, and electricity is already connected to railyards. Hydrogen fuel cell equipment needs a hydrogen fueling station that can be supported by either delivery by truck or hydrogen pipeline. Charging stations and hydrogen fueling stations may use different technologies, but there is little logic in claiming that the different technologies are impossible to support. In the SRIA, CARB calculated infrastructure costs assumed to be required to comply with the Proposed Regulation, and included infrastructure costs in the total cost of the Proposed Regulation. In the SRIA, CARB also calculated the macroeconomic impacts to the California economy, including gross state production, personal income, employment, and output. Staff estimated that the Proposed Regulation is unlikely to have a significant impact on the California economy, with its impact less than 0.06 percent of baseline in 2035, one of the years of greatest impact. By 2050, the Proposed Regulation is anticipated to not exceed an impact of 0.03 percent in any of the economic indicators analyzed in SRIA. See Master Response 18 for further discussion on infrastructure.

nn) Comment 45-23-76

[A]ssumptions regarding zero-emission locomotive infrastructure capacities must be explored further by multiple interested parties. Specifically, CARB must consider the infrastructure requirements and resiliency needed (both supply and transmission) for the electric grid to support additional demands associated with some forms of potential zero-emission locomotives, particularly when combined with rising demand from other sectors of the economy and increasing demands resulting from climate change. Moreover, if CARB anticipates entire railyards will convert to battery/electric locomotive technology, it must consider whether a particular charging station is sufficient to ensure uninterrupted supply to those yards and whether California's electric grid will be capable of meeting this demand during brownouts or blackouts. At present, it is not uncommon for a railyard to refuel 5-10 locomotives at one time within a period of one hour or less. CARB's cost assumptions need to reflect current practices, and if CARB cannot point to evidence that those practices cannot be duplicated with zero-emission infrastructure, CARB's economic and environmental analyses must reflect the impacts of additional locomotive downtime for extended refueling periods.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 18 to discuss grid resiliency and compliance extensions. Staff assumes hydrogen fueling of ZE locomotives will result in equivalent downtime as with diesel refueling. Because the Proposed Regulation does not prescribe any one technology for operators and they are free to choose the technology that best suits their operation, staff did not assess impacts of downtime or charging periods for battery-electric locomotives.

oo) Comment 45-23-88

Notably, the Carl Moyer Program, which has been one of the primary tools to enable smaller railroads to upgrade their locomotive fleet, will be unavailable if the Proposed Rule is finalized as drafted. See Carl Moyer Program Guide, Section 2: General Criteria ("Covered emissions reductions obtained through Moyer Program projects must not be required by any federal, State, or local rule or regulation, memorandum of agreement, memorandum of understanding, settlement agreement, mitigation requirement, or other legal mandate.").

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5 and the response to Comment 15-2-7-7.

pp) Comment 45-30-7

We strongly urge CARB to partner with the public agency railroads to make progress developing zero emission locomotive products. This will be most effective and least harmful to the public services offered by our railroads if it is done through incentive programs and investment in advancing the analysis and necessary infrastructure improvements on the railroad wayside so that railroads are prepared to transition from day one of the availability of the zero-emission locomotive products. As the Proposed Rule stands now, it will simply penalize our public railroad agencies, each of which is working hard to advance technology while operating a reliable, safe and frequent transit service for Californians.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11 for discussion on the AFMO, Master Response 5 for discussion on incentive programs and CARB-funded ZE pilots, and Master Response 16 for discussion on ZE technology and compliance extensions.

qq) Comment 15-3-5

We are, however, disappointed that the regulation includes provisions that fundamentally are counterproductive and would impose significant new regulatory and cost burdens on CMTA members.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5 and Master Response 7 for discussion on the SA.

rr) Comment 15-7-4

We respectfully request that CARB continue to pursue from the Administration and Legislature dedicated state funding to provide financial incentives to passenger and commuter rail agencies. These incentives should not only reduce capital costs associated with ZE deployments, including rolling stock and infrastructure costs, but also further ZE technology through the funding of pilot and demonstration projects of new ZE rail technology that has yet to be vetted by the Federal Railroad Administration for passenger use.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

ss) Comment 15-10-2

Following the hearing, CARB staff held discussions with numerous California short line freight railroads and promoted the use of its proposed Alternative Compliance Plan ("ACP") at § 2478.7 to address the concerns that had been raised to the Board. However, as was shared by these railroads, the costs imposed by the Proposed Rule remain insurmountable for small businesses, under the ACP as well as under direct compliance with the Spending Account provision at § 2478.4.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

tt) Comment 15-11-4

Seriously look into incentivizing practical near-zero and hybrid locomotives.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5 for discussion on incentives and Master Response 6 for a discussion on the definition of ZE locomotives and why it is important for locomotives to be truly ZE.

uu) Comment 15-12-5

We respectfully request that CARB continue to pursue from the Administration and Legislature dedicated state funding to provide financial incentives to passenger and commuter rail agencies.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

vv) Comment 15-13-6

We respectfully request that CARB continue to pursue from the Administration and Legislature dedicated state funding to provide financial incentives to passenger and commuter rail agencies to procure low- and zero-emission vehicles and supporting infrastructure.

There are mature commercial markets for hybrid and zero-emissions buses and personal vehicles in part because of decades of significant public investment at the federal and state levels, often in partnership with private industry. Rail will require similar time and incentive pilot funding afforded to the development of other zero-emissions technologies. Ultimately, the funding that will be required to implement this regulation will likely reach into the billions of dollars.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5.

ww) Comment BH2-7-1

California is going to be a leader in the zero emission rail transition, funding is needed to support it.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5.

xx) Comment BH2-OT-35

Achieving emissions reductions objects under an ACP scenario will require some robust grant funding. We look forward to working with the Air Resources Board and other stakeholders in supporting and securing the necessary funding to implement this very important pathway for compliance.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5.

yy) Comment BH1-7

It was stated that the Consolidated Rail Infrastructure and Safety Improvements ("CRISI") Program provides an opportunity for $1.4 billion in federal grant money for railroads in California to transition to zero emission locomotives. This is incorrect.

The CRISI Program funds projects that improve the safety, efficiency, and reliability of intercity passenger and freight rail. ASLRRA welcomed the 2022 Notice of Funding Opportunity ("NOFO") for the CRISI Program, announced at $1.4 billion, over four times the resources in 2021, and the highest amount ever provided. Enabled by the Bipartisan Infrastructure Law, the CRISI Program will also accelerate progress in building up infrastructure resilience and strengthening the supply chain, which in turns makes it less expensive to transport goods. As aptly stated by U.S. Department of Transportation Secretary, Pete Buttigieg, "freight rail is a critical part of our supply chains, and when shipping costs come down, families pay less for goods."

However, it is mischaracterization to say, as was shared by the CARB staff, that the entire $1.4 billion announced in the CRISI NOFO can go towards new locomotives in California.

Agency Response: No changes were made in response to this comment. This comment incorporates the response to Comment 15-2-7-1. The comment is out-of-scope with regard to the Proposed Regulation. CARB did not claim at the hearing that all $1.4 billion dollars of CRISI funding would be available to California's locomotive operators. CARB cannot predict how CRISI funding will be allocated, and so stated the total funding amount the CRISI program offered when describing funding potential.

zz) Comment 15-2-7-1

While California short line railroads have made use of grant funding in the past to acquire more efficient, less polluting locomotives because securing such locomotives simply is beyond the financial capacity of the short lines without grant support, it is a gross mischaracterization for CARB to claim that the funds that will realistically be available for locomotives in California will be anywhere close to sufficient to cover the cost of the regulation for these small businesses.

Agency Response: No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. CARB

did not claim in the Second 15-Day Notice that funds sufficient to cover the cost of the Regulation would be available to all railroads. Rather, CARB recognized that unprecedented amounts of funding are being made available and provided a mechanism and time to accommodate the potentially beneficial impacts of that for operators and for public health. The amount of funding available through Consolidated Rail Infrastructure and Safety Improvement (CRISI) grants, Carl Moyer Program, Volkswagen Environmental Mitigation Trust (VW program), CORE, and other programs are often stackable. The combined funding available to Class III operators dwarfs the total amount required to upgrade the Class III freight locomotive fleet in California. While it is impossible to project how much of these funds will be awarded to Class III locomotive projects, it is reasonable to assume that some compliance costs will be covered by these funds.

aaa) Comment 15-2-7-2

The Associations estimate that between $335 - $427 million will be required to upgrade the short line freight locomotive fleet currently operating in California. This amount only includes freight railroads, so the actual number will be higher if industrial, tourist, and historic locomotive operators are included. The estimate also assumes an upgrade for diesel locomotives from Tier 3 and below to Tier 4, and the range is due to the difference in cost between repurposing locomotives versus purchasing completely new locomotives. If zero emission ("ZE") locomotives were required, the total costs would be significantly higher, for the following reasons:

1. If the ZE locomotive is battery electric powered, there is a high probability that small rail operations now using one or two locomotives would require two or three, due to the recharging periods for the batteries requiring more time than simply refueling a diesel-electric locomotive.
2. A small railroad would be required to provide back-up locomotives in case of an issue with the new technology ZE locomotive that takes it out of service. Unlike a Class I railroad that can reshuffle its locomotive assignments to cover for a locomotive failure, small railroads do not have that ability and will be required to build in a back-up plan to provide service continuity to its customers.

Agency Response: No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 5 and the response to Comment 15-2-7-1.

bbb) Comment 15-2-7-3

While small business railroads can apply to numerous public funding programs to fulfill the $335 - $427 million cost to comply with the regulation, the railroads will not be able to come close to meeting this obligation with the current funding vehicles.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5, and the responses to Comments 15-2-7-1, 15-2-7-4, 15-2-7-5, 15-2-7-7, 15-2-7-8, 15-2-7-9, and 15-2-7-10.

ccc) Comment 15-2-7-4

The Federal Railroad Administration's CRISI program began funding projects in 2017. Since that time, the program has made $1.3 billion in awards, excluding funding set-asides for positive train control projects in 2018. Of this amount, projects in California have received $107 million, or about 8% of funding. California has been the second largest state recipient of CRISI funding after North Carolina, which has received $170 million. Therefore, historically, FRA's maximum willingness to fund projects in a single state over time has been 13% of available resources. While the CRISI statute does not have a quantitative geographic equity constraint, as do other USDOT grant programs, FRA has informally shared that this is a consideration within the agency when awards are made. Within that $1.3 billion, the Associations were able to identify only two funded projects where potentially five or six locomotives were purchased, representing less than a single percent of available CRISI resources. Therefore, CRISI has historically not been a meaningful source of funds for locomotives. The Associations do not have data on whether this is in part due to applicants not seeking funding for locomotive rebuilding or acquisitions rather than the agency not choosing to fund such projects.

With the passage of the Infrastructure Investment and Jobs Act ("IIJA"), CRISI has received substantial additional resources. Each of the five years of the law (2022–26) provides $1 billion to CRISI through advance appropriations. Congress also has authority to provide up to an additional $1 billion each year through the annual appropriations process and in fact has provided additional appropriations in 2022 and 2023 and is contemplating doing so in 2024. The bill included legislative language emphasizing CRISI eligibility to fund "Rehabilitating, remanufacturing, procuring, or overhauling locomotives, provided that such activities result in a significant reduction of emissions." However, the additional funding has so far been less than the additional $1 billion and is expected to decline each year.

In the FY 2022 competition, FRA highlighted the eligibility of motive power projects and provided applicants with policy guidance on competitive project applications relative to achievements in emissions reductions. Awards are expected to be announced before the end of September 2023. The awards will be instructive in helping California short lines understand FRA's willingness to fund locomotive projects supporting short line compliance with the In-Use Locomotive Regulation. Out of $1.4 billion funds made competitively available in 2022, $1.25 billion was potentially available to short lines, although historically short line related projects have received a bit less than half of all CRISI awards. Historical data suggests that as much as $162 million could be awarded to all California CRISI projects in total.

The Associations have modeled out a scenario for the CRISI program in which California received 8% of award funding for the remainder of the IIJA, the state's historical average. For the fiscal years 2022 through 2026, a range of assumptions were made including using the lowest of average annual appropriations each fiscal year, continuation of set-aside amounts seen to date, and an average for earmarked projects. In this scenario, short lines could possibly see – assuming they successfully apply and are awarded grants for locomotive compliance projects – as much as $95 million between 2022 and 2026. This assumes that FRA is willing to award 20% of the state's average annual historical CRISI funding to just short line freight railroad locomotive projects that support locomotive rebuilds or acquisitions enabling compliance with the new rule, which is admittedly very unrealistic, given the many other rail projects in California every year.

To model awards in 2027 – 2028 towards projects achieving compliance in 2030 requires a major assumption, completion of a surface transportation reauthorization bill and assumptions around the choices Congress would make to continue and fund the CRISI program. Pushing forward the previous assumptions, then CRISI could potentially deliver $35 million in awards towards California short line railroad locomotive projects in 2027 and 2028 supporting compliance with the new rule, making a total of $130 million from FY22-FY28. Fiscal Year 2029 and beyond were not modeled, assuming the potential of awards in those years would be too late to support projects towards 2030 compliance requirements.

However, it is extremely aspirational to assume that short line railroads in California will receive $130 million from CRISI to purchase Tier 4 locomotives. Based on the CRISI match from 2021 – the only year for which FRA has released this data at the award level, a 65 federal / 35 non-federal is the average. Given the estimated cost imposed on the short lines to comply, the non-federal amount they will have to produce – after considering the other assumptions made about CRISI funds availability for short line locomotive projects in CA – is an extremely large amount given the financial capacity of these businesses. Therefore, even under these optimistic circumstances, CRISI funds alone cannot come anywhere close to meeting short line operators' funding needs associated with timely compliance with the Regulation, and allowing for the Spending Accounts to be used as matching for a grant for Tier 4 or better locomotives does not provide meaningful relief.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5 and the response to Comment 15-2-7-1. The second 15-day change to allow the use of grant funds to offset an SA requirement was not predicated on whether sufficient funding was available to cover operators' full compliance obligations described above, the change was made, in part, to avoid a perverse incentive whereby an operator might be better off waiting to purchase a locomotive using SA funds rather than purchasing a locomotive right away using grant funds. The general discussion of fund availability and usefulness as to one of many sources of funding is of general interest but out-of-scope with regard to the proposed second 15-day changes, and staff lack sufficient information to evaluate or speak to the commenter's modeling.

ddd) Comment 15-2-7-5

The EPA's DERA program is a potential resource to support smaller freight locomotive operators meet the compliance targets of the new rule, but it is very limited in capacity for this purpose. Since 2009, more than $660 million awards have been made through DERA, including set-asides for emerging technology and SmartWay activities. Of that amount, over 62 awards totaling $94 million included locomotive projects. Based on project descriptions, we estimate those funded $62 million worth of locomotive replacements, repowers or retrofits. Over the 14 years of awards, that is less than $5 million per year across the entire United States. The amount within that estimated to have funded locomotive projects in California was $23 million, only $1.7 million per year. Presently the national grants cycle of DERA is open, making available $115 million in FY 2022 and 2023 funding. Region 10, which includes CA, NV, AZ, HI and the Pacific Islands, is anticipated to only receive $6.2 million in total funding. This aligns with the historical patterns. DERA is an excellent program, but only can offer a very small fraction of the resources needed to help offset the costs that will be imposed by the new rule on small freight locomotive operators.

Agency Response: No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 5 and the response to comment 15-2-7-1. DERA is one of many funding sources available. While DERA may be one of the small funding sources, it can still result in a small number of cleaner locomotives every year.

eee) Comment 15-2-7-6

The TIRCP program has made over $10 billion in awards since inception, with an average award size of $76 million. TIRCP has made numerous rolling stock awards, particularly for buses and transit passenger railcars. The program has funded traditional locomotive acquisitions on at least two occasions, ten units for Metrolink in 2015 and one unit for SJRRC in 2016. In the latest Cycle 6 of the program, 28 awards were made for $690 million, with an average award of $25 million. TIRCP can accommodate smaller awards, 12 of the last cycle awards were for $10 million or less, one as low as $2.3 million. Freight locomotive projects do not appear to be eligible for TIRCP so it cannot be considered a resource for these locomotive operators. Future cycles of this program can potentially benefit freight locomotive operators only indirectly by absorbing some of the demand for public funding for locomotive projects coming from intercity passenger rail and rail transit operators as they work towards bringing their fleets into compliance with the new rule.

Agency Response: No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 5 and the response to Comment 15-2-7-1. The commenter is correct that freight projects are not eligible for the Transit and Intercity Rail Capital Program (TIRCP). However, the Proposed Regulation applies to passenger operators and thus, TIRCP was included as a funding option. Staff agrees that a benefit from passenger operators utilizing TIRCP funds would be that there could be less demand for passenger locomotive funding from grant and incentive programs that are applicable to both freight and passenger locomotives.

fff) Comment 15-2-7-7

The Carl Moyer Program, administered by CARB, receives about $60 million in state funds annually for grants to private companies and public agencies to purchase cleaner-than-required engines, equipment, and emission reduction technologies. Locomotive projects are eligible among a wide range of other uses of funds including for projects in the construction, agricultural, marine, and emergency services sectors. Funds are administered through the regional air districts, that may implement additional criteria for awards that can restrict the flexibility of funding and relative competitiveness of different types of projects in different geographies.

Since inception in 1998, out of $1.3 billion, the program has awarded $94 million to 227 locomotive projects, or only 7% of available resources. Assuming past funding levels and sector allocations remain similar going forward, available funding for locomotives would be only $4 million per year. More than 30% of past locomotive awards went to passenger rail, leaving freight locomotive operators to compete fiercely for very limited resources in a large pool including port, short line, and industrial locomotives. Based on past awards this would be around only $2.8 million available annually to all California freight locomotive operators. Because the Moyer program statute requires that "…projects must not be required by any

regulation, memorandum of understanding, or other legal mandate but must be 'early or extra,'" the eligibility of short line and other freight locomotive operators' projects for this funding upon enaction of the new rule is unclear. Until CARB clarifies the eligibility of locomotive projects relative to and across the timeline of the new rule, we must assume no Carl Moyer funds will be available to resource-constrained locomotive operators to help them achieve compliance.

Finally, regarding the Carl Moyer program, it is important to point out that the early use of these grants was to acquire "GenSet" locomotives. This technology promised less fuel usage and fewer emissions through the use of multiple diesel engines in one locomotive that could be turned on or off as demand warranted. As with any new technology, there were problems with GenSets that did not manifest themselves until after the new locomotives went into service. California short line railroads have struggled at times to keep these GenSet locomotives in service to fulfill the requirements of the Carl Moyer grants. The lesson here should not be lost: any new locomotive technology needs to be thoroughly proven before benefits, to the railroad and to the public at large, can be fully expected. Simply mandating adoption of a new technology before it is proven can lead to serious misapplication of railroad and public funds.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 5 and the response to Comment 15-2-7-1. The comment is out-of-scope with regard to the proposed second 15-day changes, but staff has provided the following response.
>
> To be eligible for the Carl Moyer Program, projects must reduce emissions more than what is required by regulation. Thus, depending on the scale of the emissions that an operator's proposed project reduces and the timing of those emission reductions relative to the Proposed Regulation's requirements, operators may still be able to receive Carl Moyer funds. Staff encourages locomotive operators to contact their local Air District as soon as possible to determine their eligibility for this program and maximize potential grant life. Staff also encourages locomotive operators to explore the unprecedented sources of federal grant monies available to locomotive operators.
>
> The Proposed Regulation does not mandate adoption of new, unproven technologies. Tier 4 locomotives are a proven technology that have been available since 2015. An operator can use Spending Account funds to purchase Tier 4 locomotives until 2030. Electric locomotives are in widespread use throughout the world. In the United States there are at least 25 battery-electric locomotives with estimated delivery dates in

2023–2024.[13,14,15,16] Further advancements in ZE locomotive technologies are anticipated over the lengthy rollout period of the Regulation. Accordingly, the Proposed Regulation requires two assessments in 2027 and 2032 to review the state of ZE locomotive technologies and infrastructure.

ggg) Comment 15-2-7-8

The Prop. 1B Goods Movement Emission Reduction Program received $1 billion in funding and $938 million of this has been allocated. The program has funded upgrades of 72 locomotives and the original program guide identified $100 million targeting projects for locomotives and railyards. Funding terms ranged from a 25% to a 15% applicant match. Funds could be used for line haul (road) locomotives, road switchers and pure switchers. Modified higher non-CA match requirements were presented for locomotive projects where the lower emission locomotive replaced with the funding was prohibited from operating in California, and options were available based on the percentage of California operations of a locomotive for units that routinely crossed the border. This program was created and funded by a ballot proposition in 2006 but appears to have spent its appropriated resources. Should new funding be appropriated by the state, this program could be a resource for freight locomotive operators working towards compliance with the new CARB rule.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 and the response to Comment 15-2-7-1. The comment is out-of-scope with regard to the proposed second 15-day changes.

Although CARB staff cannot predict whether voters would elect to provide additional funds for locomotive emission reductions, staff encourages locomotive operators to explore the unprecedented sources of federal grant monies available to locomotive operators.

hhh) Comment 15-2-7-9

Funding is available through the Volkswagen Environmental Mitigation Trust for California, administered by the South Coast Air Quality Management District ("SCAQMD") for repowering or replacement of freight switcher locomotives. These awards are limited to 25% of replacement costs or 40% of repowering costs, not to exceed $1.35 million per unit. Just over $26 million in funding is presently available for the entire state and across a broad array

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[13] Wabtec Corporation, Union Pacific Railroad Makes Largest Investment in Wabtec's FLXdrive Battery-Electric Locomotive, January 28, 2022, accessed July 27, 2022. (weblink: *https://www.wabteccorp.com/newsroom/press-releases/union-pacific-railroad-makes-largest-investment-in-wabtec-s-flxdrive-battery-electric-locomotive*).

[14] Progress Rail, Caterpillar to Supply Locomotives to Union Pacific Railroad, Supporting Investment in World's Largest Battery-Electric Locomotive Fleet, January 28, 2022, accessed July 27, 2022. (weblink: *https://www.progressrail.com/en/Company/News/PressReleases/CaterpillartoSupplyLocomotivestoUnionPacificRailroadSupportingInvestmentinWorldsLargestBattery-ElectricLocomotiveFleet.html*).

[15] Innovative Rail Technologies, IRT Delivers First Battery-Electric Switcher to Launch Customer, July 26, 2023, accessed August 7, 2023. (weblink: *https://innovativerailtech.com/reducing-rail-emissions-in-california/*).

[16] Innovative Rail Technologies, IRT to Deliver First Battery-Electric Locomotive to NUCOR Steel Hertford County, July 31, 2023, accessed August 7, 2023. (weblink: *https://innovativerailtech.com/innovative-rail-technologies-chooses-nmc/*).

of eligible freight sector engine types under the program announcement (PA) for Combustion Freight and Marine Projects. Another $30 million may be made available through a future PA. In the absence of a history of program awards, it is conservative to assume in a competitive environment that only a fraction of these funds are likely to be secured by freight locomotive operators, perhaps $2 - $6 million in total, as seen in practice with the relative percentage of 9% of Moyer program awards going to locomotive projects. However, as with the Moyer funding, the VW Trust requires that "…existing vehicles/equipment/engines must be in compliance with all rules and regulations," this raises the same question about eligibility for repowering or replacement of locomotives subject to the new rule. The Associations request that CARB and SCAQMD provide clarification on eligibility of these funds for locomotive projects under the new rule through 2030.

> **Agency Response:** No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 5 and the response to Comment 15-2-7-1. CARB adopted minor modifications in 2023 to the VW program to align incentive funding amounts with other CARB incentive programs. One modification includes increasing all maximum funding amounts by 20 percent to account for inflation. For the Freight Switcher Environmental Mitigation Action in the Combustion Freight and Marine project category, staff has added ZE switchers to the list of eligible projects. Per the Consent Decree, awards for ZE replacements and repowers are allowed up to 75 percent of the total cost. A new solicitation for this funding that captures these updates will be released later in 2023. Regarding compliance through 2030, SA funds can be used to purchase Tier 4 locomotives (among other options), so CARB staff sees no conflict in offsetting the use of VW funds for such purchases against an operator's SA obligations.

iii) Comment 15-2-7-10

The CORE program is administered by nonprofit CALSTART and provides assistance for the purchase of "…commercial-ready products that have not yet achieved a significant market foothold." Four models of lithium battery electric locomotives are eligible for incentives, along with a very broad range of other equipment in the transport, construction, agricultural and other sectors. The locomotive models covered range from 87,281/66,050-lb. starting/continuous tractive effort up to 200,000/155,000-lb. Through various funding categories this program has received and disbursed $153 million since 2017, an average of $26 million annually. The program documentation does not identify any new funding sources for future availability.

As with other incentive programs identified by CARB, CORE has extremely broad eligibility. Should future funding be made available to this program in amounts as in the past, it is reasonable to expect that only a small fraction, perhaps less than 10% of available funds, could realistically be secured by freight locomotive operators each year. The incentives that CORE can provide for each battery switcher locomotive project is up to $1 million plus another $150,000 more for qualifying small businesses with less than $15 million in revenue and fewer than 100 employees. But the balance of the cost for such equipment as offered is substantially more than that for the entire cost for the least expensive remanufacture of a switcher to diesel Tier 4 standards.

CORE's focus on funding equipment that does not have a market foothold is problematic for freight locomotive operators, particularly small operators. This implies a product at a technology readiness level that is below implementation. As explained regarding Carl Moyer and GenSet locomotives, clear expectations of reliability of locomotives and their operations and maintenance costs are extremely important to the operational and financial health of freight rail operators, especially smaller operators who have limited fleet sizes and mechanical facilities and few mechanical personnel. Locomotives are very long-lived and expensive pieces of capital equipment that are expected to withstand punishing duty cycles with high availability. The freight rail industry is still developing a full understanding of the total cost of ownership for the latest generations of Tier 4 compliant diesel locomotives, and this is many years after those locomotives entered the market. Poor motive power performance can cripple railroad operations with corresponding effects on highly integrated freight supply chains. Even with incentives available such as from CORE, locomotive operators, especially smaller ones, will find it extremely risky to become early and broad adopters of brand-new locomotive technologies with little to no operational history. Battery-electric locomotive acquisition must also be accompanied by potentially very large investments in charging and electrical infrastructure to enable their operations. Therefore, the CORE program, due to scale, eligibility, and focus, seems unlikely to be a meaningful source of funding to enable significant investments in compliance with the new rule, particularly for smaller freight rail operators. We suggest that CARB consider that the latest Tier 4 diesel locomotive technologies should be made eligible for future CORE incentive funding, rather than only ZE technologies that are still essentially in development or pilot, such as battery– and hydrogen–powered locomotives. CARB has specifically observed that Tier 4 diesel locomotive technology adoption is not widespread in the national locomotive fleet, nor in the California locomotive fleet, and also not specifically in the California short line locomotive fleet. Broadening the eligibility for this incentive program in this manner would specifically facilitate the dramatic reduction in emissions that occurs in the jump from uncontrolled locomotives to Tier 4 compliant diesel units for potentially well over 100 short line units.

Agency Response: No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 5. CORE groups eligible equipment types into 11 funding categories to promote the broad application of CORE Project funding. Categories are funded equally. As of August 2023, some categories such as on and offroad terminal tractors are oversubscribed (exceeded the $15.4M reserved), but only $0.2M of the reserved $15.4M has been requested for the railcar movers and freight locomotives category. Because funds are reserved for each category, locomotive operators can secure at least $15.4M during fiscal year FY22/23 funding without competing with other eligible categories, on a first come first served basis. The CORE funding can typically be stacked with other funds, such as the CRISI and the Moyer Program to increase the competitiveness of applications and lower the operator matching funds.

The commenter also states that program documentation does not identify any new funding sources for future availability. This does not suggest that funding will not be available in the future. Future funding will be identified once the funding amount is determined. This generally applies to all funding programs.

jjj) Comment 15-2-7-11

CORE defines small business differently than in the Regulation. CARB uses a definition of $15 million or less in average annual gross receipts for the CORE program. This is certainly a much higher standard than the $5 million which is used in the in-use locomotive regulation. The $15 million standard would seem to exclude many short lines and make them eligible for the small business hardship extension. The Associations urge CARB to review this definition to ensure consistency in its definitions to provide meaningful regulatory relief and aid to small businesses in California. A better solution overall for the definition of small businesses in the freight rail industry would be to treat all Class II and III railroads as small businesses.

> **Agency Response:** No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 15 which describes how staff determined the definition of small business for the Proposed Regulation.

kkk) Comment 15-2-7-12

The examination of the funding programs referenced by CARB for short line railroads to utilize in order to comply with the Regulation could provide an estimated total of $20.3 million per year, or $121.8 million from fiscal years 2023-2028. This amount is as much as $305 million less than what will be needed for short line railroads in California to comply with the Regulation. The Associations continue to urge CARB to either withdraw the Regulation or completely exempt short line railroads from its requirements. (This total assumes an average of $18.6 million per year of funding available from CRISI and $1.7 million per year of funding from DERA. There does not appear to be funding available through TIRCP and Prop 1B, and eligibility clarification is needed for the Carl Moyer Program, the VW Mitigation Trust, and CORE.)

> **Agency Response:** No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 5 and Master Response 15 and the response to Comments 15-2-7-1 to 15-2-7-11.

5. Emissions

a) Comment 45-15-10

We encourage CARB to restructure the emissions formula for passenger rail agencies to weight emissions by passenger. Under both the spending account and ACP scenarios, an agency that has increased service, even with Tier-4 vehicles, would show as increasing overall emissions. In some cases, an agency may be required to reduce their emissions to comply with the regulation by reducing service. This could have the unfortunate effect of increasing overall emissions as travelers use private automobiles for travel in lieu of the reduced train service. By contrast, measuring emissions per passenger will allow passenger agencies to earn credits for increasing ridership within existing service and emissions levels. It would better achieve CARB's overall goals to allow an agency's emissions to remain stable if the agency's service decreases emissions overall.

Agency Response: No changes were made in response to this comment. A locomotive operator could increase service while still moving to ZE operations, making it feasible for passenger operators to pursue plans that reduce VMT and emissions from personal vehicles. This response incorporates Master Response 10 for discussion on incorporating VMT and emission reductions from personal vehicles into a passenger operator ACP. To facilitate planned expansion of passenger rail services, CARB in collaboration with passenger operators also developed the AFMO (section 2478.8), that can be followed instead of directly complying with the SA and IUOR.

b) Comment 45-37-1

CARB should base its emissions targets and emission fees on the time spent and MWH generated in each throttle notch, together with the emissions data for that throttle notch published in the EPA emissions data file. For locomotive engines equipped with temperature-sensitive aftertreatment such as SCR systems and diesel oxidation catalysts, the calculations should also incorporate the change in effectiveness as the catalyst cools during prolonged idle periods.

Agency Response: No changes were made in response to this comment. Emission factors used for the SA calculation are from the U.S. EPA Locomotive Engine Certificate of Conformity data. These emission factors are weighted by the time spent and MWh generated in each throttle notch, together with the emissions data for that throttle notch. CARB staff sought to align with U.S. EPA wherever possible. U.S. EPA publishes emission levels of locomotives based on weighted factor at each notch setting. Staff understands that individual locomotives will be unique and operate different than the U.S. EPA duty cycle, due to inevitable variation from the average.

c) Comment 45-23-57

[T]he Proposed Rules will not result in any creditable emissions reductions in California's State Implementation Plan ("SIP"), meaning they cannot be relied on to achieve attainment as required by the Clean Air Act ("CAA").

Agency Response: No changes were made in response to this comment. Staff disagrees with the assertion that the Proposed Regulation would not result in creditable emission reductions. The California State Strategy for the SIP is a description and quantification of the measures the State plans to use to meet its commitments under the CAA. In its accounting of projected emission reductions from proposed new measures, the 2022 State Strategy for the SIP (State SIP Strategy)[17] shows that the In-Use Locomotive Regulation brings the largest single reduction to the total tons of NOx reduced in the SIP for California.

d) Comment 45-23-66

CARB has stated that the "goal of the [Proposed Rulemaking] is to accelerate immediate adoption of advanced cleaner technologies for all locomotive operations." Yet CARB

[17] CARB, 2022 State Strategy for the State Implementation Plan, adopted September 22, 2022. (weblink: *https://ww2.arb.ca.gov/sites/default/files/2022-08/2022_State_SIP_Strategy.pdf*).

concedes in its Preliminary Cost Document that zero-emission locomotives are not commercially available. Railroads may be unlikely to invest capital funds in a multi-million-dollar state-of-the-art ultra-low emission diesel locomotive when diesel engines themselves may be replaced in the future with newer technology.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-23-79. Operators are free to wait until ZE technology is expected to mature in 2030 for switch, passenger, and industrial locomotives and 2035 for freight line haul locomotives.

e) Comment 45-23-70

There is no demand for new locomotives at this time and AAR does not anticipate demand to grow significantly in the coming years[.]

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-23-79.

f) Comment 45-23-79

As explained in the Comment and below, zero-emission locomotives are not commercially available at this time. Further, approximately 30 percent of the U.S. locomotive fleet is in storage and, as such, demand for new locomotives has fallen to near-zero levels. OEMs do not anticipate demand for new locomotives to increase for several years. Railroads will only purchase new, multi-million-dollar diesel-powered locomotives when a business demand warrants, particularly when CARB proposes to ban the use of those same locomotives decades before the end of the asset's useful life.

Given these market conditions, CARB's Proposed Rules cannot achieve the expected emissions benefits. CARB has not proposed ordering interstate railroads to design and purchase new locomotives, nor would it have the legal authority to do so. Nor does CARB have authority to order the use of any such newly designed and purchased locomotives in California. As such, even if the proposed regime were otherwise legal, it would not lead to any foreseeable emissions reductions but would simply impose a significant cost on the rail industry by, for example, depriving them of access to funds by forcing railroads to set aside capital for exclusive use in a tepid market. Thus, the Proposed Rules will not result in any creditable emissions reductions under the Clean Air Act.

> **Agency Response:** No changes were made in response to this comment. CARB staff is aware ZE locomotives and technology to convert existing locomotives to ZE are in various stages of commercial availability. Therefore, staff included the Technology Feasibility Assessment as Appendix F to the ISOR published in September 2022, and concluded that ZE technology for passenger, switch, and industrial locomotives would be commercially available by 2030 and for freight line haul locomotives by 2035. As such, the IUOR have compliance deadlines set in 2030 and 2035 for those respective locomotive types. The Proposed Regulation estimated emission reductions account for these later compliance deadlines.
>
> This response incorporates Master Response 2 to discuss why the Proposed Regulation does not require locomotive operators to purchase new locomotives or operate new locomotives in California to comply. Staff estimates that roughly

70 percent of the Class I fleet operating in California will be 23 years or older by 2030. The transition of these locomotives to Tier 4 emission levels will lead to large, creditable emission reductions.

Creditable emission reductions will be achieved by the transition of locomotive fleets to cleaner emission tiers to meet the IUOR, regardless of whether operators choose to use SA funds to prepare for the compliance deadlines. This response incorporates Master Response 8 to discuss the 2027 and 2032 assessments.

Locomotive operators will not be required to remove locomotives from California service before the end of their useful life. As explained in detail in the ISOR, the 23-year operational limit is intended to allow a minimum of two "useful life" time periods for a locomotive. A useful life is the period during which the locomotive engine is designed to properly function in terms of reliability and fuel consumption, without being remanufactured. It is also the period during which a locomotive is required to comply with all applicable federal emission standards. As such, "useful life" as defined by U.S. EPA is a restriction on manufacturers only—who must ensure locomotives in operation continue to meet their rated emission standard. Useful life does not restrict states from otherwise regulating locomotive operation. U.S. EPA defines minimum useful life as MWhs equal to the product of the rated horsepower multiplied by 7.50, and the minimum useful life in terms of years is 10 years. Allowing 23 years of operation would enable operators to use most locomotives for a time span equivalent to two useful lives.

g) Comment 45-23-72

Under CARB's paradigm, lower-tier locomotives would not be retired—instead, locomotives banned from operating in California would increasingly operate in other areas of the United States, Canada, and Mexico; as such significant greenhouse gas emissions reductions would not result from CARB's Proposed Rules.

Agency Response: No changes were made in response to this comment. The commenter noted in the same letter (comment 45-23-79) that approximately 30 percent of the U.S. locomotive fleet is in storage. This is consistent with CARB staff understanding that locomotive operators do not operate more locomotives than necessary, and surplus locomotives are either stored, sold, or retired. Therefore, if Tier 4, ZE, or ZE capable locomotives are newly purchased, operators will likely store, retire, or sell surplus locomotives that are the oldest and least reliable. As pointed out in comment 45-23-79, there is no demand outside California for these old locomotives that are beyond their useful lives. Therefore, an increase in the number of Tier 4 or ZE capable locomotives will not result in increased use of older tiered locomotives elsewhere.

Indeed, it is likely that the oldest and least reliable locomotives no longer needed would be repowered to Tier 4, ZE locomotives, or ZE capable locomotives. Repower is a common practice in the rail industry, where operators or locomotive manufacturers replace the engine of an old locomotive with a new engine. Manufacturers can repower locomotives with Tier 4 engines, and the Technical Support Document: Zero Emission Locomotive Conversion as Appendix C of the 15-Day change package published on March 1, 2023, outlines how a manufacturer or an operator could

convert a diesel locomotive to a ZE or ZE capable locomotive. Freight line haul operators operate approximately 11,000 locomotives, or about 70 to 75 percent of their national fleet in California in a single year and account for about 90 percent of the locomotive activities in California. Freight line haul operators operate the locomotives throughout the entire national rail network and staff did not assume changes to this way of operation. As the Proposed Regulation ushers in Tier 4, ZE, and ZE capable locomotives, freight line haul populations get cleaner, and could result in cleaner locomotives operations throughout the national network if operators continue to operate the fleet in the same manner.

This Proposed Regulation is an Airborne Toxic Control Measure regulation. GHG reduction is another benefit of the Proposed Regulation that comes from the transition to using ZE and ZE capable locomotives, which have less GHG emissions.

h) Comment 45-23-85

In its January 31, 2022, presentation of its Draft Plan, CARB includes estimates for NOx reductions anticipated from its locomotive plan. However, CARB continues to rely on inflated and inaccurate emissions data in reaching these estimates. As a result, actual emissions reductions resulting from the Locomotive Plan would be significantly lower than expected.

OFFROAD2021 reflects the results of CARB's updated switch locomotive and line-haul locomotive models that we have been following for the last two years. As best we can determine, in these models CARB has failed to address any of AAR's concerns regarding the line-haul forecasting methodology in this latest version of the OFFROAD model.

CARB has consistently, and continues, to overestimate NOx emissions from Class I locomotives in the South Coast Air Basin by approximately 40 percent. CARB's current locomotive inventory methodology extrapolates its forecast of South Coast Air Basin emissions to the rest of the state (ignoring the detailed, localized data supplied by each railroad in most years); consequently, this overestimate occurs in CARB's statewide locomotive inventory as well.

AAR has communicated to CARB its concerns regarding the locomotive inventory and has had several detailed technical discussions to convey these concerns. Specifically, AAR's comments were submitted in writing to CARB on July 22, 2020. That submission was followed by several calls, culminating in a presentation on September 10, 2020, where AAR presented to CARB a more accurate line-haul locomotive forecast.

In addition to the September 10, 2020, presentation, AAR's consultants (CEA) sent several emails and had several calls with CARB explaining AAR's concerns with the inventory. CARB's formal release of OFFROAD2021 and continued reliance on this inaccurate data in its Draft Plan has resulted in CARB presenting a misleading and inaccurate view of current and past locomotive line-haul emissions.

Agency Response: No changes were made in response to this comment. This comment is not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action, as it is about inventories developed prior to the Proposed Regulation. Therefore, CARB is not required to respond. However, in the interest of transparency, staff provides the following response.

Staff disagrees that CARB overestimates emissions from Class I operations in SCAB, and, by extension, statewide. Staff carefully reviewed all feedback from the locomotive operators and consultants on multiple occasions and incorporated it wherever possible. The 2021 freight line haul emission inventory and 2022 switcher rail yard emission inventory are posted online, with inputs and methodology covered in detail, at: *https://ww2.arb.ca.gov/our-work/programs/mobile-source-emissions-inventory/road-documentation/msei-documentation-road*.

Staff disagrees that CARB overestimates NOx emissions from Class I locomotives in the SCAB by approximately 40 percent. In the CARB OFFROAD2021 inventory, both freight line haul and switcher locomotives emissions make up Class I locomotives NOx emissions. Both inventories use the best available data and the most appropriate methodology given current and historical trends, aligned with emission calculations and best practices used by U.S. EPA, and accurately reflected existing conditions. The 2021 freight line haul locomotive emissions inventory for the SCAB has less than a 10 percent difference from 2015 through 2018 compared to the data provided with the comment. The switcher emission inventory uses fuel usage and switcher Tier distribution data provided by the railroads, as described in the 2022 switcher railyard emission inventory methodology. Railroads and consultants expressed that they have no issues with the switcher emissions inventory and provided no comments.

The "detailed, localized data supplied by each railroad in most years" as referred to in this comment shows total locomotive activity throughout the Class I California network without further information on what Tier locomotives are used. This data was used to inform allocation of overall locomotive activities among geographic regions in California.

The freight line haul emission inventory is directly based on data provided by Union Pacific Railroad (UP) and BNSF Railway (BNSF), uses the methodology for emissions developed by U.S. EPA with input from all Class I operators in the US, and uses the best data and methodology available. The CARB freight line haul locomotive inventory updated in 2021 is based on SCAB freight line haul locomotive activity that is representative of the statewide freight line haul locomotive activity, as over 70 percent of the UP and BNSF national fleet is operated in SCAB. CARB staff confirmed that SCAB activity data presents a similar Tier distribution with that of California locomotives data supplied by the railroads. UP and BNSF provided data only for the statewide number of locomotives in each Tier and fleet total activity, not MWhs (i.e., activity) per Tier like UP and BNSF provide in the 1998 Locomotive NOx Fleet Average Emissions Agreement in the SCAB (1998 MOU) data. The detail of the 1998 MOU data allows CARB to quantify actual emissions in SCAB. The method suggested by CEA would require making an assumption that all locomotives are used equally, regardless of the Tier, which is incorrect as shown in data provided for the 1998 MOU.

The comment does not provide detailed methodology behind the comparison, so any difference in emissions cannot with certainty be determined from the comment alone. However, 1998 MOU data does not clearly delineate emission factors between freight line haul and switcher engines and could lead to differing emission projections depending on the assumptions used. The 1998 MOU uses an averaging of locomotive engine certification data within each engine Tier. Both freight line haul and switcher locomotive emission inventory use the emission factors developed by U.S. EPA and

recommended for locomotive emission inventories (U.S. EPA, "Emission Factors for Locomotives," April 2009).

In summary, CARB used the best available data, used the most appropriate methodology given current and historical trends, aligned with emission calculations and best practices used by U.S. EPA, and accurately reflected existing conditions. The comment provided no additional methodology, data, or analysis to support the claim that the CARB emission inventory is inaccurate. Providing a different emission estimation without the methodology, data sources, and supporting evidence provides no opportunity to evaluate the work or update or inform the CARB emission inventory. As with all emissions inventories, staff will continue to update the locomotive inventories to reflect recent 1998 MOU and other data and are available to the public to review methodology, inputs, and discrepancies between analyses. The annual reporting requirements under the Proposed Regulation will also continue to improve the locomotive emission inventories.

i) Comment 45-23-86

Even if interstate freight trucks have zero emissions from their engines (setting aside the lifecycle emissions associated with the energy required to produce and charge batteries), those trucks will have particulate emissions from brake and tire wear—emissions that are not associated with locomotive operations.

Agency Response: No changes were made in response to this comment. The comment neither provides objections or recommendations specifically directed at the Proposed Regulation nor provides recommendations on the CARB rulemaking process for adopting the Proposed Regulation. Though a response is not required, staff provides the following response.

This comment is referring to the Draft Truck vs. Train Analysis released September 23, 2020. The analysis compared both current emissions and future projected exhaust emissions from moving cargo by both trucks and trains and determined that existing combustion powered trucks are cleaner than trains in 2023 outside of further action taken by either mode to transition to ZE operation. The analysis was intended to be a straightforward, community-friendly comparison of truck and train emissions for general use, regardless of a specific location within the State.

The comment implies that consideration of ZE trucks upstream emissions such as battery production and battery charging would have an impact on the results of the truck vs. train analysis. Staff disagrees. As mentioned in the ISOR, ZE locomotives as well as other ZE equipment such as trucks would have upstream emissions that are associated with the production of batteries and the electricity and hydrogen used to fuel them. The criteria pollutants and carbon intensity of transportation electricity and hydrogen are already cleaner than diesel and are becoming even cleaner under state laws mandating renewable sources of fuel and energy production, along with CARB upstream regulatory programs.

To depict an apples-to-apples comparison of non-exhaust operational emissions, like tire and brake wear for trucks, similar emissions would need to be assessed from the trains, such as brake and wheel wear. Although there is extensive research of the additional emissions from on-road tires and brakes, there is no comparable study that

accurately accounts for train brake and wheel wear. Staff has reviewed literature reporting train brake- and wheel-wear emissions and understood that train brake- and wheel-wear emissions may be substantial. However, staff has not found enough information to quantitively access the magnitude of brake and wheel-wear emission at this time. A side-by-side comparison would require additional research to quantify train brake and wheel-wear emissions.

j) Comment 45-37-10

[F]reight locomotives could [] use the basic EPA Tier status for locomotives whose recorded idle time is at or below the value of the EPA line haul duty cycle (38 percent). If a locomotive event recorder duty cycle data indicates idle activity in excess of 38 percent, that locomotive has to use switcher locomotive emissions levels, or its emissions will need special calculations that account for in-use emissions (this is a simple calculation using the EPA certification spreadsheet and event recorder details).

Agency Response: No changes were made in response to this comment. Staff disagrees with the comment. Specifically, the comment is incorrect in claiming that the suggested method is "a simple calculation using the EPA certification spreadsheet and event recorder details." The U.S. EPA certification data that the comment references includes brake specific emissions – emissions per energy exerted by the engine. U.S. EPA certification data does not include emissions by time. To calculate total emissions from the event recorder details (time spent in each notch setting), the power at each notch must be known. The comment is focusing on time in idle, but the engine output at idle setting is not publicly available data. The suggested method is possible only with more detailed engine test data for every locomotive engine, which is not currently publicly available.

The comment is also incorrect in suggesting that emissions could be better estimated by using 38 percent at idle as a criterion to separate freight line haul and switcher duty cycles. The proposal is presumably based on the fact that idle weighting factor for the U.S. EPA freight line haul locomotive duty cycle is 38 percent, and 59.8 percent for the switchers. This cannot be implemented in practice, as not all locomotives have emission levels certified for both freight line haul and switcher duty cycles. Additionally, U.S. EPA duty cycle weighting factors are based on average locomotive activities by type, so it would be normal to find half of freight line haul locomotives idling less than 38 percent of time, and half of locomotives idling more than 38 percent of time. Staff believes there is no data suggesting that the method suggested by the comment will lead to any improvement in emissions estimates.

In order to prevent multiple standards and definitions, CARB staff sought to align with U.S. EPA wherever possible while achieving the needed benefits for California. U.S. EPA characterizes switch locomotives as having a rated horsepower of ≤2,300. U.S. EPA also publishes emission levels of locomotives based on weighted factor at each notch setting. Staff understands that individual locomotives will be unique and operate different than the U.S. EPA duty cycle, due to inevitable variation from the average.

k) Comment 45-13-1

Passenger locomotive emission measurements must be based on a real-world duty cycle, which captures all the idling that occurs during a 24-hour day of standard operation.

> **Agency Response:** No changes were made in response to this comment. Passenger locomotive emission measurements are done by U.S. EPA. Passenger locomotive duty cycle is defined by the Code of Federal Regulations (CFR) and can vary by route. While it is common to find a route that has different duty cycle than the U.S. EPA duty cycle, it is a representative duty cycle for passenger locomotive applications.

l) Comment 45-13-2

Passenger locomotive in-use emissions measurements must be made with hotel power producing the full electrical load needed for the typical consist.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-13-1. Locomotive emissions due to hoteling are already captured; the emissions are calculated based on locomotive activities such as MWh or fuel consumption, which includes the energy used for hoteling. The Proposed Regulation includes provisions that if passenger locomotives are equipped with wayside power and wayside power is accessible, they must use wayside power if stationary for longer than 30 minutes. Additionally, staff included a ZE credit for locomotives that connect to wayside power prior to 2030, hoping this will address harmful emissions from providing hotel power to passenger locomotives as they idle.

m) Comment BH1-OT-4-3

As discussed in AAR's written comments, the staff proposal would create havoc within the railroad industry and the North American supply chain. Given that railroads are three to four times more fuel efficient than trucks, that should be unacceptable to the Board.

> **Agency Response:** No changes were made in response to this comment. While locomotives have traditionally been more fuel efficient than diesel trucks, trucks in California are transitioning to ZE pursuant to CARB regulation. The efficiency of battery-electric trucks is considerably higher than conventional diesel trucks. Battery-electric trucks have about 3.5 times the efficiency at highway speeds and five to seven times the efficiency of conventional diesel vehicles when operated at lower speed duty cycles. While diesel locomotives may be three to four times more fuel efficient than diesel trucks, they may have worse energy efficiency than battery-electric trucks. In addition, according to the Draft Truck vs. Train Analysis CARB released on September 23, 2020, trucks will emit less PM and NOx than trains moving same amount of cargo same distance by 2023. As trucks transition to ZE, trains will be a dirtier mode of transportation than trucks with respect to emissions of PM, NOx and GHGs. This further demonstrates the need for locomotives, as well as trucks, to transition to ZE technologies.

n) Comment BH1-OT-4-4

Unlike the efforts of the railroad industry, the staff proposals will not result in reduced emissions. The only result will be litigation. Instead of adopting these proposals, AAR urges

the Board to instruct staff to work with the railroads to achieve a win-win result as we have in the past.

> **Agency Response:** No changes were made in response to this comment. Staff disagrees with the comment. As shown in the additional supporting documents and information published on March 1, 2023, the Proposed Regulation is expected to achieve over 7,300 tons of PM2.5, 386,200 tons of NOx, and 21.6 million metric tons of GHGs from 2023 to 2050.
>
> Since 2019, when regulatory development began, CARB has held over 300 meetings with locomotive operators and community members, including several meetings with the Association of American Railroads (AAR). Throughout the development of the Proposed Regulation, AAR and their members disputed many of the proposed concepts, including the SA, IUOR, and Reporting and Recordkeeping. CARB received no proposals from AAR or their members that would reduce equivalent emissions and provide equivalent health benefits to Californians.

o) Comment 45-23-58

The proposals are impractical, would significantly burden both intrastate and interstate railroad operations, and would impose tremendous costs on California railroads and their customers with little or no measurable improvements in air quality or reductions in greenhouse gas emissions.

> **Agency Response:** No changes were made in response to this comment. See response to comment BH1-OT-4-4.

p) Comment BH1-OT-39-1

CARB needs to support a holistic strategy that recognizes the greenhouse gas emission benefits of rail transportation in general by working with Caltrans and other agencies to encourage mode shift from road transportation to rail whenever possible, but we need to push for rail electrification at the same time. CARB also needs to encourage decision-makers and government agencies to stop wasteful highway expansion, which diverts riders from transit and rail and increases greenhouse gas emissions, vehicle miles traveled, and fossil fuel use.

> **Agency Response:** No changes were made in response to this comment. The freight and passenger transportation activities and emissions in the State are all predicted to expand; accordingly, CARB is working to bring ensure ZE operation throughout California where feasible and near-ZE everywhere else. Reducing mobile source emissions statewide will be accomplished through multiple pathways that include all individual sources, as well as fuel and infrastructure measures. The Proposed In-Use Locomotive Regulation is one measure, among many, that addresses these harmful emissions. A locomotive operator could increase service while still moving to ZE operations, making it feasible for passenger operators to pursue plans that reduce VMT and emissions from personal vehicles.
>
> To facilitate planned expansion of passenger rail services, CARB, in collaboration with passenger operators, developed the AFMO (section 2478.8), that can be followed instead of directly complying with the SA and IUOR.

q) Comment 45-33-4

The proposed rulemaking also needs to consider the entire life-cycle GHG emissions of such a proposal. Battery conversion yields GHG savings years ahead of the proposed rule, while repurposing most of the sunk carbon cost represented by the life-expired retired diesels. Premature retirement of recently purchased renewable fueled diesel locomotives and replacing them with new locomotives has a very high carbon and air pollution cost. Included in the analysis should be the GHG generated by the mining and refining of copper, aluminum, turning iron into steel, energy used in manufacturing and transportation and many other elements. These factors should be included in the analysis and not ignored because they occur outside of California or in third world countries.

> **Agency Response:** No changes were made in response to this comment. The Proposed Regulation is focused on reducing PM and NOx, with GHGs as a co-benefit. In addition, CARB has traditionally used the term "zero emission (ZE)" to refer to tailpipe emissions, instead of lifecycle emissions, because of the goal to reduce exposure near the actual regulated sources. Emissions due to other processes will need to be addressed and directed towards ZE by other regulations. Furthermore, in "Evaluation of Life Cycle Air Emission Factors of Freight Transportation" by Facanha and Horvath (2007), the authors determine that, from a life cycle perspective, the overwhelming majority of PM, NOx, and GHG emissions come from the fuel combustion phase for the typical diesel-electric locomotive. Emissions from locomotive manufacture are small in comparison. Furthermore, the criteria pollutants and carbon intensity of transportation electricity and hydrogen are already cleaner than diesel and are becoming even cleaner under state laws mandating renewable sources of fuel and energy production, along with CARB upstream regulatory programs.
>
> Staff disagrees with the comment that the Proposed Regulation would lead to "premature retirement" of locomotives. Locomotive operators will not be required to remove locomotives from California service before the end of their useful life. As explained in detail in the ISOR, the 23-year operational limit is intended to allow a minimum of two "useful life" time periods for a locomotive. A useful life is the period during which the locomotive engine is designed to properly function in terms of reliability and fuel consumption, without being remanufactured. It is also the period during which a locomotive is required to comply with all applicable federal emission standards. U.S. EPA defines minimum useful life as MWhs equal to the product of the rated horsepower multiplied by 7.50, and the minimum useful life in terms of years is 10 years. Allowing 23 years of operation would enable operators to use most locomotives for a time span equivalent to two useful lives—and at any point they could continue to use the locomotive indefinitely if the convert it to be ZE Capable.

r) Comment 45-33-1

Rail transportation is the most energy efficient lowest carbon method of mechanical transportation. Large gains in GHG emissions would be gained with investments that attract riders to the rail mode as opposed to strategies that hinder that shift. So a parallel goal should be part of the equation, strategies (offsets) to reduce GHG by increasing rail ridership.

Agency Response: No changes were made in response to this comment. CARB recognizes the importance of passenger rail transportation. A locomotive operator could increase service while still moving to ZE operations, making it feasible for passenger operators to pursue plans that reduce VMT and emissions from personal vehicles.

The Proposed Regulation is an airborne toxic control measure (ATCM) focused on reducing PM and NOx, with GHG co-benefits. The primary concern of CARB is the health of Californians, including riders of rail. A California study[18] referenced in the ISOR Appendix H found that the concentrations of PM2.5 in train cabins are the highest compared with other transportation modes (e.g., buses, light rail, bicycles). It is incorrect to say that rail transportation is the most energy efficient, lowest carbon method of mechanical transportation. This response incorporates the response to comment BH1-OT-4-3 for discussion on truck versus train GHG emissions.

The Proposed Regulation includes additional flexibility in the form of the ACP, described in Master Response 10. In addition, as directed by the Board at the November 18, 2022, Board hearing, CARB, in collaboration with passenger operators developed the AFMO (section 2478.8), described in Master Response 11, that can be followed instead of directly complying with the SA and IUOR.

s) Comment 45-23-1

[T]he mechanisms that CARB has proposed to pursue this objective by singling out railroads for expensive new regulatory burdens and charges are both unlawful—because they are preempted by federal law—and counterproductive. Rail is already the most efficient and environmentally friendly way to move people and freight over land. One train can carry the freight of hundreds of trucks and freight railroads are 3-4 times more fuel efficient on average than trucks. Railroads contribute only 1.9 percent of the U.S. transportation-related greenhouse gas emissions and can move one ton of freight nearly 500 miles on average on a single gallon of fuel.

CARB has repeatedly overstated rail emissions in recent years and has used those overstated emissions to create incorrect (and overstated) forecasts of future emissions. Corrected data and an explanation for why CARB's data is incorrect have been provided to CARB staff by AAR on multiple occasions. To date, CARB staff have failed to acknowledge or correct these mistakes.

Agency Response: No changes were made in response to this comment. For discussion on federal preemption, see Master Responses 2, 3, and 4. This response also incorporates the response to comment BH1-OT-4-3 for discussion on truck versus train fuel efficiency and emissions. California has made great strides in transitioning other freight sectors to ZE operation and as such, locomotives in California will soon be the dirtier mode of freight transport. Locomotives must transition to ZE operation as well. It is also misleading to say freight rail only accounts for two percent of GHG emissions, because all non-freight transportation modes, including passenger vehicles,

[18] CARB 2022, Proposed In-Use Locomotive Regulation Initial Statement of Reasons, Appendix H: Ham W, Vijayan A, Schulte N, Herner JD., Commuter exposure to PM2.5, BC, and UFP in six common transport microenvironments in Sacramento, California, Atmospheric Environment 167, pp.335-345, 2017.

are included in the U.S. transportation-related GHG emissions the commenter references. See also comment 45-23-85 for discussion on why CARB does not agree that emissions are overstated.

t) Comment 15-11-1

We submitted a detailed 30 page document at the last public meeting with practical suggestions to improve the in-use rule. This document also detailed how poorly performing the current Tier 4 diesel passenger locomotives are:

- Emitting actual in-use NOx emissions at two to three times the EPA standard
- One of the two OEM locomotives not being emissions tested in its operating condition
- Both of the locomotives apparently idling over 30 minutes when by regulation the locomotives don't meet any of the exceptions to disable the auto shutdown features

We were disappointed to observe that instead of taking serious the deficiencies of the current Tier 4 diesel passenger locomotives, CARB staff is instead giving the passenger rail agencies a free pass on high in-use toxic emissions. The NOx chart in the document indicates that the AFMO plan predicts no reduction in passenger locomotive NOx emissions through 2035 which is unacceptable considering in-use NOx emissions are well above the Tier 4 standard.

> **Agency Response**: No changes were made in response to this comment. See response to comment 45-37-7 for discussion on passenger locomotive emissions. The idling requirements of the Proposed Regulation will allow CARB to enforce a 30-minute idling limit.

u) Comment 15-11-3

[U]se event recorder data, which is already collected, archived and contractually available to CARB, to properly inventory actual in-use emissions based on the operational configuration emissions test data.

> **Agency Response**: No changes were made in response to this comment. See response to comment 45-37-7 for discussion on passenger locomotive emissions.

v) Comment 15-2-3-3

[T]his rule is bad policy that would work at cross purposes with CARB's stated goal of advancing goods movement decarbonization. Rail is already the most efficient and environmentally friendly way to move people and freight over land. One train can carry the freight of hundreds of trucks and freight railroads are 3-4 times more fuel efficient on average than trucks.

> **Agency Response**: No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. For a discussion of GHG emissions from trucks versus trains, see the response to comment BH1-OT-4-3. For a discussion of why locomotives must be decarbonized, see the response to comment 45-23-1.

w) Comment 15-2-3-13

Providing additional time to comply with a rule…does [not] increase the likelihood that implementation of the rule would in fact be effective in reducing locomotive emissions.

Agency Response: No changes were made in response to this comment. This response incorporates the response to Comment 15-2-6-1. As stated in the Second Notice of Public Availability of Modified Text and Availability of Additional Documents and Information, published on August 8, 2023, the additional time provided to operators to comply with the Spending Account and Registration and Reporting Requirements were to:

1. Allow operators to use the additional time to secure funding for cleaner locomotives by using the unprecedented amount of grant and incentive funding that has been made available to locomotive operators prior to the first SA deposit.

2. Registration information is primarily required to monitor compliance and conduct enforcement in the event of a violation of the Proposed Regulation. Since the first SA deposit and first reports are not required until July 1, 2026, registration information is not necessary until July 1, 2026.

3. The reporting date change was made to align reporting with the first SA deposit and SA reports. While staff acknowledges that there would be value in obtaining earlier emission and idling reports, staff wished to streamline administration of the reporting requirements for both CARB and operators, and thus chose to keep a consistent start date for all reporting requirements.

Staff agrees that the additional time provided for the SA and Registration and Reporting Requirements will not in itself be effective in reducing emissions. The changes were made to aid operators in the cost and overall preparation for the rule, which does reduce emissions.

6. Definitions Use in Proposed Regulation

Several commenters made general comments on definitions revolving around the concept of "zero emission," including: (1) concern the definitions are not inclusive enough of low-emitting combustion technology and (2) concern the definitions do not cover lifecycle-emissions.

Master Response 6: The definitions used in the Proposed Regulation for ZE locomotives and ZE capable locomotives are consistent with the CFR, CCR, and commonly accepted definitions of ZE equipment. Under 40 CFR 88.1(b)(3) lists the following types of vehicles as qualifying as ZE:

1. Electric vehicles (see *40 CFR 86.1803-01*).
2. Any other vehicle with a fuel that contains no carbon or nitrogen compounds, that has no evaporative emissions, and that burns without forming oxides of nitrogen, carbon monoxide, formaldehyde, particulate matter, or hydrocarbon compounds.

CCR, title 13, section 1962.2, defines a zero emission vehicle (ZEV) as a "vehicle that produces zero exhaust emissions of any criteria pollutant (or precursor pollutant) or greenhouse gas under any possible operational modes or conditions."

The Proposed Regulation clarifies that equipment with emissions levels rounded to 0.00 g/bhp-hr does not mean they qualify as ZE, unless it burns without forming NOx, carbon monoxide, formaldehyde, PM, or hydrocarbon compounds under any possible operational modes or conditions. The Proposed Regulation clarifies that emissions levels reported as zero merely due to rounding does not qualify the equipment as ZE. This is consistent with the CFR, CCR, and commonly accepted definition of ZE equipment as discussed.

Multiple comments make the incorrect claim that, "if emissions measurement systems and protocols cannot detect any emissions, then neither will the relevant emissions inventories or receptors." Emissions measurement systems and protocols can detect criteria pollutants of combustion engines, but the reporting is rounded to the second decimal point because the current emissions standard is much higher than what the modern engines can achieve.

Diesel Particulate Matter (DPM) is PM which is directly emitted by diesel engines. CARB listed DPM as a TAC in 1998, due largely to its association with lung cancer. In 2001, U.S. EPA listed as hazardous air pollutants (HAP), twenty-one compounds that are "known or suspected to cause cancer or other serious health effects," including volatile organic compounds (VOCs) and metals, DPM, and diesel exhaust organic gases (66 Fed. Reg. 17,230 (Mar. 29, 2001) (40 CFR pts. 80 and 86). DPM is a TAC for which there is no known safe level of exposure. In addition to DPM, the exhaust from diesel powered locomotives contains over 40 substances that are considered to be HAPs by U.S. EPA and TACs by CARB.

NOx, a criteria pollutant which includes nitrogen dioxide, a potent lung irritant, is known to aggravate lung diseases such as asthma when inhaled. The health impacts from NOx that were quantified by staff occur from the conversion of NOx into secondary PM that is 2.5 microns or less in diameter (PM2.5) through chemical processes in the atmosphere. Both directly emitted PM2.5 and secondary PM2.5 from mobile sources such as locomotives are associated with adverse health outcomes, such as cardiopulmonary mortality, hospitalizations for cardiovascular and respiratory illnesses, and ER visits for asthma.

Staff notes that, in addition to battery-electric locomotives, staff discusses hydrogen fuel cell locomotives as another potential ZE technology in ISOR Appendix F. Staff assumes freight line haul and passenger operators will prefer hydrogen fuel cell technology due to their operational needs. However, it is the operator's decision what ZE technology they prefer. The Proposed Regulation is technology-neutral. Therefore, if internal combustion engines produce NOx, they do not qualify as ZE equipment under either 40 CFR 88.1(b) or 13 CCR 1962.2 or in the Proposed Regulation. Combustion engines, such as those operating on renewable natural gas (RNG) and hydrogen, may qualify for Tier 4 certification, depending on emission levels, and could be purchased and operated under the Proposed Regulation. For example, locomotive operators may use SA funds until 2030 to purchase technologies such as RNG-Hybrid locomotives and hydrogen-fueled combustion locomotives, as long as the technologies qualify for Tier 4 certification. Such Tier 4 certified locomotives would be

permitted to operate in California for 23 years under the Proposed Regulation. Additionally, the ACP may also allow the use of lower emission combustion technologies regardless of certification status.

The "zero emission" definition found in the Proposed Regulation does not include lifecycle emissions, because CARB traditionally uses the term "zero emission (ZE)" to refer to tailpipe emissions. As an Air Toxic Control Measure, one of the main goals of the Proposed Regulation is to reduce exposure near the actual regulated sources. Emissions due to electricity generation and hydrogen production are addressed by other regulations and directed towards ZE. See Master Response 2: Grid-Related Energy and Infrastructure Limitations for Electric Battery Use in the Response to Comments on the Draft EA for more discussion on infrastructure and energy sources.

a) Comment 45-6-2

The Proposed Regulation has unreasonably restrict the definitions of zero-emission (ZE) and ZE-capable locomotives in a way that will exclude technologies that can, in fact, achieve ZE equivalent emissions levels.

The proposed regulations would restrict the definitions of ZE locomotives and ZE-capable locomotives to those "that never emit any criteria, toxic, or GHG pollutant from any onboard source of power at any power setting." That overly restrictive definition will unreasonably exclude ZE-equivalent technologies – such as hydrogen-fueled combustion engines – from operating in California for no good reason.

Hydrogen-fueled combustion engines, including those being developed for use in locomotives are ZE-equivalent. In that regard, any trace of amounts of NOx that may be emitted from hydrogen-fueled engines are derived solely from the nitrogen contained in ambient air. Similarly, any trace amounts of PM that may be emitted are solely derived from whatsoever small amounts of lubricating oil may, infrequently, enter a cylinder. In both cases, the actual emissions are miniscule and can be, if deemed necessary, addressed through simplified aftertreatment systems. The net result is that hydrogen-fueled combustion engines emit criteria pollutants at ZE-equivalent levels.

Notwithstanding that well-understood fact, the proposed regulations seemingly go out of their way to prohibit the deployment of that promising ZE-equivalent technology in any locomotives operating in California. The following excerpt from CARB's ISOR makes that clear:

> [S]ome types of locomotives are called ZE locomotives outside of the [definitions of the] Proposed Regulations even though they are onboard power systems that use combustion engines. It is possible for some combustion engine technologies to achieve 0.00 g/bhp-hr for NOx and 0.000 g/bhp-hr for PM after rounding. However, even if the rounded result shows zero, PM and NOx emission rates may not be truly zero. It is important to establish that these forms of power are not considered ZE in the Proposed Regulation. (ISOR, p. 97.)

CARB's position that locomotive engines having emission profiles that round to zero (all the way to 2 or 3 decimal places) nonetheless cannot be considered equivalent to ZE locomotives is inherently unreasonable. Indeed, if emissions measurement systems and protocols cannot detect any emissions, then neither will the relevant emissions inventories or

receptors. Thus, CARB's assertion that "it is important" to prohibit the use of such clearly ZE-equivalent options has no reasonable justification or rationale behind it. Moreover, CARB should not adopt rulemakings that authorize only certain technology options (battery-electric locomotives) while effectively banning others (internal-combustion locomotives) where the emissions profiles of those technology options is the same and equivalent to zero. Rulemakings should set standards that are technology-neutral; they should not be the forum for picking technology "winners" and "losers." Accordingly, CARB needs to revise the relevant definitions to allow for the use of combustion engines that have emission profiles that round to 0.00 g/bhp-hr.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 6.
>
> CARB disagrees with the justification that "any trace of amounts of NOx that may be emitted from hydrogen-fueled engines are derived solely from the nitrogen contained in ambient air." Regardless of whether the nitrogen atom came from the fuel or ambient air, the resulting NOx has the same negative health effect. Nitrogen atoms that form NOx come from either fuel (forming "fuel NOx") or air (forming "thermal NOx" and "prompt NOx"). In most cases, NOx formed from nitrogen and oxygen in the ambient air going through combustion is the largest contributor to the total NOx in the exhaust gas of internal combustion engines.
>
> Hydrogen internal combustion engines do not automatically mean low NOx emissions, because higher flame temperature of hydrogen combustion can lead to higher NOx emissions than hydrocarbon combustion. Even if hydrogen internal combustion engines create lower amounts of PM and NOx compared to diesel internal combustion engines, hydrogen still forms NOx when burnt, and no aftertreatment system can completely remove NOx.

b) Comment 45-19-26

CGFA takes exception to the use of the term "zero emission (ZE)" in association with this regulation. Advanced technology locomotives may reduce emissions but do not eliminate emissions. CGFA recommends that the terminology be replaced with something that better reflects the actual purpose of the rule –e.g., reduced emissions. While this distinction may appear trivial, the general public is being misled to think that the rule will achieve zero emissions, which is not the case. An electric locomotive will require line power, and a battery-powered locomotive would have to be recharged – the emissions from the use of these technologies will occur at power plants. Public receptors near the railyard may benefit from reduced emissions, but public receptors near power plants may be adversely impacted. The 2016 CARB Technology Assessment suggests that multiple 50 MW power plants would have to be constructed near rail facilities to recharge tender batteries for use in the South Coast Air Basin alone – these power plants would not be zero emission facilities.

Similarly, hydrogen production will emit pollutants. If hydrogen is produced electrolytically, emissions will occur at a power plant. If hydrogen is produced via steam methane reforming, there will be combustion emissions from heating the process and GHG emissions as a byproduct of the process itself. Thus, the use of the term zero emissions misrepresents the reality of the technology and misleads the public.

Agency Response: CARB has made no changes in response to this comment. This response incorporates Master Response 6.

c) Comment 45-23-40

[H]ydrogen fuel technology results in "zero- or -near-zero smog-forming emissions." "Near-zero" hydrogen fuel cell technologies cannot be used to meet CARB's proposed requirements for zero emission locomotives. CARB's technology assessment does not distinguish between "zero" and "near-zero" hydrogen fuel cell technologies. AAR agrees with the comments of the Truck and Engine Manufacturers Association ("EMA") regarding the absurdity of CARB's prohibition of the operation of zero-emission equivalent technology, such as hydrogen-fueled combustion engines. As noted by EMA, CARB's assertion that "it is important" to prohibit the use of such clearly ZE-equivalent options lacks any reasonable justification or rationale and amounts to CARB staff attempting to pick and choose favored technologies without the technical expertise to do so.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 6. CARB staff has not identified "clearly ZE-equivalent options;" in order for any such options to qualify, they would need to meet the definition of "Zero Emission Locomotive" given. There is no ambiguity when certain hydrogen fuel technologies are not categorized as a ZE technology. CARB may offer examples of available technology to help the regulated community understand what may be feasible, however CARB holds no bias on which strategies and solutions should be applied. Any ZE technologies can be used to comply with the Proposed Regulation. See response to comment 45-6-2 for more discussion on hydrogen-fueled engines.

d) Comment 45-34-1

The proposed regulations would restrict the definitions of ZE locomotives and ZE-capable locomotives to those "that never emit any criteria, toxic, or GHG pollutant from any onboard source of power at any power setting." That overly restrictive definition will unreasonably exclude ZE-equivalent technologies – such as RNG-Hybrid locomotives that have EPA rail engines emission qualified of 0.00 g/bhp-hr for NOx, 0.000 g/bhp-hr for PM and 0.00 g/bhp-hr or NMHC – from operating in California for no good reason. RNG-fueled combustion engines used in steady-state in a RNG-hybrid configuration, including those being developed for use in locomotives, are ZE-equivalent. The net result is that RNG fueled combustion engines emit criteria pollutants at ZE- equivalent levels and the GHG emissions are significantly better with a Negative CI.

Notwithstanding that well-understood fact, the proposed regulations seemingly go out of their way to prohibit the deployment of that promising ZE-equivalent technology in any locomotives operating in California […].

CARB's position that locomotive engines having emission profiles that round to zero (all the way to 3 or 4 decimal places) nonetheless cannot be considered equivalent to ZE locomotives is inherently unreasonable. Indeed, if emissions measurement systems and protocols cannot detect any emissions, then neither will the relevant emissions inventories or receptors. Thus, CARB's assertion that "it is important" to prohibit the use of such clearly ZE-equivalent options has no reasonable justification or rationale behind it. Moreover, CARB

should not adopt rulemakings that authorize only certain technology options (battery-electric locomotives) while effectively banning others (internal-combustion locomotives) where the emissions profiles of those technology options is the same and equivalent to zero. Rulemakings should set standards that are technology-neutral; they should not be the forum for picking technology "winners" and "losers." Accordingly, CARB needs to revise the relevant definitions to allow for the use of combustion engines that have emission profiles that round to 0.00 g/bhp-hr for NOx and 0.000 g/bhp-hr for PM.

> **Agency Response:** CARB has not made changes in response to this comment. This response incorporates Master Response 6.

e) Comment 45-34-5

The proposed in-use locomotive regulations should not be approved as drafted because they unreasonably restrict the definitions of ZE and ZE-capable locomotives to exclude all combustion-engine technologies, including RNG-Hybrid technologies, that can achieve emission levels that are equivalent to zero for both switcher and linehaul locomotives. Accordingly, OptiFuel requests that the Board direct staff to revise the proposed regulations to address this issue of primary concern.

> **Agency Response:** CARB has not made changes in response to this comment. This response incorporates Master Response 6.

f) Comment 45-37-8

We recommend the following revisions [to the definition of "Cleanest Available Locomotive"] to allow for combined emissions in the same way that the Carl Moyer program uses cost-effectiveness calculations for incentive funding.

Revise (A) and (B)

[A] 1.3 grams per brake horsepower-hour (g/bhp-hr) oxides of nitrogen (NOx) and 0.03 g/bhp-hr particulate matter (PM) or {NOx + 13.3*PM} less than 1.70 g/bhp-hr prior to the year 2030;

[B] 0.15 g/bhp-hr NOx, 0.006 g/bhp-hr PM, or {NOx + 13.3*PM} less than 0.223 g/bhp-hr and GHG emissions 15 percent less than Tier 4 for years 2030 to 2035;

> **Agency Response**: No changes were made in response to this comment. "Cleanest Available Locomotive" is no longer used in the Proposed Regulation Order posted on September 20, 2022. The comment is referring to the Draft Regulatory Language posted on March 30, 2021.

g) Comment 45-37-4

End the focus on only the EPA federal Tier 4 emission standard with two discrete emissions levels for NOx and PM. Start enforcing a combined (NOx + 13.3*PM) emissions approach. This will allow incentives to be granted to very beneficial and now common technologies that reduce NOx emissions more than PM.

> **Agency Response:** No changes were made in response to this comment. This comment is about incentives and is outside the scope of this rulemaking because it is

not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action. Therefore, CARB is not required to respond. However, DPM is classified as a TAC that has no known safe level of exposure. Therefore, CARB disagrees with the comment that NOx emissions should be reduced at the expense of DPM emissions. Increased emissions of PM will have adverse health impact on communities where locomotives operate.

h) Comment BH2-4

I noticed there was no mention of converting the existing diesel engines to run on hydrogen as the combustible fuel. Is that an option?

DOE HFTO just announced funding (Apr 24 newsletter) for studying hydrogen combustion, its impact on materials, emissions, etc. Feb 22 HFTO did an H2ICE webinar where they noted every engine maker and supporting suppliers have an engine in various stages of design, companies like Cummins, Toyota, Yamaha & Mazda have H2ICE engines in production. An American Class I loco manuf'r has already hired 2 National Labs to begin the process of converting older diesels to H2ICE.

H2ICE can be made zero emission.

H2ICE can run on a dirty H2 gas mix, so H2 sales won't be reduced as H2 quality stabilizes as the infrastructure grows.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 6. For further discussion on hydrogen internal combustion engines, see response to comment 45-6-2.

7. Spending Account

Several commenters made general comments on the SA (section 2478.4) including: (1) the SA is unnecessary and unproductive; (2) the SA penalizes operation of Tier 4 locomotives; (3) concerns the SA costs are too high for operators and reduces funding for other critical expenses; and (4) SA funds should be allowed for retrofits that may not bring a locomotive to Tier 4 or better, referred to generically in the comment as "aftertreatment retrofits."

Master Response 7: To support the justification and need for the Proposed Regulation, staff detailed each provision of the SA in the ISOR, published on September 20, 2022. Detailed discussion on the economic impacts of the Proposed Regulation is also in the ISOR.

The SA is a concept formulated specifically to connect locomotive diesel emissions to the negative health outcomes, particularly the premature mortalities, caused by those emissions. The SA is not a "penalty" or "punitive measure." The SA internalizes the health costs locomotives operators create due to their operations, providing a financial incentive to utilize lower emission technology in their locomotive operations. As of the publication of the ISOR, staff research showed that every locomotive operator in the State creates emissions that cause harm to human health. The more emissions a locomotive operator emits due to operations in California, the higher their SA charge.

All locomotives that create harmful emissions would be subject to the SA, including Tier 4 locomotives. This is because Tier 4 locomotives, although cleaner than other

tiers, still emit harmful emissions. The ultimate goal of the Proposed Regulation is to have all ZE locomotive operations in the State. However, operating Tier 4 locomotives in California results in significantly less SA obligations, and so still provides a financial incentive for operators to pursue Tier 4 or cleaner technology.

SA funds are only to be used for specified clean technologies, including retrofits to Tier 4 or cleaner emission levels until 2030. However, locomotive operators may use other funding sources to otherwise reduce operational emissions caused by their locomotives, which would lower their funding obligations in the SA.

The SA results in emission reductions throughout the State by dedicating funds for cleaner locomotive technologies. Staff believes that, because of the benefit of reduced SA obligations and added benefits of reduced diesel fuel and maintenance costs ZE technologies provide, operators would replace or convert their oldest locomotives to cleaner technologies as soon as there are enough funds in the SA.

Unlike nearly all other light- and heavy-duty vehicles and equipment operating in California, locomotives have been mostly left unregulated at the State level, and the oldest, highest polluting locomotives operating in the State have been operating for many years more than the average light- or heavy-duty vehicles and equipment in other parts of the California economy. The result is made clear in the discussion of public health consequences in the ISOR—older locomotives disproportionately impact disadvantaged communities at a severe rate while providing locomotive operators an economic advantage over other modes who have been previously and continuously regulated at the State level.

The SA is justified because locomotive operators, on average (but certainly not all) show little progress in upgrading to modern, less polluting locomotives and related infrastructure. Although all locomotive operators spend money to upgrade and occasionally replace their locomotives, turnovers and upgrades that reduce emissions have been slow or in some cases, nonexistent, even among larger operators with more resources. This pattern of fleet management shifts the burden of cost to the communities exposed to diesel pollution, rather than the locomotive operators who create the pollution. Thus, the SA is a regulatory concept developed to address the unique circumstances of the railroad industry. Using SA funds to transition to an all-Tier 4 locomotive fleet alone would reduce locomotive emissions such that nearby cancer risk from locomotive emissions decreases by more than 90 percent compared to 2020 levels, as shown in ISOR Appendix H: Health Analyses for the Proposed In-Use Locomotive Regulation. While the SA is a unique regulatory concept, staff disagrees that a monetary set-aside related to environmental compliance is unprecedented. Indeed, the Comprehensive Environmental Response, Compensation, and Liability Act, commonly known as Superfund, established a fund for environmental cleanup in 1980.

However, staff acknowledges the SA may require spending on timelines that may not be adequate for passenger locomotive operators and others, especially given the recent COVID-19 pandemic. As directed by the Board at the November 18, 2022, Board Hearing staff collaborated with California passenger operators to develop the AFMO (section 2478.8), available to all operators, to be used in lieu of directly complying with the SA and IUOR.

Additionally, all operators may also use the ACP in lieu of directly complying with the SA, IUOR, or both. This will allow operators who are concerned about funding other critical expenses to obtain budget flexibility. Under an ACP, operators must reduce emissions an equivalent amount as if they had followed the SA and IUOR, within a Five-Year Verification Period. All emission reductions within three miles of current rail activity can be used as an emission reduction strategy for an ACP including emissions control of locomotives at less than Tier 4 emission standards.

To help with the costs of the Proposed Regulation, there are incentives available for locomotive operators. For further discussion on these incentive programs and general discussion on compliance costs, see Master Response 5.

a) Comment 45-8-1

MET has existing grant agreements in place for our nine locomotives, which have expiration dates ranging from 2026-2032. The proposed CARB regulation requires companies to establish a savings account to deposit funds for future locomotive purchases. MET will face a cash flow problem if forced to contribute to a savings account. Our railroad, along with others will have to make a choice to invest in normal safety and infrastructure maintenance and improvements, or add these funds to the savings account. We simply cannot afford to do both. The estimated amount, per the proposed CARB calculation, will prohibit investment in safety, infrastructure, and personnel growth, while absorbing any profits the company may presently generate. The shift in cash flows will drive our company to a singular focus: survival. To add to these saving accounts amounts to the remaining funds from our normal budget; not allowing additional investments into safety, infrastructure or the human component with competitive wage.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

b) Comment 45-10-6

Mandatory spending accounts siphon critical funds needed by commuter rail agencies recovering from precipitous ridership declines due to the pandemic. Three years after the start of the pandemic, Metrolink has recovered around 40 percent of our ridership as workers have transitioned to work-from-home schedules, and some of our peer agencies in California have even lower passenger recovery rates. This reality directly impacts operating revenues; is a direct cause of an ongoing reduction of service; and will be further exacerbated by the proposed regulation.

Agency Response: Staff made changes in response to this comment. This response incorporates Master Response 7.

c) Comment 45-11-4

We estimate that, depending on the intercity passenger and commuter rail agency, the level of funding required to be deposited in the Spending Account could reach tens of millions of dollars annually, which would then be unavailable for rail operations, state of good repair improvements, or leveraging state and federal investment in rolling stock (including ZE technologies).

Agency Response: Staff made changes in response to this comment. This response incorporates Master Response 7.

d) Comment 45-11-5

[A]gencies would be depositing funding in the Spending Account (and paying, in effect, a penalty) for operating the cleanest available Tier 4 locomotives that were only recently put into operations with significant state investment.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

e) Comment 45-11-6

This costly requirement would harm rail service in usual times by reducing funding available for operations and critical capital improvements, but it presents an existential threat to rail service when applied against the backdrop of the pandemic's impact on rail agencies' financial position and the reality that several rail agencies will soon face a fiscal cliff as one-time federal relief funding is depleted. Finally, this requirement in creating a new financial liability for locomotive operators is likely to impact the credit rating of intercity passenger and commuter rail agencies, thus limiting their ability to leverage financing instruments to deliver major capital projects and increasing their borrowing costs.

Agency Response: Staff made changes in response to this comment. This response incorporates Master Response 7.

f) Comment 45-12-4

Holding passenger rail services to a Spending Account or Useful-Life Requirement as a means of further emissions reductions is counter-productive to CARB's goals and is infeasible for Amtrak.

Agency Response: Staff made changes in response to this comment. The Proposed Regulation includes the ACP and the AFMO which can be used in lieu of the SA and IUOR. See Master Response 10 for details on the ACP and Master Response 11 for further discussion on the AFMO.

g) Comment 45-12-7

Indeed, CARB's proposed Spending Account requirement cannot accord with Amtrak's funding process. Amtrak receives an annual funding allocation that does not include funds for state-level spending accounts. Any money that Amtrak would be required to spend under CARB's proposed regulation would need approval by the Federal Railroad Administration.

Agency Response: Staff made changes in response to this comment. The Proposed Regulation includes the ACP and the AFMO, which can be used in lieu of the SA and IUOR. See Master Response 10 for details on the ACP and Master Response 11 for further discussion on the AFMO. These alternatives were provided by staff to allow flexibilities for operators and in some cases can allow additional time for operators to secure necessary funding.

h) Comment 45-16-2

[R]equiring passenger rail operators, such as NCTD, to pay into a Spending Account would divert critical operating and maintenance funds needed for rail, bus, and Americans with Disabilities Act (ADA) paratransit services. This punitive requirement is counterproductive to achieving clean air objectives because it would directly divert funding from public transit services that play a critical role in achieving the State's GHG reduction goals.

> **Agency Response:** Staff made changes in response to this comment. This response incorporates Master Response 7.

i) Comment 45-19-11

CGFA is requesting that CARB remove the spending account requirements from the rule. The concept of a spending account for environmental compliance is virtually unprecedented in California. There are many other CARB engine replacement programs, including, but not limited to, heavy-duty vehicle fleets, off-road diesel vehicle fleets, Large Spark Ignition (LSI)equipment, etc. – all rules intended to address air quality and health impacts, yet none have spending account requirements.

The spending account is also unjustified. If CARB has concerns about the railroad industry regarding regulatory compliance or financial management that it does not have with other operators or industries, the public documents offered in support of the regulation do not identify those concerns.

Further, the spending account is unnecessary for large operators. UP and BNSF have regular locomotive replacement programs and associated capital, spending approximately $490 million in California on capital equipment annually. These companies do not need CARB to impose a spending account to ensure that sufficient funding will be available to ensure compliance.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7.

j) Comment 45-19-12

[The Spending Account] program represents a significant burden to small operators, including the Grain and Feed operators. A spending account ties up significant capital without justification. It appears to be a punitive measure with no corresponding air quality benefit. Capital tied up in a spending account would be unavailable for normal operating costs such as capital upgrades, payroll, earnings distribution, taxes, etc. A spending account would have an adverse impact on business operations that was not explained, justified, or evaluated during rule development.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7.

k) Comment 45-19-13

The spending account does not include provisions on how the funds are withdrawn or if an entity discontinues business, meets the regulatory threshold through alternative compliance, or meets the requirements with a less costly alternative.

Agency Response: Staff agreed with the comment and added a provision in the regulation that allows the SA to be closed and all funds withdrawn if the locomotive fleet is operated in a ZE configuration. This response incorporates Master Response 7.

l) Comment 45-19-14

[T]he proposed rule allows funds in the spending account to be used for the lease or rental of equipment. Since both lease and rental are "pay-as-you-go" arrangements, there is no reason to put money in escrow, years in advance of a spending requirement.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7. SA funds are not restricted to lease or rental of equipment. Staff encourages operators who directly comply with the SA to use the SA funds strategically such that both emissions are reduced and their unique operations are benefited.

m) Comment 45-19-15

CGFA recommends that the Spending Account provisions of the rule be eliminated in their entirety. Alternatively, CGFA requests that CARB:

- Provide evidence supporting CARB's concerns regarding regulatory compliance and financial management so that the railroad industry can properly respond; and
- Evaluate the economic impacts of the Spending Account on small operators and provide the study results for public review and comment.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

n) Comment 45-23-20

In addition to violating federal law in several different respects, CARB's proposed operating charge and "Spending Account" requirements would be impractical and, indeed, counterproductive. Charging the railroads on an annual basis for operating even the cleanest possible locomotive available on the market –Tier 4 locomotives – does not make sense as a matter of public policy.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

o) Comment 45-23-21

[A]lthough the Proposed Rule allows railroads, prior to 2030, to "purchase, lease, rent, remanufacture, or repower to a locomotive with emissions levels equivalent to or cleaner than the cleanest standard," it is unclear why CARB believes that railroads should purchase diesel-powered locomotives, with a potential lifespan of many decades (that CARB attempts to arbitrarily limit) and operate them in California at the precise time when CARB is penalizing the use of such locomotives with an exorbitant fee and the railroads are investing in the research and development of zero emissions locomotives.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7. The goal of the Proposed Regulation is to

reduce harmful emissions. Purchase of Tier 4 or cleaner diesel locomotives is one of several feasible pathways to comply with the Proposed Regulation. CARB does not require a specific technology. Regulated parties are encouraged to explore the full range of solutions, including remanufactures and repowers, which can also reduce emissions and do not require scrappage of original equipment.

p) Comment 45-23-64

[W]hen CARB completes its small business impact analysis prior to obtaining any of the necessary waivers from EPA, it will be clear that CARB's proposed locomotive charge also places an unacceptable burden on the smallest rail carriers. The average California short line locomotive fleet is 8 units and, based on information provided by CARB in the Proposed Rules, the expected annual payment into that short line's locomotive charge account would be amount to as much as $1.6M each year, while many smaller short lines in California make less than $1.6M in annual profit. This is an extreme financial demand on a small business and would likely prevent smaller short lines from operating in California at all.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

q) Comment 45-23-65

CARB's locomotive charge (a.k.a. "Spending Account") would require railroads to place hundreds of millions of dollars into a trust account to be used only as dictated by CARB to purchase the cleanest available locomotive. There is no market for new locomotives at this time and thousands of locomotives are in storage due to increased productivity and reduced demand for specific commodities. Indeed, new locomotive sales peaked in 2014, at about 1,450 units, and dropped off to near zero by 2020.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7 to discuss alternatives to the SA. This response incorporates Master Response 2 to discuss how the Proposed Regulation does not require locomotive operators to purchase new locomotives or operate new locomotives in California to comply.

r) Comment 45-24-3

The framework penalizes the operations of Tier 4 locomotives with renewable petroleum-free fuel, which are the cleanest, most fuel-efficient diesel locomotives available today.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7, Master Response 8, and Master Response 20.

s) Comment 45-24-6

Ensure that public agencies are not held to a Spending Account under any scenario as a means of further emissions reductions. Passenger railroads will commit to achieving the proposed locomotive emission reduction targets. However, mandatory spending accounts siphon critical operating funds needed by passenger rail agencies recovering from precipitous ridership declines due to the pandemic.

Agency Response: Staff made changes in response to this comment. This response incorporates Master Response 7.

t) Comment 45-25-7

Requiring California short lines to tie up the majority of their net income in locomotive "spending accounts" will also prevent these businesses from investing in other improvements that affect quality of rail service, environmental performance and safety, as well as the long term viability of the railroad. Without adequate funds, improvements such as track and bridge upgrades and improvements to highway grade crossings will be skipped, and the associated gains in efficiency, some of which lead to lower criteria pollutant and GHG output, will not occur.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

u) Comment 45-26-2

Caltrain is requesting that passenger rail agencies not be subject to the spending account provisions of the proposed regulation.

Agency Response: CARB staff made changes based on the comment received. This response incorporates Master Response 7.

v) Comment 45-30-2

The CARB proposed In-Use Locomotive Regulation as written may punish SMART for assuming freight responsibilities starting in July 2024 with payments into an escrow Spending Account for 2023 emissions…Even if SMART succeeds in securing yet-unidentified funds to purchase the necessary two-Tier IV locomotives to provide today's level of service reliably, those locomotives may not be delivered in time for SMART to meet the 2023-24 budget year deadline imposed by this regulation.

Agency Response: CARB staff made changes based on the comment received. This response incorporates Master Response 7.

w) Comment 45-37-2

Retrofit systems to reduce NOx by 90 percent and PM by 50 percent have been developed, with costs a fraction of that of a new locomotive. However, the CARB focus on new locomotives has kept them from commercial viability. CARB should modify the proposed rule to take advantage of these quick and cost-effective emission control options by allowing emission fee accounts to be spent on retrofits, even if these don't achieve the full Tier 4 emission levels.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

x) Comment 45-37-5

Allow the railroads to spend this money on emissions retrofits based on combined emissions for older locomotives to more quickly reduce in-use NOx emissions from a much larger percentage of the locomotive fleet.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7. See response to comment 45-37-4 for CARB reasoning against the combined emissions approach.

y) Comment 45-37-7

For applications where in-use emissions are known to be higher than the certified emissions levels, build in a process to charge the emissions fees based on in-use emissions. Passenger locomotives are a prime example and should use a passenger locomotive duty cycle. Line haul locomotives that are used in switcher service are another example. The preference should be to use actual in-use emissions. Incentivize changes in operational practices that reduce emissions even if the locomotives are certified the same.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-37-1 for general staff response to an emission methodology change. U.S. EPA published informational passenger locomotive duty cycle in 1998 based on data provided by Amtrak from 20 locomotives covering 57,500 hours of operation (U.S. EPA, "Locomotive Emission Standards Regulatory Support Document," pg 54, April 1998). This informational passenger locomotive duty cycle resembles the freight line haul duty cycle. This U.S. EPA document explains why the passenger duty cycle was not used in the Federal regulation. Passenger locomotive duty cycles can vary by route, so it is common to find a route that has a different duty cycle than the U.S. EPA duty cycle. Freight line haul locomotives and switcher locomotives are defined by the CFR based on the rated power, which typically reflects the application and the duty cycle.

z) Comment 45-37-9

We propose and believe the railroads will insist that the spending account be revised to allow the generation of credits from battery hybrid diesel locomotives and also for the railroads to spend account funds to implement after-treatment emissions retrofits on existing older locomotives.

Revise 2478.4 (b) (1) (B)

Funds held in the Spending Account shall only be used for the purchase, lease, or rental of the Cleanest Available Locomotive, or to repower to the Cleanest Available Locomotive, or to install an emissions retrofit system that achieves in-use NOx levels below 2.5 g/bhp-hr.

(or an incrementally lowering Retrofit NOx target, it could start at 2.5 g/hphr and incrementally lower each year, add this incrementally dropping NOx value as a third column to the *Particulate Matter and Annual Factors by Year* Table in the new rule)

Revise 2478.4 (c) (1) (E)

Usage means total MWhs from conventional locomotives or the fossil fuel-based MWhrs for battery hybrid locomotives for the previous calendar year of Locomotive operations in California

Revise 2478.4 (c) (2)

Until December 31, 2034, for each Zero Emission or Battery Hybrid Locomotive in the Locomotive Operator's Fleet, the Zero Emission Credit shall be determined according to the following formula and Table 1:

Revise 2478.4 (c) (2) (C)

Usage means total MWhs for the previous calendar year Zero Emission Locomotive operations in California or Zero Emissions share of MWhrs of battery hybrid locomotive operations in California.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7. Battery hybrid diesel locomotives, classified as ZE capable locomotives under the Proposed Regulation, will not receive ZE credits because they will not accelerate full-ZE locomotive technology prior to 2030.

aa) Comment 45-38-1

[W]e could meet the emissions reduction goal while continuing to operate our existing locomotive fleet of 40 Tier 4 and 15 Tier 2 through 2039 without any procurement of new equipment. Metrolink would set aside a cumulative sum of $625M during this period in a Spending Account according to the regulation requirements. We understand the intent of the regulation language is that if we did set aside enough funds for a ZE procurement, it's encouraged that an agency would proceed down that path toward procurement and replacement of cleaner and/or ZE technology. However, in this scenario, the spending account requirements require Metrolink to save much more funding than is necessary for the purchase of 15 new zero emission locos in 2040 (approximately $500 million more than is needed).

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 7. Staff expects that Metrolink's Climate Action Plan would result in a progressively cleaner fleet and commensurately smaller SA deposit obligation each subsequent year, thereby substantially reducing the cumulative sum required to be deposited into the SA. Metrolink may also wish to submit an application for an ACP or the AFMO to better align Metrolink's purchasing timeline with the Proposed Regulation's requirements.

bb) Comment 45-38-2

[T]he inherent issues of our JPA governance structure…strictly prohibits annual fund set asides; even if funds were available.

> **Agency Response**: Staff made changes in response to this comment. This response incorporates Master Response 7.

cc) Comment 45-38-3

Metrolink does not have enough operating funding to fully restore its service to pre-pandemic levels. Setting aside these amounts of funds is an existential threat to Metrolink; would cripple the agency significantly and would force closure of additional service at a time when we're trying desperately to regain lost ridership.

> **Agency Response**: Staff made changes in response to this comment. This response incorporates Master Response 7.

dd) Comment BH1-OT-10-1

CARB staff proposes a rule that forces passenger rail to divert funds to spending accounts. Diverting funds desperately needed to recover ridership will devastate agencies facing fiscal cliffs with federal rescue funds having been exhausted. Metrolink and CARB staff work together on alternatives to the spending accounts, but the alternative plans proposed could result in negative fiscal impacts similar to a spending account. And our appeals for safety valves, such as if locomotive funding is not available have been rejected to date.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 7, which discusses the AFMO staff added.

ee) Comment BH1-OT-12-1

The second request is to allow more time for the implementation of the spending account. I know that all of the agencies are committed to and would like to work towards an alternative compliance plan, but that will take time. And the moment the spending account goes into effect, we have to encumber that money, which affect all of our operations, not just our rail operations, and negatively impact public transit.

> **Agency Response:** Changes were made in response to this comment. See response to comment 45-11-16, which discusses the AFMO staff added.

ff) Comment BH1-OT-30-2

The required spending account will be detrimental to our cash flow, as we operate under very slim margins. We are a private company and we do not rely on taxpayer funds to assist with safety, infrastructure, maintenance, or human capital needs. This investment, coupled with additional mandates to a spending account for future improvements has long-term business impacts.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7.

gg) Comment BH1-OT-34-1

First, the rule does not allow spending account funds to be spent on the most promising ways to quickly and cost effectively reduce emissions in the short term, which is after-treatment retrofits and hybridization. Further, it continues to rely on the faulty emissions certification duty cycle that EPA came up with and will undercount emissions from Tier 4 line-haul locomotives used as switchers, and Tier 4 passenger locomotives. We request that

the Board consider adding emissions retrofits to the spending accounts, promote hybridization of locomotives, and most importantly fix the certification loopholes that certain Tier 4 switcher and passenger locomotives are abusing.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7. The comment is incorrect. Hybridizing locomotives is an allowable purchase under the SA if it leads to locomotives that are certified to Tier 4 emission levels or cleaner. Hybrid locomotives may qualify as ZE Capable Locomotives under the Proposed Regulation as well, depending on the hybridization type. See response to comment 45-37-7 for discussion on emissions calculations.

hh) Comment BH1-OT-43-1

Like other public commenters, we support the in-use rule, but believe the spending accounts are too restrictive and overlook practical solutions.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7.

ii) Comment 45-11-11

If, in 2027, the technology assessment ultimately finds that zero-emission locomotive and multiple unit technology has not progressed sufficiently to maintain the regulation's compliance deadlines, CARB will have undermined rail service by requiring the redirection of limited resources and funding that could have been used for operations and other capital investments to the Spending Account over 3.5 years for little to no movement on the deployment of zero-emission locomotive and multiple unit technology (relative to what could have been achieved through other means).

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 7. Staff disagrees with the comment that money held in the SA would undermine rail service if ZE technology has not progressed sufficiently. The funds held in the SA can be used to set up ZE infrastructure and move ZE locomotive technology forward through pilots and demonstrations, helping the industry to accelerate deployment of ZE locomotives and multiple unit technology. SA funds can also be used to achieve at least Tier 4 emission standards for locomotives until 2030.

jj) Comment 45-15-5

Specifically, for the JPA's, our operational funding is provided by Caltrans and the regulation is not clear whether the JPAs or Caltrans would be subject to the spending account for in-use locomotives.

> **Agency Response:** No changes were made in response to this comment. The Proposed Regulation is applicable to locomotive operators unless responsibility for compliance is delegated to the locomotive owner through execution of a legally binding agreement between the locomotive operator and the locomotive owner. A locomotive operator is whomever is responsible for operating the locomotive. A locomotive owner, lessee, or rentee falls under the definition of a locomotive operator

if they are responsible for operating one or more locomotives in California. Regardless of who provides operational funding, it is the locomotive operator that would be subject to the requirements of the Proposed Regulation.

kk) Comment 45-31-3

While the rule proposes extremely onerous recordkeeping and anti-idling requirements, the spending account provision provides the most severe burden to small businesses.

Agency Response: No changes were made in response to this comment. The ACP is an alternative compliance pathway operators can follow instead of directly complying with the SA if equivalent emissions are reduced. This compliance option was included in the regulation to allow flexibility for operators that can reduce emissions but may not be able to comply with the yearly requirements of the SA. Additionally, the Proposed Regulation includes a small business hardship extension for small businesses that can show the requirements of the regulation would detrimentally harm the small business.

Staff disagrees that the Proposed Regulation idling requirements are "onerous." The Proposed Regulation's idling requirements are similar to the U.S. EPA federal idling requirements, which operators should already be following, and allows for similar exceptions. The idling requirements in the Proposed Regulation allow CARB to enforce a state idling limit. The Proposed Regulation requires recordkeeping for three years and is consistent with other CARB regulations. Therefore, staff also disagrees with the comment that the recordkeeping requirements are onerous.

ll) Comment 15-3-1

[T]he In-use Locomotive Regulation represents a grand departure from other emission reduction programs in the transportation sector and will impose significant new regulatory and cost burdens on California industries. It is disappointing that CARB has included an element in this regulation that effectively restricts businesses from being able to comply with the multitude of emission reduction regulations.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 and Master Response 7. Each new regulation is unique in that it is designed to address the health effects, economic and technical feasibility, and regulatory and incentives environment of the regulated entities; the unique characteristics of locomotives and locomotive operations under the law have influenced the design of the Proposed Regulation.

mm) Comment 15-3-2

Beginning July 1, 2024, a locomotive operator must establish a "Spending Account" for the future procurement or retrofit to the cleanest available locomotive. The Spending Account acts as a trust account wherein a locomotive operator would annually fund the account based on a calculated formula. By design, CARB prohibits the locomotive operator from utilizing those private funds for any purpose other than complying with the regulation. CARB has never promulgated a rule establishing such a requirement on private industry, and it is a far departure from what has been required in other rulemakings.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 and Master Response 7. This response also incorporates the response to comment 15-3-1.

nn) Comment 15-3-3

The spending account is a significant financial and unnecessary barrier for industries willing to invest in emission-reduction technologies across the entirety of their operation. As currently proposed, accessing funds deposited in the spending account is strictly limited. Should a locomotive operator desire to expend financial capital to replace or retrofit other vehicles, undertake decarbonization efforts for operational infrastructure, undertake other emission reduction strategies, or even fund employee payroll, the funds contained within the spending account would not be eligible for these expenditures. CARB has failed to justify why a spending account is necessary when other regulation components would achieve the same result.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 and Master Response 7. CARB appreciates the reference to decarbonization and shares the goal of reducing carbon emissions. The Proposed Regulation is an air toxics control measure focused on reducing PM and NOx, because exposure of California communities to PM and NOx results in serious health effects including premature mortality. The Proposed Regulation would also reduce GHG emissions, which include carbon. Compliance with the Proposed Regulation would achieve the goals of decarbonation and reduction of exposure to PM and NOx.

oo) Comment 15-3-4

The IUOR establishes a compliance date of January 1, 2030, and further establishes that only locomotives with original engine build dates less than 23 years old would be permitted to operate in the state.

While we understand that all of California's transportation sectors will eventually be obligated to achieve zero-emission, CMTA objects to CARB's interference regarding how our member companies financially manage this obligation. Historically, California industries have appropriately managed their financial assets to meet aggressive regulatory standards. Those required to replace or retrofit vehicles under previous emission reduction programs have done so without CARB promulgating a spending account for compliance purposes. The spending account is unreasonable, counterproductive, and the least cost-effective measure to achieving more significant emission reductions.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7 for discussion on the SA and Master Response 5 for a discussion on costs of the Proposed Regulation.

pp) Comment 15-2-3-5

Regarding the Spending Account, subsection 2478.4(b): Please fully explain the availability, both in duration and grant amount, of Carl Moyer state grant funding for Tier 4 or better locomotives with this change. CARB staff previously has been extremely clear that the Carl Moyer program will begin declining availability on enactment of the new in-use locomotive

regulations. Does CARB now expect that Carl Moyer funds will remain fully available, and if so, what is the basis for CARB's change in position? Please explain exactly how the Carl Moyer Program will be impacted by these new regulations.

> **Agency Response**: No changes were made in response to this comment. The comment is out-of-scope with regard to the proposed second 15-day changes. This response incorporates Master Response 5 for discussion of available incentives and the response to Comment 15-2-7-7 for a discussion of Carl Moyer specifically. The Carl Moyer Program is one of many grant programs that fund locomotives. Carl Moyer funding is administered at the Air District level.

8. Zero Emission Credit

a) Comment 45-11-8

This system is intended to incentivize early deployment of zero-emission locomotives and multiple units but fails to acknowledge that the procurement of locomotives by intercity passenger and commuter rail agencies is heavily dependent on their receipt of competitive grant funding. Intercity rail and commuter rail agencies that receive these grants would clearly benefit from the system; however, agencies that failed to secure these grants – despite their best efforts – would be unfairly penalized.

> **Agency Response:** No changes were made in response to this comment. The ZE credit, which is obtained through an optional action rather than a required action, provides additional SA flexibility to regulated parties. Failure to obtain a ZE credit is not a penalty.

b) Comment 45-26-4

Caltrain is requesting that credits for ZE rail vehicles do not expire.

> **Agency Response:** No changes were made in response to this comment. The banking of ZE credit may inadvertently incentivize locomotive operators to slow the pace of transformation to cleaner operation. This is the same reason the Proposed Regulation would not allow operators to bank ZE offsets under the AFMO. In addition, the use of ZE credit beyond the trigger dates of the IUOR would provide no additional benefit, because the IUOR could require that operators convert to cleaner operations faster than the mandates of the SA, depending on the population of individual fleets and the distribution of fleet usage. The ZE credit has no value, but rather it reduces the SA obligation, which allows the locomotive operator more flexibility in the timing of their spending on newer, cleaner locomotives as they prepare for the IUOR. Operators seeking more flexibility than provided by the SA and ZE credit provisions may use the ACP or the AFMO.

c) Comment 45-37-6

Allow Zero Emissions credits to be accrued by hybrid locomotives, not just zero emissions locomotives that are not yet available in the market with acceptable range.

> **Agency Response:** No changes were made in response to this comment. ZE credits are intended to speed ZE development and uptake and to maximize the use of ZE

locomotives and ZE rail equipment. However, emissions reductions from using hybrid power systems have the benefit of lowering the funding obligation in the SA.

9. In-Use Operational Requirements

Several commenters made general comments on the IUOR stating: (1) the 2030 IUOR deadline for passenger, industrial, and Class III locomotives should be moved to 2035 to match the line haul locomotive IUOR deadline and (2) the 23-year age limit on locomotives is burdensome.

Master Response 8: The 2030 date does not mean a mandate to begin using 100 percent ZE, but rather a phase-in requirement that any switch, industrial, or passenger locomotives used in the State be operated in a ZE configuration if the build date is 2030 or later. This prompts a more gradual transition than perhaps the commenters are anticipating. Staff disagrees the deadlines are more stringent for passenger than freight line haul locomotives, as both deadlines are set for as early as staff anticipates commercially available locomotives for the locomotive type. Freight line haul locomotives were given a 2035 IUOR start date because staff anticipates ZE technology will take longer to be commercially available for freight line haul operations, due to the higher power and capacity needs. Passenger, switch and industrial locomotives have less strenuous duty cycles; therefore, staff anticipates ZE locomotive technology will be commercially available earlier for these locomotive types and in fact already is in some cases. Staff would also like to note that the In-Use Operational ZE Requirement is for freight line haul locomotives, not for freight rail operators. Freight rail operators could use freight line haul, switch, or industrial locomotives.

The 2027 and 2032 assessments will evaluate if the IUOR can be met with locomotives already available for use or expected to be available for use by the compliance date. If either assessment indicates that current ZE technology and infrastructure is not ready for locomotive operators to meet compliance deadlines, staff may begin the regulatory amendment process. The IUOR provide at minimum 23 years of useful life for locomotives, which is more than twice the useful life as defined by the U.S. EPA.

Although the main compliance pathway has not been altered, CARB staff has added an AFMO. Developed at the request of the CARB Board to address the concerns of passenger operators, the AFMO would allow operators to time upgrades according to their own needs and to use ZE locomotives and ZE rail equipment deployed prior to 2047 to offset the use of legacy units at set rates. Therefore, all operators have three options for compliance: (1) the main compliance pathway of the SA and IUOR, (2) through an approved ACP, or (3) through an approved AFMO.

a) Comment 45-10-9

[W]e ask that CARB provide a consistent date of 2035 for freight and passenger rail agencies under § 2478.5 for the purchase of zero emissions equipment, fostering a more robust shared freight and passenger market for the nascent technology. The current regulation language imposes a 2030 date for passenger rail agencies and affords a five-year delay for freight rail operators. Passenger rail only accounts for 7 percent of all locomotive NOx emissions and 5 percent of PM2.5 emissions from the sector and operate larger fleets of

cleaner Tier 4 equipment compared to freight rail, which operates mostly Tier 2 and older locomotives. Freight rail is responsible for five times the harmful emissions compared to passenger rail. Passenger rail should not be held to a more stringent timeline than freight rail and a unified compliance date will provide the time needed for technology and markets to further mature. While hydrogen multiple units are in operation in Europe and elsewhere, no such zero-emission units and no battery electric or hydrogen locomotives have been approved by the Federal Railroad Administration, a process that requires extensive and lengthy review process for operation in the United States. Indeed, independent industry experts expect commercially viable zero-emissions technologies in this sector to mature within decades, not years.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8.

b) Comment 45-12-8

Passenger rail should not be held to a more stringent timeline than freight rail. The current regulation language imposes a 2030 date for passenger rail entities and affords a 5-year delay for freight rail operators. Passenger rail only accounts for 7% of all locomotive NOx emissions and 5% of PM2.5 emissions from the sector and operates many cleaner Tier 4 locomotives compared to freight that operates mostly Tier 2 and older locomotives.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8.

c) Comment 45-17-3

[A] regulation must provide a consistent 2035 zero emissions purchase date between freight and passenger rail agencies. The current regulation language imposes a 2030 date for passenger rail agencies and affords a 5-year delay for freight rail operators. Passenger rail only accounts for 7 percent of all locomotive NOx emissions and 5 percent of PM2.5 emissions from the sector. Passenger rail should not be held to a more stringent timeline than freight rail. 2035 gives the entire industry the needed time for the technology to develop. Independent industry experts expect commercially viable zero-emissions technologies in this sector over decades, not years.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8.

d) Comment 45-15-7

[W]e ask that CARB provide a consistent 2035 zero-emissions purchase date for both freight and passenger rail operators. As currently proposed, the regulation language imposes a 2030 date for passenger rail operators and affords a 5-year delay for freight rail operators. CARB's outreach to locomotive manufacturers was not sufficient to fully gauge the development and expected timeline of the passenger locomotive market to support this advanced timeline. Passenger rail should not be held to a more stringent timeline than freight rail.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8.

e) Comment 45-18-5

[C]urrent regulation language imposes a 2030 date for passenger rail agencies and affords a five-year delay for freight rail operators. Regulation should provide a consistent 2035 zero-emissions purchase date between freight and passenger rail agencies.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8.

f) Comment 45-19-16

CARB seems to provide additional compliance time for line haulers over small operators such as CGFA members. By requiring any locomotive or switcher older than 23 years to be replaced by 2030, it creates an additional burden on our members who have older equipment but operate far fewer hours. Class I operators have until 2035 to meet the ZE mandate. At a minimum, this date needs to be 2035 for small operators such and CGFA members.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8. The Proposed Regulation allows locomotives that have been infrequently used to operate for longer than 23 years, as subsection 2478.5(a)(2) states, "A Locomotive may continue to Operate in California beyond the age specified in subsection (a) if…the Locomotive's Primary Engine MWh has not exceeded a total of (rated hp) x (20.25) MWh of operation since its Original Engine Build Date." Thus, the Proposed Regulation does not burden operators that operate fewer hours.

g) Comment 45-25-5

The proposed Regulation also penalizes "early adopter" short lines that have upgraded their locomotive fleets in the cause of cleaner air. Under the proposed Regulation, companies that upgraded their locomotives over the last 20 years will have the 23-year locomotive life rule applied to their units retroactively.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8. Staff disagrees with the characterization of the 23-year locomotive life rule as a penalty against early adopters of cleaner locomotives. Operators that have updated their fleets more recently will by nature of the requirement have more time before they are required to modernize their fleets. The 23-year IUOR applies to every locomotive's operations in California, whether it was acquired before or after the Proposed Regulation. Operators with newer, cleaner fleets will also have reduced SA obligations because of their reduced locomotive emissions.

h) Comment 45-30-9

Provide a consistent 2035 zero emissions purchase date between freight and passenger rail agencies. The current regulation language imposes a 2030 date for passenger rail agencies and affords a 5-year delay for freight rail operators. Passenger rail only accounts for 7 percent of all locomotive NOx emissions and 5 percent of PM2.5 emissions from the sector. Passenger rail should not be held to a more stringent timeline than freight rail. 2035 gives

the entire industry the needed time for the technology to develop. Independent industry experts expect commercially viable zero-emissions technologies in this sector over decades, not years.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 8.

i) Comment 15-2-3-6

Regarding the In-Use Operational Requirements, subsection 2478.5(a)(2)(C): Please explain how this would apply if a Tier 4 locomotive is required before January 1, 2030, then shortly after acquisition EPA creates a new Tier level. For example, if a Tier 4 locomotive is acquired on January 1, 2025, and on January 1, 2026, EPA institutes a new, cleaner emission standard for railroad locomotives, what is the final date this Tier 4 locomotive can be used in California?

> **Agency Response**: No changes were made in response to this comment. As stated in section 2478.5(a), beginning in 2030, any locomotive 23 years or older based on its original engine build date could no longer operate in California. Therefore, if an operator were to purchase a Tier 4 on January 1, 2025 (with an engine build date of 2025), it would be permitted to operate in California for 23 years, regardless of cleaner standards being developed. That locomotive may continue to be operated in California beyond those 23 years if it qualified for one or more of the exemptions listed in section 2478.5(a)(1) or (a)(2).

j) Comment 15-2-3-7

Regarding the In-Use Operational Requirements, subsection 2478.5(a)(2)(C): For the purpose of the (a) (2) section of the new proposed in-use locomotive regulations, is the "U.S. EPA Locomotive exhaust emissions standard" specific only to diesel-electric propelled locomotives?

> **Agency Response**: No changes were made in response to this comment. U.S. EPA Emissions Standards for locomotives apply to diesel-powered locomotives and locomotive engines.

k) Comment 15-2-3-8

Regarding the In-Use Operational Requirements, subsection 2478.5(a)(2)(C): For the purpose of the (a) (2) section of the new proposed in-use locomotive regulations, what is the start date for application of a stricter "U.S. EPA Locomotive exhaust emissions standard": the date the new standard is published in the Federal Register, the date the first locomotive meeting this new standard is commercially available, or something else?

> **Agency Response**: No changes were made in response to this comment. The start date is the effective date of the new standard.

l) Comment 15-2-3-9

Regarding the In-Use Operational Requirements, subsection 247[8].5(b)(1): With the inclusion of the status "safety" in the considerations associated with CARB staff assessment of "the

status of … infrastructure improvements that may be needed to support ZE locomotives", why were "reliability", "availability" and "cost effectiveness" not also included?

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16 for discussion of what is included in the 2027 and 2032 assessments and Master Response 5 for a discussion of costs and flexibilities already built into the Regulation to account for cost effectiveness and availability. The words referenced in the comment do not need to be added in order to be accounted for in the assessments.

10. Temporary Operating Extension

Locomotive operators made general comments on the Temporary Operation Extension, including: (1) requests to expand the Temporary Operating Extension to include additional circumstances of unplanned downtime and (2) requests to reduce the stringency of the approval process.

> **Master Response 9**: Staff did not make changes in response to these comments. Operators can apply for the Temporary Operating Extension for maintenance or emergencies meeting the description in section 2478.5. The locomotive operator can submit a Temporary Operating Extension request before or during the temporary operation, which allows flexibility for unplanned locomotive downtime. Equipment breakdown is not considered an emergency, but an event that can be mitigated through contingency plans that are part of business planning. Ongoing maintenances can be adequately planned. Non-emergency events such as mechanical problems or maintenance must be addressed with compliant locomotives.
>
> One comment states that in case of unplanned locomotive downtime, demurrage charges are current practice, and product can be diverted to a facility with an operable locomotive. The Proposed Regulation provides no additional challenge to the operators by requiring the other functional locomotive to be compliant with the Proposed Regulation. While unplanned locomotive downtime, such as due to a malfunction, may cause a temporary reduction of profit, operators with a single locomotive are already operating under that financial risk. Financial consequences to operations due to unplanned locomotive downtime are business decisions made by the operator.
>
> Allowing an operator to temporarily operate out of compliance with the IOUR without prior approval from CARB and to wait up to 30 days after temporary operation before submitting to CARB an application for a Temporary Operating Extension creates the possibility that locomotive operators could operate locomotives in conditions CARB would ultimately disapprove, opening communities to unnecessary risk from exposure to diesel emissions.

a) Comment 45-19-17

CARB has provided a temporary extension to allow the operation of non-compliant locomotives. We believe this is a necessary provision in the regulation; however, the timelines for application submittal and approval do not provide the flexibility necessary to support

Grain and Feed operations. As explained in the Cost and Reliability section above, unplanned locomotive downtime has severe consequences for Grain and Feed operations and the food chain in California.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 9. In the Cost and Reliability comment cited by the above, the comment states that demurrage charges are current practice, and product can be diverted to a facility with an operable locomotive in case of unplanned locomotive downtime. While unplanned locomotive downtime, such as due to a malfunction, may cause a temporary reduction of profit, operators with a single locomotive are already operating under that financial risk.
>
> For specific conditions acknowledged by CARB as emergencies, the locomotive operator can submit a temporary operating extension request before or during the temporary operation if the issue meets the conditions described in section 2478.5, which allows flexibility for unplanned locomotive downtime.

b) Comment 45-19-18

[N]eed to be assured these waivers will be available for poor reliability and lack of parts for service. Grain and Feed operators that have Tier 3 and Tier 4 locomotives in operation are experiencing far higher mechanical issues and more downtime. These units experience mechanical issues at a far higher rate and when they breakdown, it is often more difficult to get the units repaired and source spare parts. One member operator has had a Tier 4 locomotive out of operation for almost a year because of these issues.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 9. This response incorporates Master Response 26 for an explanation of why CARB does not agree that Tier 4 locomotives have reliability issues.

c) Comment 45-19-19

CGFA is requesting that a Temporary Waiver be available on an as-needed basis, without prior approval from CARB. This would allow Grain and Feed operators to employ older standby equipment on a limited basis to support operations in the event of unplanned downtime (e.g., a breakdown and ongoing maintenance). CGFA suggests either a limit of 1,000 hours per year or a limit of 2,000 gallons of diesel fuel. These suggested limits are well below the exemption of 10,000 gallons per year provided in the rule for historic railroads, and thus would not cause emissions or health risk impacts exceeding what is allowed for other operators.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 9. The Proposed Regulation has the Historic Railroad Low-Use Exemption not because low amounts of usage cause no health effects, but because the purpose of historic locomotive operations is to exhibit and demonstrate historic locomotives in their original condition, to educate and benefit the public; the historic nature of these locomotives will be fundamentally altered if they were to comply with the Proposed Regulation. CGFA members do not require the operation of historic locomotives.

d) Comment 45-19-20

CGFA suggests that CARB require a report be submitted within 30 days following the use of a non-compliant locomotive under this waiver, to document the reason the locomotive was used, the hours of operation, and the fuel consumed.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 9.

e) Comment 45-11-12

While this is useful flexibility, we are concerned that the temporary operating waiver does not include relief for lack of funds, or lack of commercial availability, both of which are significant barriers for public agencies.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-26-7.

f) Comment 45-26-7

[W]e are concerned that the temporary operating waiver does not include relief for lack of funding, commercial availability, or FRA approval, which are significant barriers for public agencies.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 9. The temporary operating extension will prevent operators from being deemed in noncompliance for delays outside of their control. This response incorporates Master Response 16 for discussion on Federal Railroad Administration (FRA) approvals, the 2027 and 2032 assessments, and compliance extensions. This response incorporates Master Response 11 to discuss the AFMO.

g) Comment 15-2-6-8

Staff revised Subsection 2478.5(a)(2) to add subsection (C), which describes how locomotives older than 23 years, that meet the cleanest current United States Environmental Protection Agency Tier and emission standards, can continue to operate in some cases. Staff made this change because it is possible that under some circumstances an operator could have had to unnecessarily cease operation of a 23-year old locomotive and replace it with operations from a newer locomotive of the same Tier.

It is essential that staff be very cautious in not creating loopholes that allow locomotive operators to evade this regulation. We appreciate that staff revised subsections 2478.5(b) and (c) to clarify that even with the addition of subsection 2478.5(a)(2)(C), locomotives older than 23 years will need to be operated in a ZE configuration while in California as required under the provisions of (b) and (c). We ask that CARB staff support this clarification in the record to ensure that this change does not create a pathway for a regulatory loophole.

> **Agency Response**: No changes were made in response to this comment. As written under subsection 2478.5(a)(2)(C) a locomotive would only be able to continue operating for longer than 23 years if the ZE operational requirements did not apply. Subsection 2478.5(a)(2)(C) applies only when the locomotive is not subject to the

requirements of subsections 2478.5(b) or (c), and meets or exceeds the cleanest U.S. EPA Locomotive exhaust emissions standard. For example, any switch, industrial, or passenger locomotive with an original engine build date of 2030 or newer, or with an original engine build date that exceeds 23 years of age, shall operate in a ZE configuration at all times while in California, regardless of its exhaust emissions standard (subsection 2478.5(b)). Similarly, any Freight Line Haul Locomotive Engine with an original engine build date of 2035 or newer, or with an Original Engine Build Date that exceeds 23 years of age, shall operate in a ZE configuration at all times while in California, regardless of its exhaust emissions standard (subsection 2478.5(c)). A locomotive older than 23 years and meeting or exceeding the cleanest U.S. EPA Locomotive exhaust emissions standard will need to operate in a ZE Configuration at all times while in California, because it is subject to the requirements of subsections 2478.5(b) or (c).

11. Alternative Compliance Plan

Several commenters made the following comments on the ACP option including that the ACP: (1) verification period needs to be longer than five years; (2) should give credit for early emissions-reduction actions and reduced vehicle miles traveled (VMT); and (3) does not provide enough flexibility for passenger operators.

Master Response 10: The ACP has annual reporting, to regularly evaluate emission reduction progress. Locomotive operators will be able to amend an approved ACP to adjust strategies if necessary. The ACP provides flexibility by evaluating compliance with emission reduction requirements at the end of its verification period. The ACP time frame is set at a maximum of five years to balance the need for operator flexibility and the need for near-term emission reduction goals. A five-year duration is also consistent with other adopted CARB regulations. CARB believes an ACP greater than five years in duration could lead to critical delays in emission reductions. Thus, CARB has not changed the ACP time frame. To ease concerns of uncertainty in reaching emission reduction requirements within five years, staff added compliance extensions to subsection 2478.6(b) based on compliant equipment (e.g., locomotives, ZE infrastructure), manufacture delays, installation delays, or unavailability. This may help operators avoid being deemed noncompliant for delays out of their control.

Staff assumes that when the commenters discuss "early emissions-reduction actions," they are referring to the adoption of cleaner technology by passenger operators prior to promulgation of the In-Use Locomotive Regulation. Staff does not believe additional "credit" should be given because early emission reductions within a locomotive fleet to cleaner locomotives, ZE locomotives, ZE capable locomotives, or ZE rail equipment will already likely result in a lower amount of required emission reduction under an ACP. This is because less money would hypothetically be accruing in a SA, and newer locomotives would hypothetically turnover later under the IUOR.

The ACP is flexible about how emission reductions are achieved, as long as it is within three miles of operator railyard facilities and or railroad tracks. If this condition is satisfied and operators provide accurate supporting evidence for the emission reductions, VMT reductions and rail service may be included as emission reduction strategies in an ACP.

As directed by the Board at the November 18, 2022, Board hearing, CARB, in collaboration with passenger operators, developed the AFMO (section 2478.8), that can be followed by any operator instead of directly complying with the SA and IUOR. Regulated parties complying through the AFMO must meet four basic milestones:

(1) At least 50 percent of annual fleet usage must be Tier 4 or cleaner beginning in 2030.
(2) 100 percent of annual fleet usage must be Tier 4 or cleaner beginning in 2035,
(3) At least 50 percent of annual fleet usage must be ZE beginning in 2042.
(4) 100 percent of annual fleet usage must be ZE beginning in 2047.

The AFMO has an expedited ZE locomotives deadline but allows for more timing flexibilities for procurement of grants and locomotives. Detailed timeline reports and supporting documentation are required to be submitted to monitor if operators are on track to meet the milestones.

a) Comment 45-10-4

CARB's regulatory framework should incorporate the lessons learned and best practices from successfully converting other transportation sectors in a manner that is safe and appropriate. The regulation as written risks unintended harm to the public by impacting Metrolink's ability to operate a robust schedule of passenger rail service – with the potential unintended consequence of increasing transportation sector emissions and Vehicle Miles Travelled (VMT) across Southern California if our passengers turn to vehicles.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 10. CARB staff met with Metrolink and explained how the ACP can work for Metrolink without hindering Metrolink ability to operate a robust schedule of passenger rail service.

b) Comment 45-10-5

[W]e acknowledge the intended goal of the Alternative Compliance Plan (ACP) framework in reducing the harmful impacts of the regulation. However, the language as drafted would functionally revert ACP agencies back to required Spending Accounts (§ 2478.4) and IUOR (§ 2478.5). We request that public agencies not be held to the emissions requirements in the Spending Account or 23-year Useful-Life In-Use Operational Requirement under any scenario as a means of further emissions reductions.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 10.

c) Comment 45-10-7

[R]equiring that the ACP achieve the same incremental emissions reductions as the Spending Account would force public agencies like Metrolink to begin in 2031 retiring Tier 4 locomotives as early as 14 years into operation, 16 years before their end of useful life.

Agency Response: No changes were made in response to this comment. As stated in section 2478.7(b)(1)(C) of the Proposed Regulation, calculations of required ACP emission reductions assume that Tier 4 locomotives would operate for 23 years prior

to being removed from California service. Therefore, this comment is incorrect. Under an ACP, all Tier 4 locomotives would have a full 23 years of operation prior to being removed from California operations, even if there would have been sufficient accumulation of funds in the SA to purchase a new locomotive.

d) Comment 45-10-10

[W]e ask CARB to extend the time frame for an Alternative Compliance Plan (ACP) to no less than 15 years under § 2478.7. The ACP must also account for early emissions-reduction actions, technology adoptions, and provide credit for reductions in Vehicle Miles Travelled (VMT) and emissions that are facilitated through public passenger rail service. A longer-term ACP and accounting for VMT/emissions reductions through passenger rail service will provide greater certainty for operators and appropriately capture the environmental benefits accrued through passenger rail service. Our peer passenger rail agencies in California uniformly concur that five years is too short to accomplish the objectives of the ACP.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 10. Staff added to subsection 2478.6(b) compliance extensions based on compliant equipment (e.g., locomotives, ZE infrastructure) manufacture delays, installation delays, and unavailability. This will help operators avoid being deemed noncompliant for delays out of their control.

e) Comment 45-10-18

§ 2478.7(b) outlines the assumptions used in determining the equivalent emission reductions needed to be achieved as part of the Plan. The section as written would require that emissions reductions be calculated assuming that locomotive purchases occur as soon as sufficient funding is accumulated. However, publicly operated railroads rarely purchase a single locomotive and typically purchase in bulk due to manufacturing and financing constraints. The typical purchasing behavior should be allowed as an option in determining the procurement schedule and timing of calculating emission reductions. We ask that the regulation language be modified to allow for flexibility of procurement schedules.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 10.

f) Comment 45-11-13

An approved ACP would be valid for a five year "verification" period. In that period, a locomotive operators would be required demonstrate emissions reductions equivalent to compliance with Section 2478.4 and/or Section 2478.5. through use of cleaner equipment. In practice, this requirement would charge locomotive operators with absorbing financial costs and operational impacts similar to compliance with Section 2478.4 and/or Section 2478.5.

Agency Response: No changes were made in response to this comment. The ACP allows emissions reductions to occur through any approved method, not just cleaner equipment, as long as it occurs within three miles of operator railyard facilities or railroad tracks. The ACP is meant to provide flexibility in when emission reductions occur and how they occur, and thus potentially reduce financial and logistical effect.

g) Comment 45-11-14

The proposed ACP would require locomotive operators to document lower emissions for PM, NOx and GHG. These measurements are expensive and administratively burdensome, and GHG is not defined to the extent the regulation defines PM and NOx. Additionally, the measurements for GHG fail to provide an offset for GHG reductions associated with decreases in highway vehicle miles traveled resulting from rail service.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 10. Documentation of lower emissions is necessary for operators to receive credit for their emission reductions. Emissions do not have to be directly measured if they can be accurately calculated using operational data that is already collected.
>
> Staff is unsure what the comment means by "GHG is not defined to the extent the regulation defines PM and NOx." "Greenhouse Gas" is defined in section 2478.3 along with "Particulate Matter (PM)" and "Oxides of Nitrogen (NOx)." GHGs are not included in the SA because the regulation is an ATCM focused on the reduction of PM and NOx. However, because GHG reductions would have occurred as a benefit under the SA and IUOR, the ACP requires similar GHG reductions.

h) Comment 45-11-15

The proposed ACP would require usage data for each locomotive in a locomotive operator's fleet, which may not be readily available.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 13 to discuss usage reporting logistics. Usage data per locomotive is required to be annually reported even if operators are not using the ACP. Usage data is necessary for CARB and operators to quantify emissions per locomotive.

i) Comment 45-11-16

The proposed ACP would require applications to be submitted six months before their effective date. As the proposed regulation is not expected to be in force until 2024 and there is currently no approved framework under which to submit an ACP for consideration, intercity passenger and commuter rail agencies are likely to see a near-term encumbrance of funds into a Spending Account in the interval time between the proposed regulation's approval and ACP approval. Additionally, this submittal process would create uncertainty for intercity passenger and commuter rail agencies that would stymie operations and capital planning – that is, an agency is unlikely to finalize operational and capital plans if acceptance of an ACP is outstanding, as rejection of the ACP would create new financial burden.

> **Agency Response**: Changes were made in response to this comment. This response incorporates Master Response 10. The ACP can be used in place of directly complying with the SA and/or the IUOR. The Proposed Regulation is targeted to go into effect in Fall 2023. The first deposit requirement is July 1, 2024, for emissions in 2023. As demonstrated below, if approvable, an ACP submitted by January 1, 2024, will be approved by the July 1, 2024, deposit date and applicable operator would not be required to deposit funds. If the application is rejected, an operator would need to

deposit funds into the account as required. There is no need to clarify that the ACP covers the SA requirements for 2023, because the first SA deposit requirement is not until 2024.

Under section 2478.7(h), CARB is required to provide an approval within 45 days of submittal of a complete application. Thus, an ACP could be approved within 45 days of submittal if it is a complete and accurate application. CARB is also required to provide notice of deficiency under section 2478.7(f) within 45 days of ACP application submittal if the application is incomplete or inaccurate. The operator is required to provide an updated, complete ACP application within 30 calendar days of receiving the notice of deficiency. Thus, the latest an operator will know the outcome of an ACP application is approximately two months prior to the requested start date of the ACP. CARB encourages operators to work with CARB staff prior to ACP application submittal, to assist in the application being complete and accurate on the first submittal. This will provide more certainty in planning for operators. Applications may be submitted more than six months prior to the requested start date of the ACP if operators would like additional time for the approval process.

j) Comment 45-15-4

[R]espectfully request that passenger agencies that act in good faith under the ACP but are ultimately unable to meet their reduction goals should be held harmless or be put into a compliance mechanism other than the spending account. The regulation needs to clarify what that alternate mechanism would be.

Agency Response: Changes were made in response to this comment. CARB has added additional language to the Proposed Regulation in section 2478.7(j) allowing for applications to amend an ACP if circumstances require. The application must be submitted at least six months before the start date of the amended ACP. CARB encourages operators to be proactive and vigilant about ACP progress, such that amendments are applied for in a timely manner. Otherwise, an ACP will be revoked and cannot be used for compliance with the Proposed Regulation. Once an ACP is revoked, the operator may be subject to CARB enforcement action to the extent that they are out of compliance with the applicable requirements.

k) Comment 45-15-8

CARB needs to consider extending the time frame for an Alternative Compliance Plan (ACP) – preferably for no less than 15 years. Five years provides insufficient time for most agencies to plan, fund, procure, and roll out new locomotives and it will be difficult for any agency to make significant equipment-based reductions as quickly as the ACP requires.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 10.

l) Comment 45-15-9

To be most effective, the ACP should also account for early emissions-reduction actions, technology adoptions, and provide credit for reductions in Vehicle Miles Travelled (VMT) and emissions that are facilitated through public rail service. A longer-term ACP and accounting for VMT/emissions reductions through passenger rail service will provide greater certainty for

operators and appropriately capture the environmental benefits accrued through the very benefit of their service.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 10.

m) Comment 45-17-4

We also urge CARB to extend the period of approval for an Alternative Compliance Plan (ACP) –preferably for no less than 15 years. The ACP should also account for early emissions-reduction actions, technology adoptions, and provide credit for reductions in Vehicle Miles Travelled (VMT) and emissions that are facilitated through public rail service. A longer-term ACP and accounting for VMT/emissions reductions through passenger rail service will provide greater certainty for operators and capture the environmental benefits accrued through service.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 10.

n) Comment 45-19-21

The ACP requires that all emission reductions occur within 3 miles of a rail facility. The pollutants subject to regulation are NOx, PM, and GHG. The 3-mile restriction is unreasonable and/or unworkable for several reasons:

- GHG is a global pollutant – there is no reason that GHG reductions need to occur within 3 miles of a rail facility to provide an equivalent benefit.
- NOx is a local pollutant as NO2 and a regional pollutant as an ozone precursor.
    - There are no NOx non-attainment areas in the State, so reducing NOx within 3 miles of a rail facility is unnecessary to ensure continued NO2 attainment.
    - As an ozone precursor, NOx is a regional pollutant, reacting with VOC in the atmosphere. Any NOx reduction within the same air basin should be allowed.
- Impacts from PM emissions are local; however, the locomotives operated by Grain and Feed operators are remote, with few possible receptor exposures; thus, local reductions will provide no tangible health benefits.
- Because Grain and Feed operations are remote from population centers or other industrial facilities, there are few, if any, opportunities for emission reductions from other (i.e., non-Grain and Feed sources) within 3 miles of their facilities. Thus, the ACP alternative, as currently written, does not provide a viable compliance mechanism for Grain and Feed facilities.

For these reasons, the ACP should allow reductions over a much wider range of area – worldwide for GHG and at least air basin-wide for NOx and PM.

Agency Response: Changes were made in response to this comment. CARB has added language that GHG reductions have no geographical constraints on where they occur, because as the comment states, GHGs are global pollutants and reductions will have the same benefits wherever they occur.

NOx reductions must be reduced in the three-mile radius. As CGFA pointed out in its comments, impacts from NOx emissions are local. Staff is concerned with reducing

emissions near locomotive operations, not only achieving regional attainment status. NOx can also form secondary PM and ozone, which are both harmful local air pollutants, even in short-term exposures.

PM must also be reduced in the three-mile radius. As CGFA pointed out in its comments, impacts from PM emissions are local, and DPM has no safe exposure threshold. Receptors near locomotive operations should not be penalized for living or working in a less population dense region. In ISOR Appendix H, staff estimates that the Proposed Regulation could reduce cancer risk within one mile of rail facilities by approximately 90 percent by 2045, compared to 2020 levels, by transitioning all locomotives to at least Tier 4.

o) Comment 45-19-22

CGFA suggests that CARB consider a "Remediation Fund" similar to that available to Ocean-Going Vessels at Berth (H&S Code 93130.15), or SJVAPCD's Voluntary Emission Reduction Agreement (VERA) program. The fund could be administered by either CARB or the air district in which the facility is operated and could be used to fund emission reduction programs in the air basin. Such a program would reduce the administrative burden on small facilities for identifying and implementing emission reduction projects and would provide funding for the air district to implement emission reduction projects it has identified. Such a program would also reduce the administrative burden on CARB for approving and enforcing ACPs.

Agency Response: No changes were made in response to this comment. The Proposed Regulation aims to reduce harmful emissions near locomotive operations specifically. In the Control Measure for Ocean-Going Vessels at Berth, the Remediation Fund is not a full-time compliance option. Operators are only eligible for Remediation Fund compliance if their usual approved emission reduction strategy is temporarily unavailable due to circumstances such as installation or repair. The VERA program only applies for emissions reductions that are surplus of legal requirements. The Proposed Regulation has a compliance extension based on delays due to compliant equipment manufacture delays, installer delays, and unavailability that serves a similar purpose.

p) Comment 45-21-5

While we support this alternative approach, we want to make sure there is transparency for communities adjacent to these rail operations. Staff should clarify how the public will be made aware and engage in any ACP that may be selected.

Agency Response: Changes were made in response to this comment. CARB has added language to the Proposed Regulation in section 2478.7(m) stating that approved ACP applications, reapplications, and amendments will be posted to the CARB "Reducing Rail Emissions in California" webpage for public access. CARB has also added language in section 2478.8(o) stating that AFMO applications will also be posted to the CARB "Reducing Rail Emissions in California" webpage for public access. Approved ACPs must reduce emissions equal to or greater than if complying directly with the SA and IUOR and be within three miles of current rail operations. Therefore, staff does not believe public engagement prior to approval is necessary. However, once approved

ACPs are posted, CARB will take comments on ACPs and may consider comments during revocation, or reapplications.

q) Comment 45-24-7

Alternative Compliance Plan (ACP) does not offer enough relief to offset the financial impacts to operators in the long term. CARB should extend the period of approval for an ACP, preferably for no less than 15 years. The ACP should also account for early emissions-reduction actions, technology adoptions, and provide credit for reductions in VMT and emissions that are facilitated through public rail service. A longer-term ACP and accounting for VMT and GHG emissions reductions through passenger rail service will provide greater certainty for operators and capture the environmental benefits accrued through service.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 10. The ACP is meant to provide some flexibility in when the emission reductions occur and how they occur, and thus potentially reduce financial and logistical effect. However, the ACP is not meant to completely remove financial costs. Information on potential funding sources for locomotives is discussed in Master Response 5.

r) Comment 45-26-3

While staff have indicated that the Alternative Compliance Plan (ACP) section of the regulation was created to be a path for passenger rail agencies, it is not at all clear given the text that approval of an ACP could be achieved. Furthermore, it is not clear that approval would be retroactive and negate the requirement to sequester funds for any timing gap between application and approval.

Agency Response: No changes were made in response to this comment. Section 2478.7(g) provides the requirements for ACP approval. Meeting the requirements for approval will be unique to each operator that applies for an ACP and requires operators to propose their own emission reduction strategies that will work for their operations. See the response to comment 45-11-16 for CARB discussion on the timeline of ACP approval in relation to SA deposit requirements.

s) Comment 45-26-8

An approved ACP would be valid for a five year "verification" period. In that period, a locomotive operator would be required to demonstrate emissions reductions equivalent to compliance with Section 2478.4 and/or Section 2478.5 through use of cleaner equipment. In practice, this requirement would charge locomotive operators with absorbing financial costs and operational impacts similar to compliance with Section 2478.4 and/or Section 2478.5.

Agency Response: No changes were made in response to this comment See response to comment 45-11-13.

t) Comment 45-26-9

The proposed ACP would require users to document lower emissions for PM, NOx and GHG. These measurements are expensive and administratively burdensome, and GHG is not defined to the extent the regulation defines PM and NOx.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-11-14.

u) Comment 45-26-10

The proposed ACP would require usage data for each locomotive in a locomotive operator's fleet. This data may not be available for older equipment that has been through engine rebuild.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-11-15.

v) Comment 45-26-11

The proposed ACP would require applications to be submitted six months before their effective date. As the proposed regulation would take effect in 2023 and the first deposit to the Spending Account would be due in July 2024, agencies submitting an ACP would need to have all of the funding for 2023 readily available to deposit in the case that their ACP was not accepted, which they wouldn't know until about the same time as the deposit became due. This submittal process would create uncertainty for Caltrain and other agencies that would impact operations and capital planning. Further, this level of uncertainty and the tens of millions of dollars at stake could impact our agency's credit rating at a time when Caltrain is facing severe fiscal pressure and recovering from low ridership during the pandemic. Given the extreme financial hardship of an ACP rejection, Caltrain would be unlikely to finalize operational and capital plans if acceptance of an ACP is outstanding.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-11-16.

w) Comment 45-26-13

Caltrain also requests that agencies have at least 12 months in between the decision to approve or reject an ACP and the time of first Spending Account deposit in order to reduce financial planning uncertainty and avoid unintended impacts to agencies' credit ratings and overall fiscal health.

> **Agency Response:** No changes were made in response to this comment. See response to comment 45-11-16, which explains why a one-year delay between ACP approval or rejection and SA deposit deadlines is unnecessary to avoid the uncertainty and unintended impacts the comment mentions.

x) Comment 45-26-14

Caltrain requests that the ACP timeframe of five years is extended to be commensurate with the realities of public funding and procurement processes, technology availability, and other barriers and timing constraints.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 10.

y) Comment 45-26-15

Caltrain requests that if GHGs are going to be a part of the regulation, then passenger rail agencies receive credit for reduced vehicle miles traveled as a result of rail service. If GHGs are not meant to be included in the regulation, we request that they be removed from the proposed regulation.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 10. GHGs are meant to be included in the Proposed Regulation. See the response to comment 45-11-14 for the rationale behind inclusion of GHGs in ACP emission reductions.

z) Comment 45-30-3

SMART's freight railyard facilities and Brazos line tracks are located within environmentally sensitive wetlands, as such, any projects to offset equivalent emissions may result in significant negative impacts to those marshlands.

> **Agency Response**: No changes were made in response to this comment. As part of any decision-making process for choosing a compliance pathway, environmental impacts will need to be considered. Therefore, depending on the compliance pathway the operator chooses, operation of a cleaner locomotive would create no new negative impacts in wetlands. See also, response to comment 30-3, in the Response to Comments on the Draft EA.

aa) Comment 45-30-4

Whether through the Spending Account or Alternative Compliance Plan path, any additional costs assigned to the SMART Freight Budget may jeopardize SMART's ability to continue operating freight rail services starting in Fiscal Year 2023-24.

> **Agency Response**: No changes were made in response to this comment. The Proposed Regulation includes a Hardship Extension for small businesses that can show the requirements of the regulation would detrimentally harm their financial viability. See Master Response 5 for discussion on costs of the Proposed Regulation and incentive funding.

bb) Comment 45-30-10

Extend the period of approval for an Alternative Compliance Plan (ACP) – preferably for no less than 15 years. The ACP should also account for early emissions-reduction actions, technology adoptions, and provide credit for reductions in Vehicle Miles Travelled (VMT) and

emissions that are facilitated through public rail service. A longer-term ACP and accounting for VMT/emissions reductions through passenger rail service will provide greater certainty for operators and capture the environmental benefits accrued through service.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 10.

cc) Comment 45-36-6

RCTC also asks that CARB extend the time frame for an Alternative Compliance Plan (ACP) for no less than 15 years.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 10.

dd) Comment 45-36-7

The ACP should account for early emissions-reduction actions, technology adoptions, and provide credit for reductions in Vehicle Miles Travelled (VMT) and emissions that are facilitated through public rail service. A longer-term ACP and accounting for VMT and emissions reductions through passenger rail service will provide greater certainty for Metrolink and appropriately capture the environmental benefits accrued through the alternatives they provide to single-occupancy vehicles.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 10.

ee) Comment 45-38-4

Under this scenario, we would first need to replace all 15 Tier 2 with Tier 4 prior to 2029. Note, that although we have made aggressive attempts in seeking grant funding to facilitate this, as you're aware we only have partial funding for what we hope would be 8 locomotives but are still under a major funding shortfall and don't yet have remaining funding secured to move forward with this procurement.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 5.

ff) Comment 45-38-5

[I]n order to achieve the emission reduction equivalents, set forth in the regulation, in 2031 we would need to begin replacing our "new" Tier 4 locomotives to which our oldest at that time would only be in operation for 14 years.

> **Agency Response**: No changes were made in response to this comment. This response incorporates the response to Comment 15-2-6-8. The ACP assumes Tier 4 locomotives are permitted to operate for 23 years before requiring replacement or repowering to a ZE configuration. Therefore, if a fleet consists only of Tier 4 locomotives younger than 23 years for the duration of an ACP, no emission reductions would be required under the ACP.

gg) Comment BH1-OT-11-1

However, as stated in our letter, we have significant concerns with the spending account and alternative compliance plan provisions of the draft regulation. We appreciate that in responding to our concerns, CARB staff presented us with the conceptual alternative for compliance under the regulation, which would establish stringent fleet requirements for 2035 and for 2045.

We engaged with CARB on this conceptual alternative in earnest and offered several modifications to it that would address the real constraints we face relative to the commercial availability of zero-emission locomotives and federal requirements for useful life.

CARB staff has not yet agreed to the requested modifications and our justification for them. And so we must continue working to find agreement on staff's conceptual alternative. As current plea – sorry. As currently proposed, this conceptual alternative would force the retirement of locomotives before their federally mandated useful life and lead agencies to violating federal law and grant terms and returning funding to the federal government. This may include locomotives recently purchased with State Cap-and-Trade funds and reflect limited operations – oh, I'm sorry – redirect limited operations funding away from service, potentially contradicting CARB's recently passed draft Scoping Plan, which calls for an emphasis on transit operations.

> **Agency Response**: Changes were made in response to this comment. This response incorporates Master Response 11, which discusses the AFMO staff added.
>
> It is not entirely accurate to state that federally granted locomotives, such as those granted through the FTA, have a mandated useful life that must be fulfilled by the grantee, because those grants include no-penalty options to sell or transfer the locomotives to other operators outside the state. Nevertheless, as part of the AFMO, CARB staff has added a provision which would allow continued operation of older units under specific circumstances. Locomotive operators can use ZE locomotives deployed prior to 2047 to offset the use of older units at set rates.

hh) Comment 45-33-6

Operators should gain offset credits for investments that further reduce GHG or reduce VMT through initiatives that increase ridership. Some examples of these investments:

1. Complete transition to Tier 4 locomotives
2. 100 percent use of renewable fuel
3. Marketing/Pricing/Service initiatives that increase ridership;
4. Conversion of retired locomotives to battery boosters capturing braking energy and reducing fuel usage during acceleration;
5. Additional double track which would allow for more frequencies and faster schedules to increase ridership while allowing "running meets" that eliminate extra fuel usage from accelerating from a stop required by a meet at a siding;
6. Better coordinated schedules to grow ridership by facilitating connecting trips.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 10. The Proposed Regulation is an ATCM with the specific goal to reduce PM and NOx emissions. Reduction of GHGs will be a

co-benefit of Proposed Regulation requiring the operation of ZE locomotives in California. Staff is unsure how the comment intended to use "offset credits," but no "credit" will be given for the listed projects, because credits in the Proposed Regulation are intended to incentivize early use and development of ZE technologies. Specifically, the ZE credit for the SA incentivizes early deployment of ZE prior to 2030 IUOR and doubles the incentive for early ZE deployment in disadvantaged communities. The AFMO offset incentivizes early deployment of ZE prior to the AFMO 2047 100 percent ZE milestone. However, many of the emission reduction strategies suggested by the comment could potentially be used as an emission reduction strategy for an ACP if proper documentation is provided.

ii) Comment 45-33-2

RailPAC would support a more holistic strategy that recognizes the GHG reduction benefits of maintaining and expanding rail ridership and the embryonic ZEV transition development in the rail industry. This is preferable to the singular focus on a ZEV transition target which could divert resources from ridership expansion. It also should recognize that new tier 4 diesel locomotives, utilizing 100 percent renewable fuel, generate very low pollutant levels and have GHG emissions far lower than any rider whose alternative is auto travel. CARB adopted such a boarder market reflective approach in its recent automobile rules where the continued sale of plug-in hybrid vehicles was allowed post 2035.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 10. The Proposed Regulation is an air toxics control measure primarily focused on reducing PM and NOx, because exposure of California communities to PM and NOx results in serious health effects, including premature mortality. Although they are not the main focus of the Proposed Regulation, GHG emission reductions will be reduced as locomotives transition to ZE to comply with the requirements of the Proposed Regulation.

The ACP provides operators the flexibility to reduce emissions in their own way if emission reductions are equivalent to what would have been achieved through direct compliance with the SA and/or IUOR. Under an ACP, operators may claim emission reductions due to VMT reductions and use of renewable fuel in an ACP if proper documentation is provided. Additionally, using an ACP in lieu of direct compliance with the IUOR allows operators to use locomotives beyond 23 years of age as long the emissions are being reduced in another way and allows for additional flexibility for operators.

jj) Comment 15-2-3-12

Regarding the Alternative Compliance Plan, subsection 2478.7(b)(2)(C), (b)(3)(B): Please explain how this is reconciled to 2478.5 (a) (2) (C).

Agency Response: No changes were made in response to this comment. The ACP is elective. Although based on the requirements found in section 2478.4 and 2478.5, the ACP, as an elective strategy, can have more stringent requirements. Therefore, if subsection 2478.5(a)(2)(C) applies to an operator because they chose an ACP, the requirement is that they must assume a Tier 4 locomotive would operate for 23 years prior to being removed from California service.

12. Alternative Fleet Milestone Option

Several California passenger operators brought up concerns with the SA and IUOR (previously referred to as the Useful Life Limit). Concerns included: (1) The SA will siphon critical operating funds; and (2) The Proposed Regulation creates unintended consequences without measurable reductions in emissions. At the November 18, 2022, Board hearing the Board directed staff to consider passenger operators concerns and develop an additional compliance pathway. The AFMO was included in the 15-day changes package posted on March 1, 2023.

> **Master Response 11:** As directed by the Board at the November 18, 2022, Board Hearing, staff collaborated with California passenger operators to develop the AFMO (section 2478.8) to be used in lieu of directly complying with the SA and IUOR. Operators who choose to comply with the Proposed Regulation by opting into the AFMO have added flexibility in when they use their funds to procure and operate cleaner locomotive technologies. The AFMO includes ZE milestones beginning in 2042, which provides operators time to plan within federal requirements and constraints, funding limitations, public agency purchasing rules and requirements, and public sector financial planning requirements and timelines. Under the AFMO, a locomotive operator could increase service while still moving to ZE operations, making it feasible for passenger operators to pursue plans that reduce VMT and emissions from personal vehicles. This option does not tie required emission reductions to what would have been achieved under the SA and IUOR. The Proposed Regulation also includes the ACP, which can be used in lieu of directly complying with the SA, the IUOR, or both. Multiple compliance options account for the unique operating environments of each locomotive operator and provides operators compliance pathways that would not require them to set aside annual funding into a dedicated trust for the Proposed Regulation.
>
> Staff disagrees with comments that claim the Proposed Regulation does not result in measurable reductions. As shown in the additional supporting documents and information published on March 1, 2023, the Proposed Regulation is expected to achieve over 7,300 tons of PM2.5, 386,200 tons of NOx, and 21.6 million metric tons of GHGs from 2023 to 2050.

a) Comment 45-7-1

[W]e echo Metrolink's comments in asking that public agencies not be held to a Spending Account or Useful-Life Requirement as a means of further emissions reductions, and that flexibility be provided in how agencies finance their implementation of climate goals. Just as transit agencies are still recovering from ridership declines due to the COVID pandemic, commuter rail agencies are also getting back on their feet and we want to make sure that Metrolink has the financial ability and flexibility to provide service to our shared customer base at this time.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11, which discusses the AFMO staff added to the Proposed Regulation.

b) Comment 45-16-1

[R]espectfully ask that CARB amend the current Regulation to remove requirements related to the Spending Account and rail vehicle Useful-Life, as well as consider the deficiencies in the Technology Feasibility Assessment (Appendix F) used as a basis for the Regulation.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11 for discussion on alternative compliance options and Master Response 16 for discussion on the Technology Feasibility Assessment.

c) Comment 45-17-1

We urge you to ensure that public agencies are not held to a Spending Account or Useful-Life Requirement under any scenario as a means of furthering emissions reductions. Passenger railroads such as Metrolink are already committed to achieving the proposed locomotive emission reduction targets. However, mandatory spending accounts siphon critical operating funds needed by commuter rail agencies recovering from precipitous ridership declines due to the pandemic. Mandatory diversions of funding from operations and maintenance programs could jeopardize the safety and reliability of railroad operations.

> **Agency Response**: Changes were made in response to this comment. This response incorporates Master Response 11.

d) Comment 45-30-8

Ensure that public agencies are not held to a Spending Account or Useful-Life Requirement under any scenario as a means of further emissions reductions. Passenger railroads will commit to achieving the proposed locomotive emission reduction targets. However, mandatory spending accounts siphon critical operating funds needed by commuter rail agencies recovering from precipitous ridership declines due to the pandemic. Mandatory diversions of funding from operations and maintenance programs could jeopardize the safety and reliability of railroad operations. A CARB imposed useful life requirement for locomotives of 23 years will be significantly shorter than the federal 30-year life standard and could force agencies to repay federal funds if locomotives are retired early.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11. This response also incorporates Master Response 25 for discussion on useful life versus grant life.

e) Comment 45-36-8

RCTC requests your consideration of amendments to the proposed In-Use Locomotive Regulation. The current language creates unintended consequences without measurable reductions in emissions, threatening RCTC's ongoing efforts to increase daily trips, increase reverse-commute opportunities from Los Angeles to the region, improve multimodal connections to the nine stations we operate, and potentially expand the 91/Perris Valley Line further inland.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11.

f) Comment 45-36-2

The financial harm and regulatory uncertainty of the proposed Spending Account or Useful-Life Requirement regulations would risk the availability of essential passenger rail service across the state. As a Joint Powers Authority (JPA) Member Agency of the Southern California Regional Rail Authority (SCRRA) which operates Metrolink service, the requirement to set aside as much as $8 million annually for zero-emissions equipment is inconsistent with the Authority's required annual budget development process and current budget environment. An unfunded mandate would require financial resources at the cost of reducing the operating budget or delaying capital and state-of-good-repair projects in future fiscal years.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11.

g) Comment 45-36-4

Not only should the proposed Spending Account or Useful-Life Requirement provisions be stripped from the proposed regulation, RCTC believes that the proposed regulations should be equitably applied to Metrolink and other passenger rail operators, related to private freight companies, and that funding and flexibility should be applied to passenger rail operators in a manner commensurate with transit operators. For example, the current language imposes a 2030 zero emissions purchase date for passenger rail agencies and affords a 5-year delay for freight rail operators. Considering that freight accounts for the vast majority of emissions in the rail sector, it would only be fair to also allow for passenger rail agencies to have until 2035 as well.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11. This response incorporates Master Response 8 for discussion on the IUOR.

h) Comment 45-12-2

Amtrak respectfully submits that passenger rail should be exempted from CARB's proposed regulation, as the regulation undermines CARB's commitment to transition to the use of public transportation in California.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11.

i) Comment 45-12-3

Given that the proposed regulation is subject to preemption under Federal law and that Amtrak has established and is implementing a commitment to net-zero GHG emissions by 2045, our position is that the proposed In-Use Locomotive Regulation should not apply to Amtrak and is not needed to drive change at Amtrak.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11. This response also incorporates Master Responses 2, 3, and 4 for preemption discussion.

j) Comment 45-12-5

Passenger railroads are committed to reducing locomotive emissions. However, mandatory spending accounts siphon critical operating funds needed by passenger rail agencies and operators recovering from precipitous ridership declines due to the pandemic. Mandatory diversions of funding from operations and maintenance programs could jeopardize the reliability of railroad operations.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 11.

k) Comment BH1-OT-41-3

We really want to be – to comply with this regulation. We are doing everything we can to get to zero emission, but we cannot get there with this regulation as written, because we can't go against federal requirements. And we do not have the funding or the federal approval to move forward with replacing our remaining fleet. And so, we are asking the Board to direct staff to continue to work with us and allow us the opportunity and time to reach a path forward, so that we can be in compliance and reach a point where this regulation can be successful.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 11.

l) Comment BH1-OT-37-3

And finally, we support – it also mentioned that if the rule incentivizes – punish passenger railroads for getting increasing service out to get cars off the road, that is also a step backwards. So hopefully that can be fixed. Thank you for your time.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 11.

m) Comment 45-24-2

Even with the modified version, the In-Use Locomotive regulation would risk the availability of both essential passenger rail services due to the resulting financial harm and regulatory uncertainty. Metrolink and LOSSAN, with their partners, have been working with CARB staff to identify the significant concerns in the regulation, primarily the impacts related to costs to passenger rail service and the availability of such technologies. As currently written, the emissions framework that underpins the regulation disincentivizes public operators from providing robust and frequent service levels.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 11.

n) Comment 45-24-4

The State is inversely incentivizing [passenger] operators to delay or forgo increasing service, which further increases statewide VMT and emissions from personal vehicles.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 11.

o) Comment 45-15-2

First, we support the request made by other agencies asking that public agencies not be held to a Spending Account or Useful-Life Requirement under any scenario as a means of further emissions reductions.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 11.

p) Comment BH1-OT-10-4

And I just point out that the ridership in Metrolink, they're choice riders. These are folks that have the option to drive. Any rule that has the effect of diverting operating dollars actually removes the larger goal of having this mode shift option be available. And so it's worth it to take additional time to get this regulation right, because passenger rail is a partner in achieving the Board's goals.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 11.

q) Comment BH1-OT-41-2

We understand that rail vehicle procurement procedures, federal funding, and safety regulations are different for passenger rail agencies and that CARB staff was unaware of these requirements when the proposed regulation was released. Caltrain and other passenger rail agencies, which take cars off the road, and are a net reduction of emissions in the State, have reached out to CARB staff and offered to be a resource to develop a regulation that could work for passenger rail operators.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 11.

r) Comment 45-15-6

Prior to this regulation, Caltrans and the JPAs adopted the Zero-Emission Intercity Passenger Rail Strategy (ZE Strategy) that calls for a complete ZE replacement of the locomotive fleet by 2035 and intermediate reductions during the transition period. Requirements to purchase additional Tier-4 vehicles in the interim and their subsequent use across the vehicle's useful life could represent a net increase in emissions over the ZE Strategy and would divert funding away from ZE pilot and procurement projects. This ZE Strategy was discussed with CARB and presented in a final form at meetings listed in Appendix I of the Initial Statement of Reasons.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 11. The Proposed Regulation does not require Tier 4 locomotives to be purchased prior to transitioning to ZE operation. Staff encourages plans to go full ZE by 2035.

s) Comment 45-30-1

As SMART acquires the resources to construct…expansion and support it with passenger rail vehicles including the possible acquisition of new locomotives, the proposed In-Use Locomotive Regulation could have devastating consequences for SMART's ability to complete the extension. With no FTA Buy America-compliant and FRA-approved zero-emission locomotive on the market for purchase, SMART may not be able to expand services. That may in turn hinder SMART's ability to make the case to the voters to reauthorize the critical sales tax to allow for continued operations of the existing SMART Rail and Pathway system.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11 to discuss the AFMO and incorporates Master Response 8 to discuss the 2027 and 2032 assessments and IUOR. This response incorporates Master Response 16 to discuss FRA approvals. Until 2030, Tier 4 locomotives can be acquired and used for up to 23 years before they would no longer be allowed to operate in California. This would allow SMART to expand using locomotive technology that has been on the market since 2015.

t) Comment 45-11-1

Association notes concerns that the proposed regulation is being promulgated at a time when the financial position of rail agencies (which is highly dependent on ridership) has been significantly – and possibly, irreparably – damaged by the COVID-19 pandemic.

> **Agency Response**: Changes were made in response to this comment. This response incorporates Master Response 11.

u) Comment 45-17-6

In deliberating this new regulation, we urge you to take into account the significant work already being done by passenger rail providers to move toward cleaner technologies, the challenges these providers face in recovering ridership, post-COVID, as well as the fiscal difficulties and impacts to service the regulation will cause.

> **Agency Response**: Changes were made in response to this comment. This response incorporates Master Response 11.

v) Comment 45-12-11

Passenger rail operators are united in their shared goal to accelerate and deploy zero-emissions technologies as soon as feasible. CARB's regulatory framework should account for the lessons learned and best practices from converting other sectors in a manner that is safe and appropriate. Unintended impacts from the proposed regulation risks the public benefits of operating rail service at a time when the state is encouraging the use of public transportation to reduce emissions and congestion in local communities.

> **Agency Response**: Changes were made in response to this comment. This response incorporates Master Response 11.

w) Comment 45-24-1

We continue to encourage CARB to not adopt the regulation, as proposed on September 20, 2022, and instead develop a regulatory framework that accounts for the commercial viability and availability of zero-emission locomotives, the unique operating environments of each rail operator, and burdensome nature of requiring annual funding set asides for zero-emission locomotives.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 11. This response also incorporates Master Response 5 for discussion on incentive programs and CARB-funded ZE pilots, and Master Response 16 for discussion on ZE technology, compliance extensions, and the 2027 and 2032 assessments.

x) Comment 45-24-8

Include consistent offramps afforded to other public transit operators under the Innovative Clean Transit regulation, including delayed implementation for financial emergencies and the availability of equipment that meets required operations and maintenance cycles. A purchase requirement and fleet management framework with the appropriate timelines would better align shared zero-emissions goals with the realities of market availability, public procurements, and complex transition plans.

> **Agency Response:** CARB made changes to the proposal based on the comment received. This response incorporates Master Response 11. Staff also added a compliance extension based on delays due to equipment manufacture delays or installer delays in subsection 2478.6(b).

y) Comment 15-7-1

A locomotive operator applying to use the AFMO must apply to CARB at least 90 days prior to the requested start date of the AFMO. CARB is then required to approve or disapprove the AFMO application within 45 calendar days.

While we appreciate that the timeline for AFMO approval is reasonably brief, there is uncertainty with compliance and the timeline. We respectfully request that CARB also clarify that an operator that submits an AFMO in accordance with Section 2478.15 shall have no current or retroactive compliance obligations under Sections 2478.4 and 2478.5 while the AFMO application is being evaluated by CARB.

Without the certainty that compliance with the Spending Account requirements is not required during the application period, Caltrain would still need to plan for the financial impacts of the Spending Account well in advance in the event that the AFMO is not accepted which would be deleterious to budgeting efforts given the financial planning timelines of public agencies.

> **Agency Response:** No changes were made in response to this comment. Because it is impossible to know without review of an application as to whether an application would be approved, staff has declined to include language in the Proposed Regulation that an operator "shall have no current or retroactive compliance obligations under Sections 2478.4 and 2478.5 while the AFMO application is being evaluated by CARB." It would

be inappropriate to allow operators to be removed from the requirements of the SA or IUOR prior to approval. Staff would also like to note that no SA deposits are due prior to July 1, 2024.

Caltrain could prepare an AFMO application and submit it as soon as the Proposed Regulation go into effect. At most, they would have to wait 45 calendar days to be informed of deficiency. Additionally, staff has offered to meet with and respond to any questions received from operators about an ACP or AFMO.

z) Comment 15-7-2

An approved AFMO may be revoked at any time for failing to meet the requirements of the AFMO provisions, failing to submit required documentation, and other factors. CARB is required to provide notice of the revocation to the locomotive operator at least 30 days prior to the official revocation.

Given the magnitude of the impact of this regulation on public passenger rail transit agencies, we respectfully request that CARB establish an appeal process that permits a locomotive operator to present information to CARB that identifies valid reasons for the operator's failure to meet the requirements that served as the basis for AFMO revocation. An appeal process would benefit both CARB and the operators by setting clear expectations for how to proceed to enable compliance, especially for those agencies with less financial flexibility. We also recommend that CARB's revocation be stayed while an appeal is pending to avoid disruption.

Agency Response: No changes were made in response to this comment. Staff understands that revocation of an AFMO could have large financial impacts on operators that fail to meet the agreed upon requirements. The large penalties are by design to discourage intentional violations of the AFMO. Staff has included in the Proposed Regulation compliance mechanisms for valid reasons for a failure to meet the requirements of the Proposed Regulation, including compliance date extensions for manufacture and installation delays of compliant equipment, or even if equipment needed for compliance is unavailable. No appeals process is necessary as other failures would be considered violations, and the CARB enforcement process would be followed. This process includes an opportunity to discuss violations and provide evidence to persuade staff to take no further action and close the case.

aa) Comment 15-7-3

Currently, the proposed regulation suggests, but does not clearly state, that locomotive operators should rely on the definition of "Usage" in Section 2478.83 to track MWh usage. This definition requires locomotive operators to report MWh usage from the meter and affords locomotive operators with the ability to calculate MWh using annual fuel consumption if the locomotive is not equipped with a functional MWh meter. Unfortunately, this lack of clarity in the proposed regulation, as modified, may lead to unnecessary confusion and misreporting as locomotive operators work to comply with the proposed regulation.

We respectfully request that CARB clarify that operators can submit a methodology to CARB to track MWh usage under the AFMO that includes but is not limited to fuel consumption, and any alternative methodologies for tracking and usage that are submitted by an operator and are approved by CARB.

Agency Response: No changes were made in response to this comment. The AFMO requirements state that operators use annual fleet "Usage." Usage is a defined term in the Proposed Regulation and states either a MWh meter or a fuel consumption calculation can be used to quantify MWhs required. Because "Usage" is a requirement of the AFMO, staff does not believe that there is a lack of clarity as to what the reporting requirements are. Additionally, staff believes obtaining MWh by meter reading or by fuel consumption conversions are the most effective ways to track usage. The comment fails to explain what alternative methodologies for tracking usage could be, and thus staff cannot evaluate whether these other methodologies would be an effective surrogate to the requirements as they stand.

bb) Comment 15-10-3

The modified text also provides a new provision, the Alternative Fleet Management Option ("AFMO") at § 2478.8. Unfortunately, the AFMO does not provide a feasible alternative means of compliance for the overwhelming majority of small businesses. Like the ACP, the AFMO still requires the purchases of Tier 4 locomotives at about $4 million each or prototype "Tier 5" locomotives at about $7 million each, with no specific funding assistance. Although the Proposed Rule provides alternative investment timelines in the ACP section, AFMO section and the Small Business Hardship Extension at § 2478.14, those investments are out of reach for most small companies given the timeframes specified in the Proposed Rule.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 to discuss funding. The AFMO was specifically developed for fleets that are currently made up of Tier 4 locomotives and focuses on transitioning to ZE operations. Staff disagrees with the comment that the ACP requires purchases of Tier 4 locomotives. Operators could operate locomotives of any Tier as long as equivalent emission reductions were achieved. For example, an operator could choose to replace pre-Tier 0 locomotives with a Tier 3 locomotive, depending on the emissions reduction requirements needed for their individual ACP. There is no limit to how many times the Hardship Extension can be applied for by an operator, allowing small businesses flexibility in compliance if they can demonstrate financial hardship.

cc) Comment 15-11-2

The AFMO plan be scrapped and that CARB finally emissions test these passenger locomotives in their actual operating condition.

Agency Response: No changes were made in response to this comment. The AFMO focuses on quicker transition of locomotives to ZE operation. Therefore, staff does not believe it is necessary to remove the AFMO from the Proposed Regulation to test emissions. See response to comment 45-13-1 for further discussion on passenger locomotive duty cycles.

dd) Comment 15-12-2

We appreciate that CARB has included a clear and brief timeline for approval or disapproval of an AFMO or ACP, but we respectfully request that CARB also clarify that a locomotive operator that submits an AFMO or ACP in accordance with Section 2478.15 shall have no

current or retroactive compliance obligations under Sections 2478.4 and 2478.5 while the AFMO or ACP application is being evaluated by CARB.

> **Agency Response:** No changes were made in response to this comment. See response to comment 15-7-1.

ee) Comment 15-12-3

An approved AFMO or ACP may be revoked at any time by the Executive Officer for reasons that include: failure to meet the requirements of the AFMO or ACP provisions; failure to submit documentation as required; the locomotive operator's failure to obtain approval of a detailed timeline report by no later than one year after the submission deadline; the locomotive operator's failure to meet the milestone dates set forth in the detailed timeline report, if no extension is obtained; or the locomotive operator fails to meet other application requirements in the regulation. CARB is required to provide notice of the revocation to the locomotive operator at least 30 days prior to the official revocation.

We respectfully request that CARB expand on these provisions by also including provisions establishing an appeals process that permits the locomotive operator to present information to CARB that identifies valid reasons for the locomotive operator's failure to meet the requirements, as to be specified, that would otherwise serve as the basis for revocation of an AFMO or ACP. These provisions should allow for a clear process for this appeal to be considered by the Executive Officer and granted, if specified conditions are met.

> **Agency Response:** No changes were made in response to this comment. See response to comment 15-7-2.

ff) Comment 15-12-4

We respectfully request that CARB clarify the methodology that should be used to track MWh usage under the AFMO and ACP. We also urge CARB to recognize that the technological and human resource capacity of each locomotive operator differs significantly and provide a path toward locomotive operators and CARB identifying an alternative and mutually agreeable methodology for tracking and reporting MWh usage.

> **Agency Response:** No changes were made in response to this comment. See response to comment 15-7-3.

gg) Comment 15-13-3

We appreciate that CARB has included a clear and brief timeline for approval or disapproval of an AFMO or ACP, but we respectfully request that CARB also clarify that a locomotive operator that submits an AFMO or ACP in accordance with Section 2478.15 shall have no current or retroactive compliance obligations under Sections 2478.4 and 2478.5 while the AFMO or ACP application is being evaluated by CARB. This recommendation seeks to address the financial impacts of the Spending Account requirements that would otherwise exist under the regulation, and which served as the primary basis for our concerns with the proposed regulation, as introduced.

> **Agency Response**: No changes were made in response to this comment. See response to comment 15-7-1.

hh) Comment 15-13-4

We respectfully request that CARB expand on these provisions by also including provisions establishing an appeals process that permits the locomotive operator to present information to CARB that identifies valid reasons for the locomotive operator's failure to meet the requirements, as to be specified, that would otherwise serve as the basis for revocation of an AFMO or ACP. These provisions should allow for a clear process for this appeal to be considered by the Executive Officer and granted if specified conditions are met.

> **Agency Response:** No changes were made in response to this comment. See response to comment 15-7-2.

ii) Comment 15-13-5

The AFMO and ACP provisions require locomotive operators to demonstrate their compliance with proposed regulation, as modified, through the tracking of MWh usage. As drafted, the proposed regulation suggests, but does not clearly state, that locomotive operators should rely on the definition of "Usage" in Section 2478.83 to track MWh usage. This definition requires locomotive operators to report MWh usage from the meter and affords locomotive operators with the ability to calculate MWh using annual fuel consumption if the locomotive is not equipped with a functional MWh meter. Unfortunately, this lack of clarity in the proposed regulation, as modified, may lead to unnecessary confusion and misreporting as locomotive operators work to comply with the proposed regulation.

We respectfully request that CARB clarify the methodology that should be used to track MWh usage under the AFMO and ACP. We also urge CARB to recognize that the technological and human resource capacity of each locomotive operator differs significantly and provide a path toward locomotive operators and CARB identifying an alternative and mutually agreeable methodology for tracking and reporting MWh usage.

> **Agency Response:** No changes were made in response to this comment. See response to comment 15-7-3.

13. Idling

Several commenters made general comments on the idling requirements, stating that idling should be allowed for more than 30 minutes for passenger operators.

> **Master Response 12:** The Proposed Regulation, Section 2478.8 states, "A Locomotive may only exceed 30 minutes of idling for the following reasons" and among the reasons: "To otherwise comply with federal or state regulations." Idling extensions for temperature control in passenger cars would therefore be considered exempt, because several state and federal regulations deal with the issue of safe air temperatures on locomotives, in railcars and in workplaces, ensuring safety for both passengers and rail workers. Below are some examples:
>
> > 40 CFR § 1033(g)(5) states, "it is not considered circumvention to allow a locomotive to idle to heat or cool the cab, provided such heating or cooling is necessary."
> >
> > The Occupational Safety and Health Administration General Duty Clause, under Section 5(a)(1) of the Occupational Safety and Health Act of 1970 specifies that

employers are required to provide their employees with a place of employment that "is free from recognized hazards that are causing or likely to cause death or serious harm to employees." This includes heat-related hazards that are likely to cause death or serious bodily harm.

The California Heat Illness Prevention Standard requires employers to provide training, water, shade, and planning. A temperature of 80°F triggers the requirements.

a) Comment 45-10-19

§ 2478.8(a) limits idling to no more than 30 minutes after a locomotive becomes stationary. Passenger rail agencies are required to complete locomotive maintenance and properly maintain a comfortable temperature in the passenger cars that may require idling for periods greater than 30 minutes. We request that language be added to allow idling more than 30 minutes for locomotives when required for passenger rail service.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 12.

b) Comment 45-26-16

Caltrain requests that passenger rail agencies be exempt from idling requirements or that typical scenarios for passenger rail vehicle idling be included as exceptions.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 12.

c) Comment 45-11-18

The proposed regulation prohibits idling for more than 30 minutes with exceptions for various scenarios that do not include typical reasons passenger services may idle to ensure the safety of the public.

Finally, we note that the proposed regulation would require locomotive operators to report usage data for each locomotive including, in some cases, usage by air district. This data may not be available, particularly by air district.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 12 for discussion on idling and Master Response 13 for discussion on reporting.

d) Comment BH1-OT-42-1

I'd like to, you know, just add that a 30-minute idling limit is ridiculous. I can -– you know, I get reactions to the smell within seconds of smelling what is happening in my backyard. Thirty minutes is too much and maybe even is 15 minutes. But please continue to educate us on what you're doing for infrastructure and setting milestone to reach the goals that you are proposing in this rule.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 1.

Regarding infrastructure, SA funds may be spent on ZE infrastructure or Tier 4 or cleaner locomotives. If wayside power is available, locomotive operators are required to connect to it instead of idling for longer than 30 minutes. The Proposed Regulation further incentivizes the use of wayside power by allowing a ZE credit applied to the SA for its use.

14. Registration, Reporting and Recordkeeping

Several commenters made the following comments on the registration, reporting and recordkeeping requirements: (1) the reporting requirements are burdensome and labor intensive; (2) reporting will be costly; and (3) reporting costs are not considered by CARB in the cost analysis.

Master Response 13: Staff disagrees that reporting will be burdensome. The Proposed Regulation reporting requirements only include information that is necessary to verify compliance and locomotive emissions across the State. Such information should be readily available to locomotive operators. Much of this information, such as location, is already tracked by locomotive operators in order to operate an efficient railroad. As explained in ISOR Appendix F: Locomotive Technology Feasibility Assessment, since 1994, the American Association of Railroads has required Automated Equipment Identification tracking on locomotives, which allows locomotives passing reader equipment to be identified. Additional information tracking was added by the Federal Rail Safety Improvement Act of 2008, which required implementation of positive train control (PTC) on railroads. PTC is a communication and signaling system capable of preventing incidents caused by train operator or dispatcher error; it uses signals and sensors along the tracking to communicate train location to better manage routes and fuel consumption. Within the freight industry, cargo owners, shippers, and logistic firms often already track and measure what is happening with their freight. Demand for such tracking has increased, and shippers often want exact locations of cargo, cargo weight, container or cargo temperatures, and humidity. Additionally, there are several GPS tracking systems available today, even most cell phones have this capability.

Activity data can be obtained with MWh meters already installed on all Tier I and newer locomotives as required by 40 CFR § 1033.115(h) or, if the locomotives have operated 100 percent in California for the year being reported, activity can be manually calculated by fuel consumption as described in subsection 2478.4(g)(2)(F). Operators can also install a MWh meter on any locomotives that are not currently equipped with one. Staff assumes most locomotives will be equipped with tracking systems and employ new software to simplify reporting to CARB. If not, they can add hardware or manually track reporting information.

Other readily available information includes locomotive identification information such as the road number, engine information such as the serial number and emission tier, and for locomotives equipped with AESS, information on idling if idling occurs for longer than 30 minutes. Specifically, reporting of idling is necessary to determine if excess idling has occurred and why. Reporting of wayside power is optional and only required if using wayside power for ZE credit.

Not all reporting items are used directly to calculate emissions, and some items are used to corroborate reported data or calculate other necessary operational characteristics to improve CARB's understanding of locomotive emissions. For example, engine hours per locomotive is required to compare and corroborate the level of MWh usage reported from the MWh meter reading. The purpose and rationale of all reporting requirements are transparently listed in the ISOR chapter III, item by item.

During the regulatory process, CARB did not receive any suggestions for appropriate surrogate data that would fulfill the reporting objectives as described in the ISOR. CARB will evaluate ACP proposals that include non-equipment-based tracking and modelling. Understanding locomotive emissions and health impacts is critical for this regulation and other regulatory efforts—including compliance with federal mandates under the CAA such as SIPs—and the CARB overall mission to quantify, reduce and, where possible, eliminate harmful air emissions throughout the State.

CARB evaluated the costs of reporting in SRIA section 3.1.1.3 Locomotive Tracking Hardware, Subscription, and Database Upgrades. Staff assumes there may be some costs associated with technology upgrades to comply with the Proposed Regulation. CARB also assumes additional staffing could be required for operators to comply with reporting requirements and lists costs in SRIA section 3.1.4.1 Registration and Reporting (p. 81). Although reporting could include additional labor to gather and submit reporting information to CARB and/or could require additional hardware and software, these reporting requirements are not expected to be cost prohibitive.

a) Comment 45-10-13

[W]e ask that onerous and burdensome reporting requirements under § 2478.10 be revised for public agencies. Collection of much of the data requested, such as idling, the use of ground power and engine shutdowns is not automated and would require a labor-intensive manual system collection exceeding existing staff and technical resource capacity at significant cost.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 13. Passenger operators in California have some of the newest fleets, many with Tier 4 locomotives making up over half of their fleet. From discussions with locomotive OEMs, it is CARB's understanding that these newer locomotives offer technology advancements, including automated reporting of locomotive systems such as engine shutdowns when a locomotive is in an idle notch setting. Thus, rather than manually reporting, information could be gathered by post-processing of systems data already recorded or by adding new hardware to the locomotive.

b) Comment 45-12-9

[T]he proposed reporting requirements are burdensome, onerous, and technically infeasible for passenger rail agencies and operators. Much of the data requested, such as idling, the use of ground power and engine shutdowns are not automated. These data points would need to be primarily collected in a labor-intensive manual system that goes beyond the capacity of existing staff and technical resources.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 13.

c) Comment 45-26-12

The proposed regulation requires locomotive operators exercising an approved ACP to annually report several data points…For publicly funded passenger railroads, reporting this data annually is certain to be onerous and costly, and will have a negative impact on overall agency budgets. Caltrain requests that the ACP simplify emissions data and reporting requirements to workable estimates rather than the complicated requirements currently included. This would include not requiring locomotive operators to report usage data for each locomotive including, in some cases, usage by air district, because for older locomotives like those operated by Caltrain, this data is not available.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 13.

d) Comment 45-10-20

§ 2478.10(c)(1) describes the reporting requirements for the locomotive emissions annual reporting. We note that these requirements are substantial and request that flexibility be added to these requirements where it is determined infeasible or cost-prohibitive by the operator. For example, it will require substantial effort beyond our current ability to determine the required reporting for the activity data in each air district. Metrolink is in full compliance of federal equipment and standard idling procedures, which do not require annual documentation and reporting. We request that language be added to recognize that should these requirements require excess resources, that appropriate surrogates or substitute reports be allowed upon approval of CARB's Executive Officer. Since the reporting of hours per locomotive is not needed in calculating emissions, this requirement should be removed from the regulation. These required flexibilities maintain the reporting's spirit of transparency.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 13. In the Proposed Regulation SRIA, Sections 3.1.1.3, 3.1.4.1, and 4.1.1, CARB staff estimated that incremental costs to the passenger operators to comply with the registration and reporting requirements to be less than $20,000 per year. In ISOR Appendix F: Technical Feasibility Assessment Section XI, CARB staff explains federal requirements and industry trends that enable passenger operators to monitor locomotives to comply with the annual reporting requirements. Annual reporting requirements are neither infeasible nor cost prohibitive. The registration and reporting requirements are independent of an operator securing full compliance with the federal procedures.

e) Comment 45-11-17

The proposed regulation requires locomotive operators exercising an approved ACP to annually report several data points…For publicly funded passenger railroads, reporting this data annually is certain to be onerous and costly, and will have a negative impact on overall agency budgets.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 13.

f) Comment 45-15-11

[W]e ask that the reporting requirements being proposed be revised for public agencies. Much of the data requested, such as idling, the use of ground power and engine shutdowns are not and cannot be automated for the existing equipment and infrastructure. These data points would need to be primarily collected in a labor-intensive manual system that goes beyond the capacity of existing staff and technical resources, particularly us as the JPA's overseeing the state-supported intercity passenger rail where Caltrans owns the equipment, the JPAs manage the service, and Amtrak operates and maintains the vehicles.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 13. See response to comment 45-10-13 for discussion on data collection capability.

g) Comment 45-21-4

The recordkeeping and reporting component will provide very helpful information to CARB, air districts, and the public regarding exactly where trains are operating in our communities, and this will allow agencies and advocates to identify where the needs for clean up are greatest. We ask that this information be made available to the public so that communities and advocates can also be informed of where this equipment is operating.

Agency Response: No changes were made in response to this comment. CARB recognizes the importance of public access and will consider what reporting information it can make available. The public can review CARB enforcement reports for regulation compliance rates and air basin level inventories.

h) Comment 45-23-27

CARB's regulatory timeline does not anticipate presenting the final In-Use Locomotive regulation to the Board until November 2022, with final adoption of the rule in early 2023. Yet CARB indicates in its Proposed Rule that the recordkeeping requirements it proposes effectively begin in January 2023, with a requirement that an annual report be submitted to CARB on July 1, 2024, for each locomotive that operated in California beginning on January 1, 2023.

The information necessary for these reports is specific to each locomotive's operation and would require real-time collection that railroads do not undertake for all locomotives. For example, the Locomotive Emissions Annual Report must contain particular data for each locomotive that operated in California during that year, including the locomotive's "Total MWh Operated . . . in each California Air District" and "[t]otal engine hours Operated in each California Air District." And the "Idling Annual Report" must include "the following for each Locomotive that is not a ZE Locomotive Operated in California from the previous Calendar Year: (1) Whether the Locomotive has an [Automatic Engine Stop/Start]; (2) The time, date, location, and duration of each instance when a Locomotive idled for longer than 30 minutes in California; and (3) The reason for idling for each instance when a Locomotive idled for longer than 30 minutes in California." Tracking the various data required by the Proposed Regulation would require railroads to install or deploy new technology (both hardware and

software). For example, not all locomotives have functioning megawatt hour meters; not all locomotives have functioning GPS units; and not all locomotives have data transmission capability that can transmit the required data to the locomotive operator's centralized data acquisition system. This technology would be required on locomotives operated within the state but that may be owned by another railroad based in another part of the United States or North America.

The Proposed Regulation's reporting requirements are phrased in prospective terms, as railroad operators are not required to file reports until July 2024, which would postdate its effective date. But the reporting requirements are nonetheless functionally retroactive to the extent that the reports would contain information that must be collected before the regulation becomes effective, and the collection of such information would require the installation of hardware and/or software on thousands of locomotives at a date prior to the anticipated effective date of the rule, but before the final rule language has been published by CARB.

The imposition of data-collection requirements that would have to begin before any new regulation becomes effective would be patently unlawful. California statutes do not "operate retrospectively unless the Legislature plainly intended them to do so." Similarly, "a statutory grant of legislative rulemaking authority will not, as a general matter, be understood to encompass the power to promulgate retroactive rules unless that power is conveyed by [the legislature] in express terms."

Nowhere in California law has the Legislature bestowed upon CARB the power to adopt recordkeeping regulations requiring retroactive maintenance of records from periods before the recordkeeping obligation was created. Section 43013(b) of the Health and Safety Code only provides that CARB "shall, consistent with subdivision (a) [which prohibits CARB regulations preempted by federal law], adopt standards and regulations for . . . off-road or nonvehicle engine categories, including, but not limited to, . . . locomotives." Thus, even for locomotive regulations arguably not preempted by federal law, nowhere is CARB expressly granted the power to adopt regulations with retroactive effect.

As authority for its reporting and recordkeeping requirements in Proposed § 2478.10, CARB cites sections 38560, 39600, 39601, 39658, 39659, 39666, 41511, 43013, and 43018 of the California Health and Safety Code. None of those sections—or any other California statute of which AAR is aware—gives CARB the authority to make retroactive its proposed reporting requirements. Thus, there should be no dispute that CARB has no legal authority to compel an entire industry to comply with a draft regulation before it has been lawfully promulgated and finalized, nor to force businesses to undertake actions and incur expenses on the bare assumption that a draft regulation will be adopted in its proposed form. This is particularly true in a case such as this, where CARB lacks the legal authority to promulgate such a regulation.

> **Agency Response:** No changes were made in response to this comment. Recordkeeping and reporting requirements begin on the effective date of the Proposed Regulation. There is no retroactivity. Operators will not be required to keep records or submit reporting data for locomotive activity prior to the effective date of the Proposed Regulation.
>
> Operators have the responsibility to collect data from the locomotives they operate in California, regardless of who owns the locomotives. Operators may install additional

equipment on their locomotives to make data collection more automated, if such equipment is not already on the locomotive. Otherwise, they may manually record the data. Air District level reporting has been removed as a requirement for compliance with the Regulation.

i) Comment 45-23-28

If CARB goes forward with a version of its proposed rule (and it should not), CARB should at a minimum clarify that any data collection obligations associated with the Proposed Rule's reporting requirements do not begin until 12 months after the regulation takes effect in order to allow time for railroads to put in place the necessary equipment and technology in order to comply with the regulation after it is finalized.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 13. Locomotive activity and location data are needed as soon as the Proposed Regulation goes into effect, so that SA funding requirements can be accurately calculated. A manual tracking system can be implemented to track locomotive activity (for example, fuel records, if the operator operates solely in California) while the necessary equipment is installed to make the data collection process more automated.

j) Comment 45-23-83

California's two Class I railroads already submit to CARB information sufficient to enable CARB to estimate locomotive emissions, by air district, throughout the state. In fact, such a detailed breakdown can be easily obtained from CARB's website: CEPAM2019v1.03 - Standard Emission Tool | California Air Resources Board. For example, using CARB's CEPAM website tool one can find that oxides of nitrogen emissions from switch engine locomotives operating within the South Coast Air Basin were 2.485 tons per day in calendar year 2020. CARB has demonstrated no regulatory need nor environmental benefit associated with the onerous additional reporting requirements contained in the Proposed Rules.

> **Agency Response:** No changes were made in response to this comment. CEPAM emission estimates use a base year of 2017 (six years ago) as reference and forecasts growth and control rates to estimate later emissions, whereas reporting under the Proposed Regulation will allow CARB to annually update the CARB locomotive emission inventory with actual recorded data. The additional reporting requirements of the Proposed Regulation would greatly improve the accuracy of the CARB locomotive emission inventory throughout the State.

k) Comment 45-30-13

Reduce burdensome, onerous, and technically infeasible reporting requirements for public agencies. Much of the data requested, such as idling, the use of ground power and engine shutdowns are not automated. These data points would need to be primarily collected in a labor-intensive manual system that goes beyond the capacity of existing staff and technical resources.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 13. See response to comment 45-10-13 for discussion on reporting data collection.

l) Comment 15-2-3-10

Regarding the Reporting and Recordkeeping Requirements, subsection 2478.11(a)(6): What other requirements "under this Locomotive Regulation" would require "a specific report" be required before July 1, 2026?

Agency Response: No changes were made in response to this comment. Each provision of the Proposed Regulation may have its own reporting requirements and deadlines, for example Alternative Compliance Plans. If applicable, the Proposed Regulation will specify requirements.

m) Comment 15-2-3-11

Regarding the Reporting and Recordkeeping Requirements, subsection 2478.11(d)(1), in relation to section 2478.5: Is it correct that this data collection requirement actually pre-dates the implementation of these regulations, based on operations in California of a Tier 4 locomotive before the regulations go into effect and the 2030 start date for this provision?

Agency Response: No changes were made in response to this comment. To use this optional exemption from otherwise applicable requirements, the locomotive operator must provide the information necessary to support the application of the exemption—in this case, the total lifetime MWhs of operation for the locomotive engine. Operators not seeking this exemption are under no obligation to provide the information requested under section 2478.11(d)(1).

15. Historic Railroad Low-Use Exemption

Several commenters made general comments on the Historic Low-Use Exemption stating: (1) the 10,000-gallon annual limit is not enough to continue operations and (2) it is not clear if non-diesel locomotives are subject to the Proposed Regulation.

Master Response 14: The Proposed Regulation applies to all locomotives operating in the State, including historic locomotives such as steam locomotives, which are considered "locomotives" as defined by the Proposed Regulation. CARB appreciates the work of historic locomotive operators, but must limit fuel usage in order to minimize harmful locomotive emissions. As is discussed in the ISOR, staff surveyed California historic locomotive operators to determine the average usage amounts historic operators typically require to carry out their objectives. From the survey data, it was determined that providing an exemption to historic operators that use 10,000 gallons or less of fuel annually will permit historic operators to operate while still limiting diesel emissions produced. Because these are some of the oldest and highest polluting locomotives in operation today, staff believes anything in excess of 10,000 gallons would be too high.

a) Comment BH1-3

I am here from Southern California Railway Museum, Perris, California, a 501(c)(3) public benefit non-profit educational museum. The museum has been a part of the Moreno Valley for over 60 years, displaying and demonstrating the operation of historic railway equipment, including diesel, steam and electric cars. Some of our locomotives are historic diesel engines from the mid 20th century that pulled famous passenger trains and helped build California. Each one usually operates only a few hours per month on our short museum railway. Our mission is to preserve, display, and demonstrate these restored locomotives, as well as provide a training for mechanics and engineers. In addition, we partner with local vendors who assist us in restoration. In a hearing about 18 months ago, during the height of the pandemic and decreased visitor attendance, we were asked during the meeting for an estimate as to how many gallons we used per year, to which we provided the number of 10,000 gallons/year for the historic fleet of affected locomotives, and that figure was graciously adopted by this Board in the proposal. We have since conducted a more intensive examination and realize that to continue our mission, we request that 14,000 gallons annually be allowed for the historic locomotive exemption. There are only about 3 or 4 museums like ours in California, so the total usage is extremely small, but will allow the Museum to go forward in the future.

> **Agency Response:** CARB has not made changes in response to this comment. This response incorporates Master Response 14.

b) Comment BH1-4

[E]stablish an exemption from the proposed regulations for historic locomotives that are used as instructional devices to preserve the heritage of our country. Our particular locomotive is an oil-burning steam locomotive that served the Owens Valley until 1954. It has been restored to operating condition; is owned by Inyo County; and now resides at the Eastern Sierra Museum in Independence, California. It is operated only a few days every year. The proposed regulations have apparently been written for application to diesel-electric locomotives, and are not applicable to historic steam locomotives. I would hate to see the proposed regulations applied to historic locomotives, simply because such requirements would make their operation almost impossible, and thus end a unique connection with our past. Please create an exemption for this historic equipment.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 14.

c) Comment BH1-5

We have requested an exemption for our historic use museum. The current proposal for museums such as ours is instead 10,000 gallons per year. Failing an exemption we respectfully request a level of 14,000 gallons. The 10,000 gallon figure was derived from conversations with your staff during the covid pandemic. Our operation is primarily for educational purposes and we do not have any operation for profit such as moving freight. This will allow us to carry out our mission of providing the historical accuracy of locomotives and trains in the 20th century. The museum serves a wide range of community needs including fulfilling Make A Wish requests, providing a safe environment for school aged children to learn about railroads and mass transit. We also provide a platform for the

propulsion technology Changes. Our emissions level is very small. Railroad museums in California use less the 0.0003 percent of the diesel fuel used by locomotives in the state.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 14.

d) Comment 15-4-2

Re.Sec. 2478.11 Reporting and Recordkeeping Requirements. par.(g) Historic Railroad Report. I think the authors mistakenly omitted "No later than July 1 of each Calendar Year..." Without that language the paragraph does not define when and how often the operator "...shall submit...".

> **Agency Response:** No changes were made in response to this comment. Subsection 2478.11(a)(4) requires operators to annually submit any required reports no later than July 1 of each calendar year.

e) Comment 15-4-3

Re.Sec. 2478.13 (a)(2) I would suggest increasing the maximum fuel usage allowed. I propose "...does not use more than 20,000 gallons of fuel collectively..."

Explanation: Some historic steam locomotives will require more than 10,000 gallons of fuel for just a few days of operation. Given the small number of steam locomotives in the state, their limited days of operation, and practical absence of NOx emissions, I would appeal to the Board's generosity to grant more latitude for operation of museum/educational steam locomotives. Can an exemption be made for steam vs. diesel-electric locomotives?

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 14.

16. Small Business Hardship Extension

Several commenters made comments on the Hardship Extension, stating that it will not keep small businesses from closing.

> **Master Response 15:** The Hardship Extension is for small businesses that make an average gross revenue of five million dollars annually or less. As discussed on page 148 of the ISOR, subsection 2478.13(a) is necessary to define which businesses could apply for the Hardship Extension. Staff modeled the estimated costs of compliance with the Proposed Regulation for the smallest operators: Class III and industrial. Staff observed that operators that have an average annual revenue over five million dollars are generally already buying new locomotives using their revenue and available grants. Businesses with less than five million dollars in revenue per year rarely, if ever, purchase new locomotives, and primarily operate pre-Tier 0 engines, which have the highest emissions and would also incur the highest SA charges. For further details on the five-million-dollar revenue cap for small businesses see SRIA section 3.3.
>
> If the Hardship Extension is not applicable for an operator, such as Grain and Feed operators, they are able to comply with the regulation using the ACP, which allows operators to continue to use their locomotives as long as the emission reductions achieved are equivalent to those that would be achieved through direct compliance.

This could include emission reduction technologies that are at a lower cost than replacement of a locomotive, such as electrification of other facility equipment, use of renewable fuels, utilization of wayside charging etc. Additionally, the AFMO is another available compliance option for use in lieu of directly complying with the SA and IUOR; the AFMO allows for additional flexibility for when operators will need to operate Tier 4 and ZE or ZE capable locomotives.

CARB has continued to work with industrial and Class III operators (short line) throughout the regulatory process. Staff encourages individual operators to reach out to staff for assistance in determining the best compliance path for them.

a) Comment 45-19-23

[T]he applicability threshold for the hardship exemption is so low as to be useless for the Grain and Feed industry and, we suspect, all other locomotive operators. A typical Grain and Feed operator will receive one or two corn trains per month, with each train having 100 railcars. The value of a single corn train is approximately $4 million. For this reason, CGFA believes that the hardship exemption will not provide the intended relief to small operators, and certainly does not provide relief to many operators who have low emissions and minimal health impacts.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 15 for discussion on the Hardship Extension and Master Response 26 for CGFA-specific discussion.

b) Comment 45-25-4

[E]ven the 3-year "small business hardship extension" described in the SRIA will not keep many California short lines from having to close.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 15.

c) Comment 45-31-5

While CARB allows that it may issue an extension in the time required to set aside funds into the Spending Account, reduce the Spending Account contribution requirement, or provide an extension of eligibility to operate a locomotive by up to three years, there is no guarantee to any small business in California that CARB will exercise any discretion to avoid its elimination.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 15.

17. Zero Emission Technology

Several commenters made the following comments on ZE technology including: (1) concerns over the commercial availability of ZE technology aligning with Proposed Regulation requirements; (2) concerns CARB is prescribing the ZE technology type for operators; and (3) concerns the Technology Feasibility Assessment released with the ISOR fails to consider the

market and technology availability of ZE locomotive and multiple unit technologies, infrastructure, and fuel in the United States.

Master Response 16: As determined by ISOR Appendix F, Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, CARB estimated that ZE technology will be commercially available by 2030 for passenger, switcher, and industrial locomotives and by 2035 for freight line haul locomotives, based on best available data on the current state of ZE technology, small-scale demonstration, and full-scale demonstration. This is based on previous development cycles of new locomotives, and consistent with comments stating that 30–50 locomotive years of testing is needed. Thus, staff proposed 2030 and 2035 ZE IUOR for the applicable locomotive types.

In Appendix F, staff used information gathered from many sources, including meetings with locomotive operators. For example, from January 2020, through August 2022, staff had over 80 meetings with passenger locomotive users, including Caltrain, Metrolink, Altamont Corridor Express, North County Transit District, and Caltrans, as listed in the ISOR Appendix I, List of Public Workshops, Meetings, Conference Calls, Video Conferences, and Site Visits Supporting the Public Process for Development of the Proposed Regulation. Staff determined various manufacturers offer ZE multiple units, which can also be used to transport passengers by rail, and at least one model has covered more than 124,000 miles since its first testing in 2016. As discussed in Appendix F, San Bernardino County Transportation Authority purchased hydrogen fuel cell multiple units in 2019, with operation anticipated in 2024. As noted in the November 18, 2022, Board Hearing presentation, Caltrans ordered up to 29 hydrogen multiple units in September 2022. Appendix F also shows that ZE locomotives, especially hydrogen fuel cell locomotives, can meet the range requirements of intercity passenger and commuter rail agencies. The 2030 IUOR trigger date for passenger operators allows approximately seven years for the development process from European ZE passenger locomotives and switchers already in use to be scaled for use in California for passenger locomotives. Similarly, by policy design, other locomotive types will have years to develop ZE locomotive technology prior to the IUOR trigger dates.

Staff anticipates that operators may wish to avoid purchasing new locomotives to meet the ZE requirements of the Proposed Regulation. Indeed, the Proposed Regulation does not require the purchase of any new locomotive. In the 15-day changes package released on March 1, 2023, Appendix C, Technical Support Document: Zero Emission Locomotive Conversion, staff provides an initial overview and demonstration of feasibility on how operators may convert existing diesel-electric locomotives to ZE. CARB understands that locomotive operators play a key role in development of locomotive technology, and the staff projection of ZE technology is based on the operators assisting in the ZE technology development. The Proposed Regulation will help provide a stronger incentive for locomotive operators to move the locomotive industry towards ZE operation in California. Master Response 5 discusses the billions of dollars available to locomotive operators in state and federal incentives.

The Proposed Regulation remains technology-neutral. Staff has consistently stated that different ZE technologies will be suitable for different applications. Appendix F included examples of technologies that may be used for compliance with the

Proposed Regulation, but as stated, was not exhaustive of all potential technologies. The Proposed Regulation does not prescribe any one ZE technology for use for compliance, but states that the operations in California must meet the definition of ZE configuration as applicable (see Master Response 6 for more detail).

Appendix F also discusses the projected infrastructure requirements of mature hybrid, battery-electric, all-electric, and hydrogen fuel cell locomotives. Appendix F acknowledges that new fueling/charging infrastructure will be necessary and finding locations for the new infrastructure may be challenging depending on the operations. Staff also agrees with comments that it may be necessary for locomotive operators to employ duplicate fueling/charging infrastructure during the transition from traditional diesel to ZE technology.

Staff acknowledges FRA approval may be necessary to operate ZE rail technologies. An approval from the FRA can only be issued when a railroad, such as an intercity passenger rail or commuter rail operator, requests one. However, CARB has had discussions with FRA about the Proposed Regulation and the FRA approval process for ZE technology. FRA and CARB are coordinating regarding ZE technologies being approved for rail use in a timely manner.

As part of the Proposed Regulation, staff will conduct assessments in 2027 and 2032 on the state of ZE locomotives, ZE capable locomotives, and ZE infrastructure to verify that ZE locomotives will be commercially available by the compliance deadlines. If either assessment indicates that current ZE technology and infrastructure is not ready for locomotive operators to meet compliance deadlines, staff may amend the Proposed Regulation accordingly. Staff welcomes discussions with locomotive operators on the commercial availability of ZE locomotive technology during the process of completing the 2027 and 2032 assessments. Staff would specifically like to discuss the efforts locomotive operators will have made in the interim at developing and testing ZE locomotive technology. The 2027 and 2032 assessments will be able to include additional discussion on safety, reliability, maintainability, and operability of ZE locomotive technology, as well as feasibility under domestic content requirements for funded locomotives.

To address issues with compliance delays that are beyond the control of the locomotive operator, staff added a compliance extension based on delays due to compliant equipment manufacture delays, installation delays, or unavailability. Operators may reapply for the extension if the delay is longer than one year. This will prevent operators from being deemed in noncompliance for delays outside of their control.

In addition, operators may comply with the Proposed Regulation using Tier 4 locomotives even beyond 2050 if the locomotive is built before 2030. The Proposed Regulation includes options such as the ACP and AFMO that allow operators flexibility to move towards a ZE goal. Staff reached out to locomotive operators numerous times to design alternative plans in a collaborative manner.

a) Comment 45-10-3

It is imperative to continue discussion and development of the proposed draft regulation within the context of what is feasible given the realities of technological maturity and

financial realities of each passenger rail agency. Such considerations will enable zero emissions goals to be achieved as soon as possible and provide the framework for the following specific comments.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16 for discussion on technology and Master Response 5 for discussion on costs.

b) Comment 45-11-3

[Z]ero-emission locomotives and multiple unit technologies are a still emerging technology and currently lack the required range to be a direct one-for-one replacement for diesel powered units. Due to these range limitations and lack of readily available infrastructure for recharging and refueling, intercity passenger and commuter rail agencies would be required to significantly expand their fleet size to maintain current levels of service.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16.

c) Comment 45-11-7

[W]e are also gravely concerned that the proposed regulation and its Spending Account requirements are premised on a false assumption – that is, that zero-emission locomotives and multiple unit technologies will be commercially available and a satisfactory alternative to diesel locomotives when Spending Accounts reach financial maturity to cover the costs of a zero-emission locomotive or multiple unit. To be clear, there are currently no Federal Railroad Administration-approved zero-emission locomotive or multiple units commercially available for passenger rail use in the United States except those that run on wayside electrified lines. In fact, approval is required to operate such locomotives on intercity passenger and commuter rail systems and would take 1-5 years from order date to approval, longer for multiple units.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16.

d) Comment 45-16-4

[T]he Regulation is based upon the presumption that passenger rail equipment needs can be met using zero emission technology within the proposed timeframe of the Regulation. However, this technology is not currently available. CARB's Technology Feasibility Assessment asserting the availability of implementable technology is insufficient and does not accurately reflect the current marketplace.

There are no production-ready zero emission passenger rail technologies that are commercially available beyond conceptual prototypes, except those that require full electrification of the railroad, which is not currently feasible for NCTD's operating environment. Although several manufacturers have indicated interest in developing potential zero emission passenger rail products at some point in the future, passenger rail agencies initiating the order will likely bear the brunt of research and development costs.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16.

e) Comment 45-16-5

[T]he Regulation can only serve to delay the adoption of cleaner rail technology by the public sector by limiting public agencies' ability to efficiently move towards a zero emissions goal. CARB should instead establish a grant program to fund the pilot implementation of zero emission locomotives and multiple-unit trains, as well as associated infrastructure.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16. This response incorporates Master Response 5 for discussion on incentive and grant funding.

f) Comment 45-18-3

Currently no zero-emissions locomotive technologies exist that have been deemed safe for public passenger rail service. Zero-emissions locomotives will require time and public incentives to achieve the same market availability as on-road hybrid and zero-emissions technologies.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16.

g) Comment 45-23-2

[Z]ero emission locomotive technology is not commercially viable, nor is it likely to be viable for the foreseeable future.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16.

h) Comment 45-23-34

Before any technology can be introduced into the nationwide rail network, that technology needs to pass rigorous testing to ensure it is safe, reliable, and cost effective. Railroads operate 24 hours a day, 365 days a year in all types of weather and geography and play a critical role in the nation's supply chain; industry cannot rely on technology that is unsafe for our employees or the communities in which we operate or that fails or breaks down frequently. As a result, the railroads have extensive testing periods for new technology to ensure it can handle the rigorous demands imposed on it in a safe and dependable manner. This includes 30-50 locomotive years of testing for new locomotive models and feedback to the original equipment manufacturers to help them develop practical products.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16.

i) Comment 45-23-35

CARB's statement in the Notice of Public Hearing for this rulemaking that "[a]s more [zero emission] and [zero emission] capable locomotives are operated in California . . ., industry acceptance of advanced technologies will improve" misunderstands industry's concerns and

requirements. Industry will only accept new technologies that meet the safety and performance requirements demanded by the railroads – the minimization of emissions cannot be pursued myopically without regard to whether the resulting technologies will reliably achieve their intended use.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. Staff agrees with the comment that ZE locomotive technologies need to meet safety and performance requirements of operators. The increase of ZE and ZE capable locomotives operating in California is evidence that these technologies can meet the safety and performance requirements demanded by the locomotive operators.

j) Comment 45-23-37

Even with the railroads' focus on developing and demonstrating lower- and zero-emissions technologies, battery-electric locomotives are still in their development phase and are not expected to reach commercial or operational viability in the foreseeable future for line-haul locomotives.

The challenges with these new locomotive technologies are well established and have been communicated to CARB staff… even given the most optimistic manufacturer estimates, over the next decade, battery electric technology will provide approximately 10-15 percent of the energy required per locomotive to move today's trains. As such, this technology may one day provide a viable option for switcher locomotives, but it is unlikely to provide the power needed to pull a train long distances.

CARB's suggestion that battery tenders can fill the gap between what is possible for an onboard battery and what is needed to pull a line-haul locomotive ignores several significant technical and efficiency limitations. As noted above, a modern-line haul locomotive can have the equivalent of about 100 MWh of "usable (deliverable to the rails)" energy in its 5,000-gallon fuel tank. To match the 100 MWh "operating range" of a diesel locomotive, a battery tender solution would require having 7.1 total sets of propulsion batteries. A battery tender could be as large as a battery-electric locomotive in length (~75 feet) and weight (~430,000 lbs or 215 tons). From a simple physics perspective, this would be a significant trade off in terms of additional weight and length for a typical train in exchange for additional power – thus reducing the overall efficiency of the train. Further, the charging time for 714 MWh battery tenders would severely interfere with railroad operations. Even swapping out fully charged tenders for empty tenders would add considerable operational complexity and result in drastic underutilization of a very expensive and operationally-critical asset. In effect, battery tenders make little sense when considered in the overall context of railroad operations.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. CARB staff has consistently stated that different ZE technologies will be suitable for different applications. The Technical Feasibility Assessment submitted with the ISOR on September 20, 2022, assesses that fuel cell technology may be more feasible for freight line haul locomotives, and that freight line haul operations may consist of both battery-electric locomotives and fuel cell locomotives.

k) Comment 45-23-38

Even assertions regarding the feasibility of hybrid locomotives may be overstated. For example, in its Feasibility Study, CARB asserts that "several hybrid locomotives are commercially available and in use[.]" As evidence of the commercial availability of this technology, CARB points to six hybrid locomotives: Toshiba HDB 600, AMPS Traction GSHX 3380, Siemens "Charger" Hybrid, Stadler FLIRT, WINK and GTW, Wabtec FLXdrive, and Rail Propulsion Systems ZE Booster Locomotives. But…all six of the hybrid locomotives cited by CARB as being "commercially available and in-use" are largely not "in-use" and none have achieved commercial readiness.

While demonstration projects and proof-of-concept locomotives that are underway in California and elsewhere in the United States and Canada are a part of the overall process of developing new technologies, they do not prove commercial readiness.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. Many of the hybrid locomotives listed in the assessment are available for purchase and in many cases are in-use.

l) Comment 45-23-39

CARB's analysis of hydrogen locomotive technology is completely speculative. As CARB itself has noted, costs and other estimates regarding hydrogen fuel cell locomotives are difficult to evaluate "because there are too few fuel cell locomotives" to do so. Today, there are many unknowns about this technology, such as overall energy efficiency of fuel cell locomotives due to train routes, topography, tonnage, available power, attainable speeds, and the potential for restricted usage to specific routes and trains.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. Fuel cell technology currently is commercialized and used in various stationary and mobile applications. Appendix F, Technical Feasibility Assessment, included with the ISOR, has substantial evidence that included facts, reasonable assumptions predicated upon those facts, and staff provided expert opinions on available information. Therefore, staff analysis is not speculative.
>
> As concluded by staff in Appendix F, hydrogen locomotives will need further development prior to being commercially available. Staff believes by 2030 some applications of hydrogen locomotives will be commercialized.

m) Comment 45-23-41

CARB fails to evaluate the safety implications of hydrogen technology. Hydrogen is unlike today's diesel fuels. Safety risks associated with hydrogen include fire/explosion and asphyxiation. Hydrogen is characterized by a short quenching distance, wide flammability limits, low ignition energy, and flames that are nearly invisible in daylight. It also is associate with steel embrittlement. Hydrogen is a colorless, tasteless gas yet no odorant is light enough to travel and disperse with hydrogen.

> **Agency Response:** No changes were made in response to this comment. Staff agrees that hydrogen is indeed unlike diesel. For example, hydrogen is non-toxic, and

dissipates rapidly when it is released, allowing for relatively rapid dispersal of the fuel in case of a leak. Different fuels have different risk, and require different risk mitigation strategies. As there are increased hydrogen demonstrations, the safety record of hydrogen will grow and build confidence that hydrogen can be as safe as the fuels in widespread use today. See Master Response 18 for further discussion on hydrogen infrastructure.

n) Comment 45-23-42

There are zero fuel tenders in service that are capable of transporting compressed or liquified hydrogen, nor any fuel tender refilling stations. All of these technologies will require intense development and validation programs that, for the most part, have not yet even begun. As such, predictions regarding the future use, cost, or maintenance of such a locomotive are entirely speculative at this stage.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16. Although the comment is correct that there are currently no hydrogen tenders in use in the United States, page 30 of the Technical Feasibility Assessment submitted with the ISOR on September 20, 2022, details the state of hydrogen tenders. The analysis includes reference to a 2021 study conducted by the FRA on hydrogen fuel technology suggests that, with some revisions, the strategies used for the safe implementation of natural gas (NG) and liquefied natural gas (LNG) should be directly applicable for establishing gaseous or liquid hydrogen tenders.

o) Comment 45-23-67

It is impossible for CARB (or any other state agency) to predict which technology (either in development today or yet to be developed) will be adopted by the national transportation sector generally and the rail industry specifically.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16.

p) Comment 45-23-68

[T]he infrastructure to support zero-emission line-haul locomotives must be constructed across the North American continent due to the interconnected nature of the rail network. For example, the current rail network cannot support the use of hydrogen-fuel cell locomotives or battery-electric locomotives. In its attempt to force a transition to an as-yet unidentified new technology, CARB has failed to acknowledge that it is not feasible to have one rail network used in California and another used in the rest of North America.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 5 for discussion on national ZE infrastructure. Staff assumed that locomotive operators will continue to operate as they have. It is up to each operator to choose the compliance method and technology that best suits their individual operations.

q) Comment 45-23-80

[G]iven that the lifespan of a locomotive is several decades, complete conversion to a new, zero-emission fleet within the span of 14 years is highly unlikely.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. The IUOR allow locomotives to operate at a minimum of 23 years. There is no requirement for operators to convert a fleet to ZE within the span of 14 years.

r) Comment 45-25-2

[Z]ero-emission ("ZE") batter[y] locomotives also may be required in greater numbers than the locomotives they are replacing. Since they are required to spend idle hours every day while recharging, they cannot work continuously and another locomotive must take their place while they recharge.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. If battery-electric locomotives are not ideal for operations, other technologies can be used, such as hydrogen fuel cell.

s) Comment 45-25-8

[T]here is also significant technological risk in the purchase of ZE yard switcher or road switcher locomotives that are untested and may not reliably p[er]form the same functions as their diesel counterparts. CSLRA-member short lines, on their own initiative, are already involved in pilot projects to build and demonstrate battery-electric and hydrogen-electric locomotives. From these projects and from monitoring ZE locomotive developments generally CSLRA is finding that delivery and testing of prototype units is taking 2 to 3 years or more from the time that funding is secured. Whether for battery electric or hydrogen electric propulsion, scaling up batteries to deliver 2 to 8 Mwh of power without overheating or other reliability issues, is difficult. The proposed Regulation demands that short lines make near-term purchases of very expensive locomotives that may not perform adequately, causing service failure for short line customers.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16. The Proposed Regulation does not require locomotive operators to make near-term purchases of ZE locomotives.

t) Comment 45-26-20

The proposed regulation relies on the existence of freight test programs, and in particular, the availability of low horsepower switcher locomotives as the basis for presuming passenger rail equipment needs can be met. This is in conflict with the fact that passenger rail equipment is a specialized, low volume market. Critical to the feasibility of its proposed regulation, CARB has not explored the fact that there are no production ready ZE passenger rail technologies that are commercially available beyond prototypes, except those that require full electrification of the railroad.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16.

u) Comment 45-26-21

The proposed regulation notes that ZE solutions would need to be sized based on the operational needs of each railroad but does not provide analysis as to how current passenger operations can be met by ZE technology. This is a fundamental oversight. While there exists a potential path for short distance, low frequency operations, no known ZE solutions for the majority of commuter and intercity passenger rail operations currently exists, outside of electrification. Further, it is unclear if any such solutions will be available within the next 10 years to meet the needs of today's operations. A sensitivity analysis should have been performed to assess the expected range of development for a solution that can meet the needs of most long-distance and higher capacity commuter and intercity passenger operations.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16.

v) Comment 45-26-22

Though the proposed regulation seems to rely on the assumption that battery or hydrogen tenders could be used to bridge the significant range and energy capacity gap, no analysis is provided as to its availability, or operational feasibility. There are no existing tender designs for passenger use.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16. The Technical Feasibility Analysis submitted with the ISOR on September 20, 2022, includes an analysis for hydrogen tenders. The analysis points to a need for further development; the analysis does not state that hydrogen tenders will be the only feasible solution to address range and capacity needs.

w) Comment 45-26-23

The proposed regulation does not provide a market analysis to examine the potential for manufacturers to bring ZE platform solutions to the U.S. market. Any substantive fleet replacement would require commercial availability of a product line. There would need to be a sustained market beyond California to justify investment in a production line and supply chain that could meet U.S. regulatory and Buy America requirements.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16.

x) Comment 45-26-26

Both battery and hydrogen multiple-unit (MU) prototypes are identified as potential solutions for passenger rail operations based on pilot programs in Europe. There is no analysis, however, as to whether or not manufacturers of these products would be willing to develop variants of these platforms for the U.S. market. Currently, no manufacturer has committed to bringing a ZE platform to the US market beyond a prototype phase except those that require full electrification of the railroad.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16.

y) Comment 45-26-27

While the concept of tenders is mentioned as a means to achieve range and capacity for ZE technology that otherwise cannot be met for the foreseeable future, no analysis of the availability or practicality of tender equipment for passenger use is included in the proposed regulation. Any new design would need to be developed in concert with FRA, to include incorporation crashworthiness requirements and fire safety considerations. It would likely take three to five years to go from concept to prototype for a new tender design that could be developed for commercial production. Further, FRA has noted that liquid hydrogen tenders are not being considered as a viable option for passenger rail, due to significant safety concerns.

Agency Response: No changes were made in response to this comment. See response to comment 45-26-22 for more discussion on hydrogen tenders. As pointed out in the Technical Feasibility Analysis submitted with the ISOR on September 20, 2022, a 2021 study conducted by the FRA on hydrogen fuel technology suggests that, with some revisions, the strategies used for the safe implementation of NG and LNG should be directly applicable for establishing gaseous or liquid hydrogen tenders. See Master Response 16 for discussion on FRA approvals.

z) Comment 45-26-28

In order to implement ZE technology, most passenger railroads will depend heavily on federal funding sources. These funding sources have domestic content requirements such as Buy America, and similar programs that must be complied with. Since there is no domestic production of ZE rail technology for passenger use except those that require full electrification of the railroad, there exists no current supply chain that could be proven to meet domestic content requirements. Prototypes, and even eventual production models will likely require a domestic content waiver which could take several months to obtain.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16. If there are no ZE technologies legally available for passenger operation due to a lack of a domestic content waiver, passenger operators would qualify to apply for a compliance extension due to compliant equipment unavailability.

aa) Comment 45-26-32

While the need for additional infrastructure is identified within the Technology Feasibility Assessment, there is no analysis of how this additional requirement will impact the short- and long-term implementation of ZE technology. Analysis of the cost, timeframe, or regulatory process required to implement such support infrastructure is not included in the proposed regulation. This represents a major challenge for passenger railroad's attempting implementation of ZE technology, because agencies cannot control the pricing, availability and regulatory standards of this infrastructure.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 16. The SRIA prepared for the Proposed

Regulation included infrastructure costs assumed to be required to comply with the Proposed Regulation and included these costs in the total cost of the Proposed Regulation, as seen in Section 3.1.2.5 Fueling Infrastructure Capital and Maintenance Cost. Staff could not conduct an analysis on the timing of infrastructure as each locomotive operation will have varying engineering, development, and siting requirements.

bb) Comment 45-33-3

Unlike auto technology, there has been little in the way of public ZEV research and development funding for the rail mode. Almost all R & D for the rail mode has fallen on the equipment manufacturers. In addition, CARB has failed to leverage an interim near-term achievable technology that could further reduce rail GHG emissions. That technology would convert life-expired diesel locomotives to battery booster units, which added to each train would create a hybrid, providing power from initial charge while capturing braking energy and dramatically reducing the fuel needed to accelerate from stops. Amtrak is pursuing this strategy, building units in Sacramento as part of its recent equipment order.

Agency Response: No changes were made in response to this comment. CARB has funded $22.6 million for the Wabtec-BNSF battery-electric locomotive demonstration project, as part of a Zero- and Near Zero-Emission Freight Facilities project to pilot several emissions-reducing technologies in and around railyards. The project demonstrated PM, NOx, and GHG emission reductions. CARB has also awarded $3 million to the Port of Los Angeles to demonstrate a battery-electric switcher. Passenger operator plans also include investing millions in ZE locomotive technology using public funding. Locomotive OEMs have been utilizing CARB grants to develop low and ZE technologies, and more funding is available for the OEMs to develop and demonstrate ZE locomotives, such as Low Carbon Transportation and Air Quality Improvement Program Grants. In addition, locomotive operators can use the SA to pilot or demonstrate ZE locomotives.

CARB agrees that converting a diesel locomotive to a ZE locomotive, whether it is a fuel cell or a battery locomotive, can improve energy efficiency and reduce emissions. CARB published the Technical Support Document: Zero Emission Locomotive Conversion as Appendix C of 15-day changes package released on March 1, 2023, to describe the feasibility of converting a diesel locomotive to a ZE capable locomotive. Locomotive operators will benefit from using locomotives with low NOx and PM2.5 emissions in the form of reduced SA obligations, whether the reduction comes from hybridization, improved combustion strategies, or any other relevant technology. In addition, any locomotive technologies that reduce emissions can be used as part of an ACP. See Master Response 5 for funding available for discussion on incentive and grant funding.

cc) Comment 45-33-5

While still keeping the goal of zero emission, RailPAC would recommend a more flexible timeline that reflects that development of proven rail locomotive ZEV options lags behind auto development. During this transition period CARB should fund an accelerated R & D effort in the rail industry, funding" beta" tests of the alternative technologies – hydrogen fuel

cell, battery electric and battery electric with segment electrification – in order to provide guidance for the full-scale ZEV implementation.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16. See Master Response 5 for funding available for discussion on incentive and grant funding.

dd) Comment 45-34-2

CARB proposes that all future all switcher locomotives should be battery electric. However, there are not commercially available 100 percent battery-electric switcher locomotives on the market.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. CARB disagrees with this comment. Staff assumes that given how switchers operate, often short distances and near infrastructure, they would be well suited for battery-electric ZE locomotives. As of 2023, there are ZE switchers that can be purchased from the major locomotive OEM. In fact, in 2022 UP purchased battery-electric switchers to use at railyards in California and elsewhere.[19]

ee) Comment 45-37-3

Recognizing the difficulty of meeting range requirements with pure battery propulsion systems, CARB now allows plug-in hybrid light-duty highway vehicles to qualify as ZEVs. CARB should make the same accommodation for plug-in hybrid locomotives.

> **Agency Response:** No changes were made in response to this comment. The Proposed Regulation would allow hybrid locomotives that can operate on both combustion fuel and ZE technologies such as batteries. SA funds could be used to purchase ZE-capable locomotives, which are hybrid locomotives that can be operated in a fully ZE mode. Hybrid locomotives would be allowed to operate for 23 years using combustion fuels; after that point, they would only be allowed to operate in a fully ZE capacity while in California.

ff) Comment BH1-OT-4-2

Switcher locomotives may be the first to reach commercial readiness, but line-haul locomotives will take significantly longer given the demands placed on those engines. Furthermore, CARB must not overlook the infrastructure that will be necessary should a viable alternative to the diesel locomotive be developed.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16 and Master Response 18.

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[19] Progress Rail, Caterpillar to Supply Locomotives to Union Pacific Railroad, Supporting Investment in World's Largest Battery-Electric Locomotive Fleet, January 28, 2022, accessed July 7, 2022. (weblink: *https://www.progressrail.com/en/Company/News/PressReleases/CaterpillartoSupplyLocomotivestoUnionPacificRailroadSupportingInvestmentinWorldsLargestBattery-ElectricLocomotiveFleet.html*).

gg) Comment BH1-OT-5-1

As a result, staff's framework for zero-emission locomotives is simply not realistic. The locomotive manufacturers note they currently produce an 8 megawatt hour battery electric locomotive. And they project they could potentially reach 15 megawatts by 2030. That's likely enough energy for yard and local rail service, but insufficient for line-haul locomotives.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. The Technical Feasibility Analysis submitted with the ISOR on September 20, 2022, assesses that fuel cell technology may be more feasible for freight line haul locomotives, and that freight line haul operations may consist of both battery-electric locomotives and fuel cell locomotives.

hh) Comment BH1-OT-5-2

Hydrogen technology is still very early in development. It's far too soon to predict how this technology will evolve. The first demonstration project for hydrogen is not planned until 2025. A more achievable path to reducing emissions in the time frame CARB proposes is using low carbon fuels and combustion engines.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. CARB agrees that hydrogen locomotive technologies are still being developed. The Proposed Regulation allows SA funds to be used for the purchase of Tier 4 diesel locomotives until 2030. Operators are also able to use SA funds on pilots and demonstration projects for ZE locomotives and ZE rail equipment.

ii) Comment BH1-OT-9-1

This regulation all man -- also mandates the move to zero-emission locomotive technology. This technology just does not exist today. My company, Sierra Northern Railway, is building the first-of-its-kind hybrid hydrogen fuel cell electric switcher locomotive in partnership with the California Energy Commission. This locomotive under construction today will not be going under test until the end of 2023 or middle of 2024 at the earliest. Commercialization of this technology will be many years behind that assuming it works as planned.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16.

jj) Comment BH1-OT-10-2

It would be unconscionable to commit to a fully zero-emission fleet by 2045, given the immature state of the technology, limiting funding available for new purchase, age of the fleet, and requiring the place -- replacement of Tier 4 locomotives well in advance of their end of useful life.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 16.

kk) Comment 45-15-1

Regrettably, we have significant concerns regarding the proposed timing, structure and overall compliance requirements presented in the regulation. Despite the recommendation and conclusions made in the 2022 market and technology assessment, Zero-Emission (ZE) technology is still a developing technology in the United States. Per statements from the vehicle manufacturers, the ZE technology that has been implemented in other countries still lacks the necessary range and capacity required for many of the intercity passenger and commuter rail operations in the United States.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16.

ll) Comment 45-23-77

[T]he Associations ask CARB to consider whether it is prematurely anticipating the ideal zero-emission locomotive technology—i.e., whether CARB is attempting an uninformed selection of "winning" and "losing" technologies. For their parts, the Associations are not aware of any consensus among industry or researchers regarding how best to reduce emissions from freight shipping.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16.

mm) Comment 45-11-20

[Appendix F of the Initial Statement of Reasons includes] only supplier marketing statements and public transit agencies' plans, and fails to consider the market and technology availability of zero-emission locomotive and multiple unit technologies, infrastructure and fuel in the United States in the context of the proposed regulation's precise compliance requirements and deadlines. Moreover, that earlier assessment neglects to highlight that much of the technology reviewed is currently unavailable in the United States as it has not been approved by the Federal Railroad Administration for use by American intercity passenger and commuter rail agencies and does not meet federal Buy America requirements; and minimizes the reality that, for such technologies to be approved for deployment in the United States, manufacturers and suppliers would need to establish a wholly new manufacturing presence in the country to meet federal domestic content requirements.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. See Master Response 18 for discussion on ZE infrastructure.

nn) Comment 45-23-33

CARB's technology feasibility analysis, located in Appendix F of the regulatory package, overstates the current state of zero emissions technologies for locomotives and provides an unrealistic picture of how new technologies develop in the North American rail industry. Notably, CARB has historically underestimated the time needed for development of zero emissions technologies, and its process for evaluating feasibility is disconnected from reality.

Technically possible technology is not the same as "feasibility" and is a poor indicator of overall technological success. CARB's analysis fails to provide any data or evidence of safety, reliability, maintainability, or operability of the locomotives and related technologies currently being evaluated. Simply conducting a "literature search" and interviewing "people with knowledge and expertise in advanced technologies," without speaking to the actual users of the locomotives at issue, is not a true measure of "feasibility" or "technological readiness."

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. Staff disagrees that the Technical Feasibility Assessment submitted with the ISOR on September 20, 2022, overstates the current state of ZE locomotive technologies and underestimates the time needed for ZE technology development.

oo) Comment 45-23-43

CARB's Feasibility Study fails to adequately address the energy infrastructure needed for the new technologies it envisions. Refueling today's 5,000-gallon fuel tanks takes approximately 15 minutes. During BNSF's 2021 test of a 2.4 MWh battery-electric locomotive (which held more than 40 times less energy than its diesel counterpart and had to be included as part of a consist with diesel locomotives), battery charging took between 6 and 8 hours. The extensive delays that would result from a large-scale rollout of this technology would cripple the supply chain and cause chaos in ports and railyards across California and the United States. Thus, in addition to addressing the inadequate battery capacity, fast-charging infrastructure would be required on a national basis before battery-electric line-haul locomotives could be deployed en masse. This fast-charging infrastructure would need to be built out in areas where traditional fueling infrastructure exists today in order to accommodate a transition from one energy source (diesel) to another (either battery-electric or hydrogen or some other alternative, lower carbon fuel). This additional infrastructure would require the acquisition of additional land near existing yards because the existing diesel infrastructure cannot be removed, nor is the new infrastructure likely to be co-located with diesel fueling infrastructure. This duplicate fueling/charging infrastructure would need to remain in place until a full conversion of the entire North American locomotive fleet is completed.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. Staff disagrees with the comment on the inadequacy of CARB feasibility study. Staff observes that the comment is discussing charging infrastructure needs of a specific type of ZE locomotive technology available in 2021, instead of the ZE technology that will be available in 2035 for freight line haul locomotives.

pp) Comment BH1-OT-3-1

The Board should know that the proposed regulation rests on assumptions about the market availability and technology readiness of zero-emission locomotives in the United States that are not sound. Although this technology has been demonstrated in Europe, it has not been intro -- demonstrated or introduced into passenger service in the United States. Before that could happen, we would need the FRA to provide safety clearance for the use of these technologies for passenger service, and we would need the manufacturers to demonstrate that they meet Buy America requirements.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16.

qq) Comment 45-26-19

Because the Technology Feasibility Assessment is incomplete, it does not provide meaningful input for consideration in the Standardized Regulatory Impact Analysis (SRIA). This means the SRIA's basis for conclusions on related passenger rail impacts is incomplete and makes the SRIA insufficient with respect to CARB's responsibilities under the California Administrative Procedures Act.

> **Agency Response:** No changes were made in response to this comment. The comment is correct that the Technology Feasibility Assessment staff released as part of the ISOR (Appendix F) was still a draft when the SRIA was published in March 2022. Regardless of whether the assessment is "complete," staff provided sufficient facts and analyses to support of the conclusions reached in the SRIA. Specifically concerning passenger rail impacts, staff has provided an analysis on passenger operator funding sources and the possible impact to passenger fares, fiscal impacts to federal, state, and local government agencies that own passenger locomotives, and monetized and non-monetized benefits from the reduced emissions. Staff calculated that the Proposed Regulation would cost passenger locomotive operators approximately $492 million from 2023 to 2050, Staff also allocated capital and maintenance costs among local, state, and federal governments based on data from the FTA National Transit Summaries and Trends 2019. The fiscal impact analysis includes not only costs to the locomotive operators, but also changes in federal, state, and local government revenues from utility user taxes, diesel fuel taxes, local sales taxes, and ZE related fuel and infrastructure construction taxes.
>
> Therefore, the analyses conducted in support of the SRIA are sufficient to meet the requirements of Government Code section 11346.3 (within the California Administrative Procedure Act). Namely, staff has provided to the public, with the Technology Feasibility Assessment and other documentation as part of the SRIA, "tools to determine whether the regulatory proposal is an efficient and effective means of implementing the policy decisions enacted in statute or by other provisions of law in the least burdensome manner." (Gov. Code § 11346.3(e).)

rr) Comment 45-28-1

With respect to CARB's Technology Feasibility Assessment for the Proposed Regulation, Wabtec believes that the design, development, and deployment of alternative propulsion

technologies, beyond a Tier 4 diesel-electric heavy-haul locomotive, remain in various phases of pilot and demonstration programs.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. Staff agrees with the comment and expects technologies to continue to advance.

ss) Comment 45-34-4

CARB staff also ignored additional OptiFuel Press Releases: OptiFuel Obtains U.S. EPA, Tier 4 Rail Certification for 100 percent Natural Gas Engine That Emits Zero NOx and PM and Significantly Reduces Fuel Cost (2/14/2020); Production of Zero Criteria Emission Freight Locomotives From 1,200 to 2,400 Hp (11/19/2020); and OptiFuel Secures Agreement to Transition Argentina's 400 Freight Locomotive Fleet from Diesel-Power to Zero-Emission Power (7/12/2022). My question is why did not the CARB staff include any information on OptiFuel RNG-Hybrid products in Appendix F.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. The comment is incorrect. On page 44 of Appendix F: Locomotive Technology Feasibility Assessment, staff included a discussion on NG locomotive technologies, including specifically "[t]he Gas Technology Institute, partnering with Optifuel received $2.6 million to develop and demonstrate a 4,300 hp diesel dual-fuel locomotive." This partnership was for the demonstration of a RNG hybrid freight line haul locomotive.

tt) Comment 45-34-3

The last two years, the CARB staff has ignored any other solution other than battery-electric for locomotives even they were well aware that OptiFuel had Rail Certified from EPA the Cummins ISX12 engine in steady-state mode with emissions of 0.00 g/bhp-hr for NOx, 0.000 g/bhp-hr for PM and 0.00 g/bhp-hr for NMHC. The CARB staff was also aware that that engine running RNG can have a negative CI.

> **Agency Response:** No changes were made in response to this comment. The Proposed Regulation is technology-neutral. As explained in Master Response 6, OptiFuel NG locomotives are not ZE locomotives, U.S. EPA has certified them as Tier 4 locomotives. Operators can use SA funds to purchase Tier 4 locomotives until 2030, and operate them for up to 23 years in California as allowed by the IUOR. In addition, the Proposed Regulation is an ATCM focused on reducing DPM and NOx. GHG emission reductions are a co-benefit of the Proposed Regulation occurring when locomotives begin ZE operations. Staff is aware that some RNGs can have a negative carbon intensity, depending on various factors, such as variations in feedstock types, origin, raw material production processing efficiencies, and transportation. CARB has programs and documents that address GHG from fuels, such as LCFS and Scoping Plan.

uu) Comment BH2-OT-9

[C]urrently, there is no clear path to zero-emission locomotives. Some technologies seem well suited to yard operations, but are new and untested. Similarly, the infrastructure and capacity

required for replacing conventional locomotives with electrification or other alternatives is inadequate.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16 for discussion on ZE locomotives and Master Response 17 for discussion on ZE infrastructure.

vv) Comment 15-2-3-1

Today, numerous railroads are participating in demonstration programs for alternative fuel line-haul and switcher locomotives that hold great promise. But the railroads are testing these locomotives. Alternative fuel locomotives are not commercially viable today, nor will they be in the short term. Significant research and testing in terms of safety, reliability, and functionality still needs to be done before these locomotives can begin to replace diesel-powered locomotives. This reality is well-known to CARB and cannot be wished or regulated away.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16.

ww) Comment 15-2-3-14

If permitted to go into effect, this rule will… do nothing to speed the development of commercially viable zero emission line-haul locomotives.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16.

18. Catenary Lines (Overhead Power)

Several commenters brought up their concerns with the Proposed Regulation assuming only battery-electric and hydrogen fuel cell ZE locomotives will be used for compliance with the IUOR when catenary lines are also a ZE technology.

> **Master Response 17:** Staff agrees that overhead electrification is a well-established ZE technology that has been proven for over 100 years. As is discussed in the SRIA, page 67, staff assumes switchers are likely to be battery-electric and freight line haul and passenger locomotives are likely to be hydrogen fuel cell. For the cost analysis, electrified railways using locomotives primarily powered by overhead catenary lines were not modeled because of concerns about high cost, vertical clearance required for catenary lines, the lack of locomotive technology that accommodates both a diesel engine and catenary power, and low and/or variable utilization along many rail lines.
>
> As mentioned in the Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, page 29, all-electric locomotives that operate on overhead power systems require higher initial capital investments, mainly due to high infrastructure cost of an overhead catenary system. For example, Caltrain is electrifying 51 miles of its route. The budget for the construction of the Caltrain electrification is $848 million, and the total capital budget including new trains and other services is $1.9 billion. Staff believes that electrification of freight rail in California will cost about two-thirds more per mile than the Caltrain electrification, due

to higher power requirements of freight locomotives. Thus, staff believes that freight locomotive operators are less likely to employ solutions that require electrification of rail routes. Staff agrees battery-electric and hydrogen fuel cell infrastructure will also have large costs and provides estimates in the SRIA, Table 3.15, page 86, but believes battery-electric and hydrogen fuel cell infrastructure will be easier to afford and implement.

Although staff assumes overhead catenary lines to be expensive, for some operators, such as Caltrain, catenary lines are considered advantageous. The Proposed Regulation does not prescribe any one ZE technology. Operators are free to choose the technology that best suits their operations, including overhead catenary systems.

a) Comment BH1-OT-27-2

I also want to highlight a particular zero-emissions technology that is – already has been available for decades, is available off the shelf and is widely used for freight – both freight and passenger rail in other parts of the United States as well as widely in use internationally. That technology is overhead electric catenary – catenary lines. This is – this is technology that could be purchased today, if there is the motivation to. We have no need to wait for other speculative lighter duty technologies like hydrogen when this – when this technology is available today. And I would like to see greater emphasis for catenary electrification in these standards, as well as support for the implementation of this infrastructure.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 17.

b) Comment BH1-OT-31-1

I think it's very important to look at harm reduction in the short term, in the immediate term, which is to say, even without zero emissions, we need to have much cleaner trains in our railyards and so on. But we can do both. We can make it cleaner and go all the way to zero emissions now without novel technology. This is a solved issue. Electrification running overhead wires, possibly batteries in shorter distance places that can recharge more frequently. But for main lines, overhead wires, catenary's, are the only real way.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 17.

c) Comment BH1-OT-31-2

They say that the timetable for using hydrogen and/or batteries is simply unrealistic. They're correct. We cannot use that as our zero-emissions policy. We need to use what is shown to work, electrification through overhead catenaries.

Agency Response: No changes were made in response to this comment. This response also incorporates Master Response 17.

d) Comment BH1-OT-36-1

You can shift riders to cars if you reduce the availability of trains. Several speakers have suggested that we have to focus more on catenary. Other countries are far ahead of us in

that and we need to catch up. I hope that you'll begin to put as much effort into electrification of the rail system as you're putting into this project.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 17.

e) Comment BH1-OT-39-3

Battery and hydrogen rail propulsion is likely to be practical only for specialized applications, such as freight yard switching or lightly used branch passenger lines, not mainlines with frequent trains. It is implied by the CARB staff report that conventional overhead wire electrification is too expensive to pursue and that battery and hydrogen will be cheaper. However, battery, and especially hydrogen, require very expensive supporting infrastructure as well.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 17.

f) Comment BH1-OT-39-2

I am very concerned by CARB staff's prescription for zero-emissions rail being entirely based on two unproven technologies with serious limitations, battery and hydrogen powered trains with no con – serious consideration given to the technology proven to work for mainline rail, overhead wire electrification. The CARB staff report states that zero-emission line-haul interstate locomotive operation may be feasible by the year 2035. They're off by about 120 years. The first zero-emissions line-haul long distance electric freight trains in this country were running on the Milwaukee Road back in 1914. It is off-the-shelf technology proven to be economical for many different types of rail operations all over the world. It is also well established with many decades of experience and a large diverse pool of vendors and equipment providers worldwide.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 17.

g) Comment BH2-OT-40

I continue to be very disappointed that battery and hydrogen are the only technologies mentioned for cleaning up rail, with presumed emphasis on hydrogen as the primary way to power California trains in the future.

Why does conventional overhead wire electrification continue to be completely dismissed by CARB, as if it doesn't even exist? The State, CARB included, needs to develop and implement policies that will electrify the California Rail Network. The emphasis should be on conventional overhead wire electrification for main line railroads.

Hydrogen and battery-powered locomotives and trains have a very limited range, and are much more expensive to purchase, operate, and maintain compared to conventional all-electric locomotives using an overhead wire. Conventional, zero-emissions electric rail technology utilizing overhead wire is very well established, over a century old. Most of the major railways of the world, outside of the Americas, have rectified their main lines. The world's most powerful locomotives are all electric, pulling 40,000 ton iron ore trans in South

Africa, and Australia. The hydrogen trains in Germany that were mentioned have been a very expensive failure. They've been a catastrophe of reliability problems, extreme cost overruns, and they're about the size of like a light rail train. They're not a big train at all. They can't haul freight. And leakage is a very serious problem with hydrogen and has environmental justice implications.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 17.

19. Infrastructure

Several commenters made general comments stating that CARB did not consider the challenges of implementing and scaling ZE infrastructure.

> **Master Response 18:** CARB understands concerns regarding the need for expanded electricity and hydrogen generation, transmission, and distribution as ZE locomotives begin operation throughout California. However, as supported by the record, CARB expects that the California electric grid will be capable of meeting additional demand and fueling infrastructure as ZE technologies expand. Staff assesses power demands that will be required for the electrification of each sector and works with our state energy partners and the electric utilities to identify the resource needs and infrastructure development timelines that will make this electrification work possible. The FRA and Department of Energy are currently looking into hydrogen and fuel cell technologies for rail applications via an impact study on the applicability and safety of hydrogen for rail, as stated in the 2019 H2@Rail Workshop hosted by Sandia National Laboratories. See Master Response 2 in the Response to Comments on the Draft EA for more detail on California ZE infrastructure development. See Master Response 5 for discussion on national ZE infrastructure considerations.
>
> The Technical Feasibility Analysis submitted with the ISOR on September 20, 2022, details the state of ZE technology and the likelihood of commercialization by 2030 for switch, industrial, and passenger locomotives and 2035 for freight line haul locomotives. However, as part of the Proposed Regulation, staff has included commitments to complete assessments on the state of ZE locomotives and ZE infrastructure, discussed in more detail in Master Response 16 and Master Response 19.
>
> The 15-day changes published on March 1, 2023, included a compliance extension for scenarios where there are delays in installation of ZE infrastructure or unavailability of compliant equipment, which includes ZE infrastructure. This change was included to respond to comments that expressed concern that ZE infrastructure may not be ready even though the operator has done their due diligence to comply.

a) Comment 45-26-34

The proposed regulation does not include assessment of the short- or long-term ability of utilities or hydrogen suppliers to provide 100 percent reliable energy to passenger railroads, particularly if demand continues to grow, driven by continued demand from the auto and transit sectors.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 18.

b) Comment 45-23-45

[H]ydrogen technology, also imagined as a near-term solution by CARB, requires a massive, multi-billion-dollar public investment in infrastructure on a national basis to produce and transport hydrogen safely. Again, line-haul locomotives don't just operate in California, nor do trains stop at California's borders – they traverse the continent, often through remote areas. Hydrogen hubs will be needed in areas of existing industrial activity, such as ports and railyards, and in rural locations along the network, raising significant environmental justice concerns. The federal government, through the Department of Energy, is only just now beginning to grapple with what a hydrogen-reliant economy might look like in the coming decades. These plans are in their nascent stages.

These challenges are difficult to address and will take time to overcome in a way that is safe for communities and railroad employees, is economical, and is able to meet the demands inherent when transporting freight as part of a global supply chain. CARB's suggestion in Appendix F that zero emission locomotives will be commercially ready and available by 2024 is unfounded and unrealistic. Indeed, earlier in this same rulemaking, CARB estimated, that "[z]ero-emission (ZE) locomotives will be commercially available starting no later than 2035." Even if this assumption were accurate, which is itself questionable and with which AAR's members strongly disagree, the infrastructure required to use these new technologies will take years and billions of dollars of public funding and investment to build. CARB simply fails to account for these significant challenges.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 18. Staff disagrees that Appendix F states that ZE locomotives will be commercially available by 2024. Appendix F only states that SA funds will be allowed to be used toward ZE locomotives beginning in 2024, because that is when the first SA deposit is due. While staff is not anticipating ZE locomotives to be commercially available in 2024, staff encourages operators to purchase ZE locomotives earlier than the 2030 and 2035 IUOR deadlines. Staff further disagrees that introduction of hydrogen infrastructure to ports, railyards, and rural areas will lead to higher environmental justice concerns than allowing combustion-powered locomotives to continue operating indefinitely.

c) Comment BH1-OT-6-1

However, the infrastructure required to meet the energy demand for these new electric technologies does not exist today. As long-haul locomotives operate continuously across all states nationwide, infrastructure is required to ensure railroads can continue to meet the demands of the global supply chain.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 18.

d) Comment BH1-OT-6-2

And it is well documented that the current electricity demand on California's grid surpasses what the existing grid is able to support, and as seen as are rolling brownouts. CARB has,

from our perspective, not adequately addressed how the energy infrastructure needed for this regulation to be successful will be met. The nation's rail network cannot rely on battery electric technologies if forced to depend on inadequate supply of energy, forced brownouts, and demands to refrain from charging electric vehicles as we saw this past summer.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 18.

e) Comment BH1-OT-6-3

Zero-emission hydrogen fuel cells technology also requires a significant amount of infrastructure that also does not exist and will need to be developed, permitted, and installed before any significant investment is made in that technology. As published in our climate action plan, UP has a – has been a proactive leader by stating our goal of net zero by 2050. This announcement preceded the federal government's goal of 2050, which is based on science-driven expectations for technology and infrastructure. UP's commitment to ZE technology, zero-emission technology, is broader than just locomotives.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 18.

f) Comment 45-26-33

No agreed upon standards for interface of charging or hydrogen fueling infrastructure for rail-bound vehicles currently exists. The proposed regulation provides no assessment of the timeline associated with the development of necessary standards that would be required to promote interoperability of ZE technology over the general railroad network which will be critical to its adoption beyond the prototype phase.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 18. Staff assumes industry standards for ZE infrastructure will develop alongside ZE locomotive technology. Operators will need to work collaboratively to develop ZE technologies that work over the general rail network. The Proposed Regulation does not prescribe any one technology for compliance but rather allows for the operator to choose the technology that best fits individual needs.

g) Comment 45-23-44

[T]he amount of energy and related infrastructure required to convert the entire rail network to a battery-electric solution cannot be supported by the nation's current electric grid and infrastructure, much less California's. The United States and California must make significant investments in their own infrastructure before industry is able to rely on it as a stable source of electricity to power locomotives and other equipment. The current grid cannot handle even today's load, much less the increased demand of several entire industries electrifying over a short period of time. The nation's rail network cannot rely on battery-electric technologies if forced to depend on an inadequate supply of energy, forced brownouts, and demands to refrain from charging electric vehicles.

CARB's statement that the "expansion of electric charging infrastructure will also increase the amount of electricity supplied by utility providers" defies logic. The current electricity

demand on California's grid surpasses the amount of electricity capable of being supplied by California's utility providers on many occasions – this is well documented and is not open to serious dispute. It is unclear how added demand on an already overtaxed system will do what the existing lack of electricity has not accomplished – "despite adding new powerplants, building huge battery storage systems, and restarting fossil fuel generators, California still relies on energy from other states." Demand on California's grid solely from electric vehicles, not even accounting for freight truck and rail demands should proposed regulations be finalized, are expected to increase the demand for electricity by 25 percent by 2045. CARB's complete lack of consideration in this rulemaking for this well-documented situation is both inexplicable and irresponsible.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 18.

20. 2027/2032 Assessments

Several commenters indicated their concern with the 2027 and 2032 assessments. The concerns included: (1) the assessments would be too late to be helpful; and (2) the SA strands funds while operators wait for ZE technologies to purchase.

> **Master Response 19:** Staff added an additional compliance extension for scenarios where there is unavailability of compliant equipment. This will prevent operators from being deemed in noncompliance for delays outside of their control, without operators needing to wait on the conclusion of the 2027 or 2032 assessments.
>
> If ZE locomotives are available for purchase, operators should not wait until CARB conducts the assessments; operators should order ZE locomotives as necessary. For example, passenger locomotive operators should prepare for purchases of locomotives in 2030 or later to be ZE. Depending on the usual procurement methods, passenger operators would plan purchases as usual. If they are unable to procure ZE locomotives, staff will consider this information in the assessment in 2027.
>
> Staff disagrees that the SA is "stranding" funds while operators await the conclusion of the 2027 and 2032 assessments. SA funds do not require ZE technology to be commercially available prior to being spent. SA funds can be used for Tier 4 or cleaner locomotives (until 2030), ZE locomotives, ZE capable locomotives, ZE rail equipment, ZE infrastructure, and even for the pilot and demonstration of ZE technologies. This gives operators several opportunities to spend their funds to reduce their locomotive emission impacts, which will in turn reduce their SA obligations in a given year.

a) Comment 45-11-10

[W]e are concerned about conducting a technology assessment in 2027, as is too late to be helpful to intercity passenger and commuter rail agencies that would be required, beginning on July 1, 2024, to deposit funding into a Spending Account.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 19.

b) Comment 45-23-36

…CARB's assurance that it will "publish assessments in 2027 and 2032" to reevaluate its estimation of the availability of zero emissions locomotive technologies does little to cure the defects associated with this rulemaking for several reasons. First, the Proposed Regulation would require the transfer of billions of dollars into its "Spending Account" starting in 2024. If finalized as proposed, this would have the effect of stranding billions of dollars of liquid assets in this "Spending Account," preventing the railroads (notably privately owned corporations) from making necessary investments in the national rail network, track maintenance, and other investments that are not "approved" by CARB.

Second, locomotives are not commodities that can be purchased "off the shelf." There is a minimum 18-month to 2-year lead time between the placement of an order for a particular locomotive and its eventual delivery. New battery-electric locomotives may involve even longer lead times given the current shortage of metals and other components necessary for battery technology. It simply is not feasible for CARB to revisit its technology assessment mere months before the proposed bans are slated to take place; the locomotive market does not function like that of the automobile market.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 19. See also Master Response 7 for discussion on the SA.

c) Comment 45-26-1

The ZEV rail technology, market readiness and resource availability needs must be reviewed and assessed by CARB in a way that takes into account federal requirements and constraints, funding limitations, public agency purchasing rules and requirements, and public sector financial planning requirements and timelines.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 19 for discussion on the 2027 and 2032 assessments and Master Response 11 for discussion on the AFMO.

d) Comment 45-26-6

If, in 2027, the technology assessment ultimately finds that zero-emission locomotive and multiple unit technologies have not progressed sufficiently to maintain the regulation's compliance deadlines, CARB will have undermined rail service by requiring the redirection of limited funding that could have been used for operations and other capital investments to the Spending Account over 3.5 years for little to no movement on the deployment of zero-emission locomotive and multiple unit technologies. There is a serious cost to agencies like Caltrain of encumbering funding, especially at the levels that would be required for compliance in the proposed regulation even if ultimately, the deadlines are moved back.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 19 for discussion on the 2027 and 2032 assessments and Master Response 11 for discussion on the AFMO.

e) Comment 45-30-6

We encourage CARB to modify the Proposed Rule's approach to the Technology Assessment (Section 2478.5 (b)(1)) by moving that analysis earlier and re-evaluating that assessment more frequently than proposed. If the assessment is held in 2027 as proposed, with an implementation date of 2030 for passenger rail locomotives, there will not be sufficient time for railroads to react. Locomotive procurement for passenger rail services takes many years. SMART's fleet procurement was seven years until the rail cars were in revenue service, with FRA testing delays and service start delays due to technology failures with a relatively known technology product type. These timelines will likely be significantly longer for the new technology implementation of zero-emission locomotives.

> **Agency Response:** Changes were made in response to this comment. This response incorporates Master Response 19. The Proposed Regulation was modified to include the AFMO to help passenger operators transition to ZE operations, increase ridership, and minimize repayment of public grant funds. See Master Response 11 for discussion on the AFMO. See Master Response 16 for discussion on FRA approvals.

f) Comment 15-7-6

Caltrain fully supports CARB's completion of technology assessments in 2027 and 2032. As specified in the staff report for the proposed regulation, this assessment would include an analysis of the progress made in ZE locomotive technologies and allow CARB the ability to determine if compliance dates need to be adjusted. As these assessments move forward, we urge CARB to ensure that they are as robust as possible and conducted with input from industry stakeholders and all relevant state and federal departments and agencies.

> **Agency Response:** No changes were made in response to this comment. Staff agrees, and will consider any industry-submitted data for the 2027 and 2032 assessments.

g) Comment 15-13-7

Metrolink fully supports CARB's completion of technology assessments in 2027 and 2032. As specified in the staff report for the proposed regulation, this assessment would include an analysis of the progress made in ZE locomotive technologies. This technology assessment would also provide CARB with the ability to determine if compliance dates need to be adjusted. As these assessments move forward, we urge CARB to ensure that they are as robust as possible and conducted with input from industry stakeholders and all relevant state and federal departments and agencies.

> **Agency Response:** No changes were made in response to this comment. See response to comment 15-7-6.

21. Renewable Diesel

Several comments requested CARB include alternative fuels such as renewable diesel (RD) in the Proposed Regulation as an emissions reduction strategy for locomotives operating in California.

Master Response 20: The Proposed Regulation is an ATCM aimed at reducing toxic DPM, PM2.5, and NOx. By transitioning locomotives to ZE operations, the Proposed Regulation would also achieve co-benefits of reduced GHG emissions.

The ACP allows operators to reduce emissions in various ways if emission reductions equivalent to direct compliance with the SA and IUOR are achieved. Alternative fuels, such as RD, may be used as an emission reduction strategy under the ACP with supporting documentation. Although RD has been shown to reduce PM, NOx, and GHG emissions in some applications, the current data is insufficient to warrant a single emission reduction value for all locomotives.

a) Comment BH1-OT-40-1

We would like for CARB to consider adding renewable diesel as a compliance option in the in-use locomotive regulation. So that significant emission reductions can be achieved more quickly and without the need for new infrastructure. Locomotive manufacturers are on track to release renewable diesel locomotives that are shown to reduce PM by up to 80 percent and NOx by 13 percent. The rail sector has also expressed a strong interest in using renewable diesel. And this regulation could create the necessary incentives. So please consider adding renewable diesel as a compliance option in the In-Use Locomotive Regulation.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 20.

b) Comment 45-20-2

Research by the Intergovernmental Panel on Climate Change (IPCC) has consistently highlighted that GHG reductions achieved in the next 10 to 15 years are critical in reaching carbon neutrality by 2045. Increased deployment of zero-emission vehicles (ZEV) in the Medium and Heavy-duty (M&HD) vehicle fleet can contribute to those reductions on a timeline dependent upon several factors including: advances in battery technology, ramp up of M&HD vehicle production, electric charging/fueling infrastructure and renewable electricity generation. In a study of 10,000 HD vehicles in the Northeastern U.S. released in 2022, Stillwater Associates LLC compared the environmental benefits of phasing in new diesel ICE trucks fueled with renewable diesel vs. EV trucks from 2022 to 2032…the ICE/RD scenario delivers three times greater cumulative GHG emissions over the study period. Similarly, Neste believes that RD is capable of achieving larger GHG reductions than ZE locomotives.

Agency Response: CARB has made no changes in response to this comment. This response also incorporates Master Response 20.

c) Comment 45-20-1

Neste would like to request that CARB consider evaluating renewable diesel as a more immediate way of reaching the emissions reductions goals of this regulation. We strongly urge that CARB consider adding RD into the proposed regulation based on the enormous potential it has to reduce GHG, particulate matter and NOx emissions per CARB emissions testing. RD is a technology that is available today and that can be used by the rail sector with

minimal impact to current operations, and that will generate immediate air quality benefits to local communities.

Agency Response: CARB has made no changes in response to this comment. This response also incorporates Master Response 20.

22. Mode Shift and Leakage

Several commenters made general comments on the concern of mode shift away from rail and emissions leakage.

Master Response 21: Staff reviewed literature on freight diversion and mode shift (e.g., a shift from transport by train to transport by truck) and spoke with industry experts and did not find empirical research that focused on the impact of regulatory costs on freight diversion or mode shifts from rail to trucks. Staff researched and directly engaged industry for their experience or data and found that the decision to divert freight from rail to truck is complex and unique to individual businesses.

Staff also disagree with comments that claim the Proposed Regulation would divert passengers from rail to cars, increasing vehicle miles travelled (VMT). However, as directed by the Board at the November 18, 2022, Board hearing, staff continued to work with passenger operators to include an additional alternative to direct compliance with the SA and IUOR. In response, staff developed the AFMO. For a detailed discussion on the AFMO, see Master Response 11. Staff believes that the addition of the AFMO to the Proposed Regulation will provide passenger operators the flexibility to continue essential operations and avoid mode shifts.

Although staff does not believe the Proposed Regulation would lead to a mode shift from freight locomotives to trucks or from passenger locomotives to personal vehicles, if a mode shift were to occur, those modes are transitioning to ZE pursuant to other CARB Regulations. Locomotives will also need to transition to ZE operations in California.

For a more detailed discussion, see Response to Comments on the Environmental Analysis (EA) Prepared for the In-Use Locomotive Regulation Master Response 1: Increased Mode Shift to Trucks and Passenger Vehicles.

a) Comment 45-8-3

Our railroad customers have a heavy focus on food, beverage, and agriculture commodities. These customers supply vital food resources for retail, restaurants, and institutions, whom also operate on tight margins. Shippers that have the option to shift transportation mode from rail to truck, will see an additional cost for this change; current estimates are as much as 40 percent increase in cost. Consumers, in turn, will have to pay more for their final product. These customers utilize boxcars, where each boxcar equates to 3.5-4 truckloads. Some other customers may not be able to survive, and close business in California. Our largest customer in this segment ships approximately 265 cars per week. Monday – Friday. Converting these shipments to truckloads equates to approximately 1,100 truckloads per week. The sheer volume converting to truck is staggering.

Agriculture commodities ship primarily into an area, known as our transload, which receives between 9,000-10,000 annual units. This traffic is shipped via unit trains, 100+ cars, or manifest/single cars. If this number is converted to truck traffic, the number grows to 40,000 new, additional truckloads on the California highways system. The additional truck traffic adds to our already congested roads, needing taxpayer dollars to maintain. Some smaller customers may not be able to compete. Others can utilize their out-of-state locations, and truck their end uses in California. This would cause job loss in California, as well as increase truck on the highways.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 21. See Master Response 22 for further details on the regulatory costs to small businesses.

b) Comment 45-23-4

CARB is proposing to introduce barriers to…interoperability of the rail network by proposing state-specific regulations that would likely increase criteria, toxic, and climate pollutants.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 3 for discussion on interoperability. Staff disagrees that the Proposed Regulation would increase criteria, toxic, or climate pollutants. As shown in the additional supporting documents and information published on March 1, 2023, the Proposed Regulation is expected to achieve over 7,300 tons of PM2.5, 386,200 tons of NOx, and 21.6 million metric tons of GHGs from 2023 to 2050.

c) Comment 45-23-81

[T]he desired modal shift should be from truck to rail to reduce greenhouse gas emissions and achieve the United States' climate goals. CARB has previously reached this same conclusion. In addition, U.S. EPA, Biden Administration officials and peer-reviewed academic articles have identified modal shift as an important consideration when considering the regulation of freight transport.

> **Agency Response**: No changes were made in response to this comment. For a discussion of mode shift, see Master Response 21. For a discussion of GHG emissions from trucks versus trains, see the response to comment BH1-OT-4-3.

d) Comment 45-11-2

[D]espite advances in zero-emission locomotive and multiple unit technologies internationally, the proposed regulation would proceed on a timeline that is faster than technology and market readiness and resource availability would permit, creating negative operational and financial impacts to rail service that would undermine the state's ability to reduce vehicle miles traveled and that would create travel "leakage" to other modes, like personal automobiles and airplanes.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 21.

e) Comment 45-25-10

Modal diversion to truck will in turn stress road networks and subject Californians to roadway congestion, greater road and bridge wear, higher highway accident/death rates, and ironically, at least over the next 20 years, greater air pollution because of the modal shift.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 21.

f) Comment 45-31-8

Should CARB's Proposed Rule become final, much of the freight carried by short line railroads will continue to be shipped through California even as the short lines themselves are forced to cease operations given their inability to meet the financial burdens imposed by the rule. This will inevitably result in a modal shift of freight traffic from rail to its competing mode of truck transportation.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 21 for discussion on mode shift and Master Response 5 for discussion on costs.

g) Comment 45-31-9

[F]reight that had previously moved by rail will move to truck and the highways leading to an increase in accidents, injuries, and fatalities, not to mention an increase in cost to the public to maintain the road network.

Eliminating short line freight rail service in California will decrease safety to the motoring public on California roadways by substantially increasing a substantial the number of trucks on the roadways.

> **Agency Response**: No changes were made in response to this comment. This response incorporates Master Response 21 for discussion on mode shift and Master Response 5 for discussion on costs.

h) Comment 45-35-1

It has been brought to our attention that California Air Resources Board is considering new locomotive regulations that would place a massive financial demand on these small, short line operations. Considering the importance of small railroads, and the very low percentage of air pollution and GHG emissions they create in the state, risking their financial ability to survive is not good public policy. If these railroads cannot operate and maintain their tracks, freight shipments like those handled our region will have no choice but to ship via trucks, which would only increase highway congestion levels.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 21. The Proposed Regulation includes an ACP option that can be used in place of direct compliance with the SA, IUOR, or both, if equivalent emission reductions are achieved. The ACP allows operators to reduce emissions in a variety of ways, which need not be through the operation of cleaner locomotives. This will provide short line operators flexibility in how they choose to comply and could lessen the financial and logistical effect. Additionally, the Proposed

Regulation also includes a Hardship Extension that can be used to delay the requirements of the Proposed Regulation if it can be shown that they could put a small business in financial distress. As explained in the ISOR, 66 percent of the locomotives operated by Class III locomotive operators are pre-Tier 0, and 83 percent of locomotives operated by industrial locomotive operators are pre-Tier 0. These are some of the oldest and highest polluting locomotive operating in the State. Therefore, staff disagrees with the comment that Class III locomotive operators should be excluded from the Proposed Regulation.

i) Comment 15-10-4

The cost to comply with the proposed regulatory requirements would cripple and threaten to render a number of short line railroads financially insolvent. Should CARB's Proposed Rule become final, much of the freight carried by short line railroads will continue to be shipped through California even as the short lines themselves are forced to cease operations given their inability to meet the financial burdens imposed by the rule. This will inevitably result in a modal shift of freight traffic from rail to its competing mode of truck transportation, leading to an increase in road congestion and wear on public highways, micro plastic pollution from shredded tires, accidents, injuries and fatalities, to the detriment of the residents of California.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 21. See also Master Response 5 on the costs of the Proposed Regulation and response to comment 45-35-1.

23. Requests to Exempt Small Operators (i.e., Class III and Industrial)

Several comments were made requesting Class III railroads be exempt from the Proposed Regulation due to expense and potential economic harm with "very small reduction in criteria pollutant and GHG[s]" as well as the possibility the Proposed Regulation would lead to an increase in freight moving from trains to trucks. The following comments discussed these topics: 45-22-1, 45-14-1, 45-25-13, BH1-OT-7-1, BH1-OT-7-2, BH1-OT-8-2, and BH1-OT-9-2.

Master Response 22: The Proposed Regulation is an ATCM that reduces emissions of PM and NOx. As discussed on page 59 of the ISOR, the PM emitted by diesel locomotives, DPM, is classified as a TAC and has no identified safe exposure level. Therefore, it is important that all locomotives operating in California are included in the Proposed Regulation.

Locomotives used by Class III and industrial operators are some of the highest polluting locomotives in the State. Without the Proposed Regulation, switchers, Class III, and industrial locomotives are projected to account for 14 percent of PM2.5 emissions and 13 percent of NOx emissions from locomotive activities in California in 2040, even though they account for only 4 percent of the estimated operational MWhs. Approximately 80 percent of all Class III and 90 percent of industrial locomotives in California are pre-Tier 0, meaning they do not have any emissions limits on their engines. By using Tier 4 locomotives, PM2.5 and NOx emissions from Class III and industrial locomotives can be reduced by over 80 percent. These large emission reductions will be realized near communities where Class III and industrial locomotives operate.

The ACP and AFMO compliance pathways, which can be used in lieu of direct compliance with the SA and IUOR, provide operators additional flexibilities while still reducing harmful emissions. The Proposed Regulation also includes a Hardship Extension for eligible operators. See Master Response 5 for discussion on costs and possible funding sources for locomotive operators.

Staff disagrees that the Proposed Regulation would lead to mode shift from trains to trucks. See Master Response 21 for further discussion mode shift.

a) Comment BH1-OT-8-1

. . . [T]he proposed In-Use Locomotive Regulation is financially impossible for most small railroads. Using the notional small business shortline described in your SRIA documents, if you run the calculations, this business's available funds would be $321,269 short of its required spending account contribution for 2023. The three-year hardship delay allowed in this regulation will not make this situation workable. The alternative compliance plan won't help a small company's available cash problem and the prescribed regulation review in 2027 will come too late to save small railroads from bankruptcy. Meanwhile, adopting this regulation will also end the use of our most successful grant program for upgrading shortline locomotives, which has been the Carl Moyer Program. Discontinued rail service by small railroads will cost significant job losses. It will also cause plant closures by customers that can no longer compete in their markets. And a massive modal shift by cargo that is available to change from rail to truck.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 22.

b) Comment 45-19-24

CGFA recommends that CARB develop other exemption strategies that would achieve the goals of reducing emissions and protecting public health while exempting those operators who do not have significant emissions or cause adverse health impacts.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 22.

c) Comment 45-31-10

Given the negative effects of the Proposed Rule raised here and in the comments so incorporated, and as better options exist to make meaningful environmental progress, CARB should withdraw this rulemaking. If CARB continues to pursue regulating the emissions from locomotives, it should completely exclude short line railroads. Instead of eliminating Class III railroads in California, as CARB has predicted could occur, given their inability to pass on the high costs of the Proposed Rule onto their customers, the agency should encourage short line railroads to voluntarily adopt strategies to reduce locomotive emissions, including investing in new locomotives when economically feasible and participating with industry efforts to test and invest in methods to reduce emissions.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 22. As discussed in the ISOR and during the Board hearings on November 18, 2022, and April 27, 2023, there are several incentive

programs available for Class III operators. This response incorporates Master Response 5 for discussion on incentives. CARB funding has been available for locomotive operators via the Carl Moyer program for several years prior to the Proposed Regulation, and in the 17 funding years analyzed, Class III operators statewide have accessed those funds only 39 times for purchases, 17 times for engine replacements, and 1 time for engine remanufacture.

d) Comment 15-10-1

The Associations are disappointed to see that CARB continues to decline to exempt small business railroads from its proposed regulation. Extensive in-person testimony and written comments concerning the very serious and highly negative impacts of the Proposed Rule on short line railroads were provided to the CARB Board during its Friday, November 18, 2022, public hearing.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 22 for discussion on exempting small operators and Master Response 5 for further discussion on the costs on the Proposed Regulation.

e) Comment 15-10-5

The Associations urge CARB to either withdraw its Proposed Rule or completely exempt short line railroads from its requirements.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 22.

24. Include Innovative Clean Transit Regulation Exemptions

Several passenger operators requested the Proposed Regulation provide the same exemptions as are included in the Innovative Clean Transit (ICT) regulation. The following comments discussed this request: 45-10-11, 45-18-4, and 45-30-11.

Master Response 23: Staff made some modifications to the Proposed Regulation based on the comments received.

The ICT regulation allows for the following exemptions for transit agencies:

- Delay in bus delivery caused by setback of construction of infrastructure needed for the ZE bus.
- Available ZE buses cannot meet daily mileage needs.
- Available ZE buses do not have adequate gradeability performance to meet daily needs for any bus in its fleet.
- A required ZE bus type for the applicable weight class based on gross vehicle weight rating is unavailable for purchase.
- When a required ZE bus type cannot be purchased by a transit agency due to financial hardship. A transit agency may request an exemption from the ZE bus purchase requirements due to financial hardship.

An extension was added into the Proposed Regulation for delays due to compliant equipment (including infrastructure) manufacture delays, installation delays, or unavailability. Staff does not believe the other exemptions included in ICT are applicable or necessary for compliance with the Proposed Regulation.

When passenger ZE operation is required in California for locomotives with engine build dates of 2030 or newer, staff anticipates multiple locomotive technologies to be available for operators to choose from. It is common that, for locomotives, original engine manufacturers (OEM) work directly with operators to manufacture locomotives that meet specific operational and power needs. The Proposed Regulation includes two assessments in 2027 and 2032 that will review the status of ZE technologies and infrastructure, which allows for potential development of amendments to the Proposed Regulation, if needed.

a) Comment 45-36-5

Innovative Clean Transit (ICT) Rule are afforded regulatory offramps, including delayed implementation for financial emergencies and the availability of equipment that meets required safety, operations, and maintenance cycles. Passenger rail agencies should be afforded the same, as well as strong incentive funding to develop the technology via a pilot program.

Agency Response: Some changes were made in response to this and other similar comments. This response incorporates Master Response 23. See also Master Response 11 for discussion on the AFMO, which provides additional timing flexibility to avoid "financial emergencies," and Master Response 5 for discussion on incentives and pilots.

25. Independent Market Analysis & Fleet Management Framework

Several comments included the request that CARB have an Independent Market Analysis completed prior to Board adoption of the Proposed Regulation. The market analysis would include items such as;

(1) The commercial availability of ZE locomotive and multiple unit technologies and fuels in the United States,
(2) consideration to all applicable federal laws and regulations;
(3) The deployment status of ZE locomotive and multiple unit technologies in the United States;
(4) The capital and operational costs, performance, and reliability of ZE locomotive and multiple unit technologies and requisite infrastructure on the United States market;
(5) The availability of state and federal funding opportunities to address the costs of deploying and operating ZE passenger locomotive and multiple unit technologies and requisite infrastructure;
(6) The barriers to adoption of ZE locomotive technologies, including the availability of battery storage and regularity of required maintenance on locomotive batteries; and,
(7) The status of intercity passenger and commuter rail service in California.

Several comments also recommended a fleet management framework be incorporated into the Proposed Regulation.

Master Response 24: There is no requirement under the California Administrative Procedure Act that a "neutral and independent market analysis be completed by an informed third party," and CARB has declined to contract for such an analysis here. CARB is the preeminent air quality regulatory agency in the world, and has studied air pollution and regulated sources of air pollution across California since before the federal Clean Air was enacted. Over such time, CARB has developed substantial expertise in analyzing the impacts—economic, health, air quality, and business specific—of its proposed regulations.

Prior to the publication of the SRIA, on March 16, 2021, staff released a Preliminary Cost Document for public comment and held a workshop on cost assumptions on March 30, 2021, to allow interested parties time to review and provide documentation for staff to consider for the SRIA. At that time, no substantiated cost information was provided to CARB staff or documentation was confidential and could not be used. As is usual CARB practice, following the release of the SRIA on May 26, 2022, staff continued to work with industry to develop a technical assessment that was released as part of the ISOR, on September 20, 2022. The ISOR technical assessment is the best analysis staff could produce given currently available information and the data provided by locomotive operators and OEMs. Cost ranges of battery-electric and hydrogen fuel cell locomotives were determined through many sources, including meetings with locomotive operators and OEMs, as listed in the ISOR Appendix I, List of Public Workshops, Meetings, Conference Calls, Video Conferences, and Site Visits Supporting the Public Process for Development of the Proposed Regulation. The information gathered in this outreach was corroborated using CARB incentive program data and industry feasibility studies. These cost ranges were published in the Preliminary Cost Document. Further cost information was published in the SRIA and CARB research on technology readiness is included in Appendix F: Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation. The Technical Feasibility Analysis details the state of ZE technology and the likelihood of commercialization by 2030 for switch, industrial, and passenger locomotives and 2035 for freight line haul locomotives. The purpose of the Technical Feasibility Analysis was not to address details of safety, reliability, maintainability, or operability of ZE locomotive technology, as the technology is not expected to be commercially available until 2030; another technology analysis at this time is unlikely to produce new results. An additional independent analysis prior to Board adoption would unnecessarily delay the Proposed Regulation and resulting emission reductions, especially given that the Proposed Regulation has built-in backstops related to ZE locomotive technology availability. Such an analysis would also be duplicative and wasteful of limited public funds and resources.

Instead, as part of the Proposed Regulation, staff has included commitments for new comprehensive assessments on the state of ZE locomotives and ZE infrastructure in 2027 and 2032, to reassess commercialization of ZE locomotives for the compliance deadlines in the Proposed Regulation. The 2027 and 2032 assessments will be able to include more discussion on safety, reliability, maintainability, and operability of ZE locomotive technology. If the assessments point to changes to compliance deadlines being necessary, staff may start the rule amendment process. As with any new data provided, independent third-party analyses will be accepted and reviewed by CARB as part of the assessments if provided.

Comments are focused on ZE locomotive technologies; however, Tier 4 locomotives are already commercially available and can be purchased until 2030 with SA funds. If, prior to 2030, the commenters do not believe there is a ZE option available for them to use for their operations, they could purchase a Tier 4 locomotive and operate it in California for up to 23 years. In 2030, switch, passenger, and industrial locomotives with engine build dates of 2030 or later will need to operate in ZE configuration in California, making the first ZE requirement start seven years after the anticipated effective date of the Proposed Regulation and which would allow enough time for commercialization and safety approvals for ZE passenger locomotives.

Furthermore, the Proposed Regulation provides flexibility for operators to choose whichever technology works best, given availability and unique operations, and also includes the ACP, an alternative compliance pathway that allows emission reductions to occur through any approved method as long as it is within three miles of railroad facilities. As directed by the Board during the November 18, 2022, Board Hearing, staff continued to work with passenger operators to find a compliance pathway that would work with the unique way passenger operators are funded and operate in California. In collaboration with passenger operators, staff developed the AFMO that could be used by any operator in place of directly complying with the SA and IUOR. The AFMO has a fleet management framework, as requested by some comments from passenger operators.

a) Comment 45-10-12

[W]e ask that a neutral and independent market analysis be completed by an informed third party, such as the Caltrans Division of Rail and Mass Transportation before a rule is adopted by the CARB Board of Directors. The SRIA omitted or mischaracterized significant critical information relating to the cost and availability of zero-emissions locomotive technology according to our estimates.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 24. In addition, Caltrans is not a neutral and independent third party in the context of this Proposed Regulation, as they would be directly affected by the Proposed Regulation as the owner that operates locomotives used in Amtrak Intercity routes.

b) Comment 45-10-15

We ask that CARB fully consider an independent market assessment and analysis prior to approving any regulation language. This study will inform the timeline, incentives, and technologies necessary to meet the needs of operators across the state. The Standardized Regulatory Impact Assessment (SRIA) document included errors and incorrect information with respect to cost estimates and the assessment on the availability of zero emissions locomotive technologies which issues were raised in a comment letter submitted from the five statewide commuter rail agencies to CARB and Department of Finance staff. Additionally, this is further compounded as Appendix F: "Technology Feasibility Assessment for the Proposed In Use Locomotive Regulation" in the Initial Statement of Reasons (ISOR) did not address the missing and incorrect information of the SRIA.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 24. In addition, the letter mentioned by the comment was submitted to staff on September 19, 2022, a day before the ISOR scheduled publication date. Although the ISOR was already drafted and published, staff examined the letter and found that none of the comments related directly to SRIA cost estimates or assumptions on availability of ZE locomotive technology. Instead, the letter discussed general concerns with the ACP and underscored that dedicated, reliable, and commensurate funding would be necessary for the success of the Proposed Regulation and ZE technology transition.

c) Comment 45-10-17

We ask that the CARB Board carefully consider alternative regulation models, including a purchase requirement or fleet management framework. These models with the appropriate timelines would better align shared zero-emissions goals with the realities of market availability, public procurements, and complex transition plans. These models have proven successful in the transition of other public transportation fleets to zero-emission technologies.

Agency Response: Staff made changes to the proposal based off of this and other similar comments. Staff developed the AFMO, which gives set milestone dates for when locomotive fleets must turn over to cleaner locomotives. This alternative to directly complying with the SA and IUOR has an expedited ZE locomotives deadline of 2047 but provides additional flexibilities for when cleaner locomotive technologies need to operate.

d) Comment 45-12-12

CARB should consider an independent market assessment and analysis prior to approving regulation language. This study will inform the timeline, incentives, and technologies necessary to meet the needs of operators across the state. A funded pilot phase should be implemented before penalties or purchase requirements are imposed. Such pilots will accelerate the development of technologies faster than will be possible with operators pursuing independently. A purchase requirement and fleet management framework with the appropriate timelines would better align shared zero-emissions goals with the realities of market availability, public procurements, and complex transition plans.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 24 for discussion on an independent market analysis and fleet management framework. This response incorporates Master Response 5 for discussion on CARB-funded pilots.

e) Comment 45-15-12

[W]e ask that a neutral and independent market analysis be completed by an informed third party, before a rule is adopted by the CARB Board of Directors. We feel the Standardized Regulatory Impact Assessment (SRIA) omitted and misrepresented critical information relating to the cost and availability of zero-emissions technology and does not coincide with information known from prior engagements with leading passenger rail equipment manufacturers. This analysis will inform the timeline, incentives, and technologies necessary

to meet the needs of operators across the state. A funded pilot phase should be implemented before penalties or purchase requirements are imposed. Such pilots will accelerate the development of technologies faster than will be possible with operators pursuing independently. A purchase requirement and fleet management framework with the appropriate timelines would better align shared zero-emissions goals with the realities of market availability, public procurements, and complex transition plans.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 24 for discussion on an independent market analysis and fleet management framework. This response incorporates Master Response 5 for discussion on CARB-funded pilots. In citing "penalties" and "purchase requirements," CARB staff assumes the comment is referring to the SA requirement, which is not a penalty but rather a trust account held and controlled by the locomotive operator.

f) Comment 45-11-21

[O]ur market and technology assessment is distinct from the assessment scheduled for 2027 in the proposed regulation in that it aims to proactively identify and address the barriers associated with transitioning to zero-emission locomotives before agencies are required to take preparatory steps – i.e. investments in the savings accounts – for technology deployments that may later prove to be infeasible. In a time of limited resources, we believe strongly that this phased approach is necessary and responsible.

If CARB were to pursue this market and technology assessment, we urge CARB to continue to take actions to prove the viability of zero-emission locomotives; such actions can include continued investment in demonstration and pilot projects that deliver near-term benefits to communities burdened by poor air quality and that set the stage for a broader industry transition.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 24 for discussion on an independent market analysis and fleet management framework. This response incorporates Master Response 5 for discussion on funding and CARB-funded pilots.

g) Comment 45-24-5

While zero-emission units have been approved for pilot service by the Federal Railroad Administration, there are currently no zero-emissions locomotive technologies that are deemed safe for passenger rail service. An independent market assessment and analysis should be completed prior to approving regulation language. This study will inform the timeline, incentives, and technologies necessary to meet the needs of operators across the State. A funded pilot phase implemented before penalties or purchase requirements are imposed would accelerate the development of technologies faster than will be possible with operators pursuing independently. The benefit would be more readily available, proven zero-emission technologies that can better meet the demand of the operators.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 24 for discussion on an independent market analysis and fleet management framework. This response incorporates Master Response 5 for discussion on funding and CARB-funded pilots.

h) Comment 45-11-19

[T]he Association urges CARB to initiate and complete an independent and peer-reviewed market and technology assessment before implementing the proposed regulation or any alternative regulation. This market assessment should be conducted with input from industry stakeholders and all relevant state and federal departments and agencies, and should address the following issues:

1. The commercial availability of zero-emission locomotive and multiple unit technologies and fuels in the United States, with consideration to all applicable federal laws and regulations;
2. The deployment status of zero-emission locomotive and multiple unit technologies in the United States;
3. The capital and operational costs, performance, and reliability of zero-emission locomotive and multiple unit technologies and requisite infrastructure on the United States market, including the compared costs of locomotives and related technologies now versus estimated future costs;
4. The availability of state and federal funding opportunities to address the costs of deploying and operating zero-emission passenger locomotive and multiple unit technologies and requisite infrastructure;
5. The barriers to adoption of zero-emission locomotive technologies, including the availability of battery storage and regularity of required maintenance on locomotive batteries; and,
6. The status of intercity passenger and commuter rail service in California.

This market and technology assessment is intended to inform: the timelines for compliance by intercity passenger and commuter rail agencies with the proposed regulation or any alternative regulation; amendments to the proposed regulation or any alternative regulation to address assessment findings; and funding strategies to support the deployment of zero-emission locomotive technologies and requisite infrastructure.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 24 for discussion on an independent market analysis and fleet management framework. This response incorporates Master Response 5 for discussion on funding.

i) Comment 45-26-17

Caltrain requests that CARB initiate and complete an independent and peer-reviewed market and technology assessment, as called for by the California Transit Association, before implementing the proposed regulation or any alternative regulation. This market assessment should be conducted with input from industry stakeholders and all relevant state and federal departments and agencies, and should address the following issues:

1. The commercial availability of ZE locomotive and multiple unit technologies and fuels in the United States, with consideration to all applicable federal laws and regulations;
2. The deployment status of ZE locomotive and multiple unit technologies in the United States;
3. The capital and operational costs, performance, and reliability of ZE locomotive and multiple unit technologies and requisite infrastructure on the United States

market, including the compared costs of locomotives and related technologies now versus estimated future costs;
4. The availability of state and federal funding opportunities to address the costs of deploying and operating ZE passenger locomotive and multiple unit technologies and requisite infrastructure;
5. The barriers to adoption of ZE locomotive technologies, including the availability of battery storage and regularity of required maintenance on locomotive batteries; and,
6. The status of intercity passenger and commuter rail service in California.

This market and technology assessment is intended to inform: the timelines for compliance by intercity passenger and commuter rail agencies with the proposed regulation or any alternative regulation; amendments to the proposed regulation or any alternative regulation to address assessment findings; and funding strategies to support the deployment of zero-emission locomotive technologies and requisite infrastructure.

This market and technology assessment would be more expansive than the 2022 assessment included in ISOR Appendix F. That earlier assessment reflects only supplier marketing statements and public transit plans and fails to highlight that much of the technology reviewed is unavailable in the United States as it has not been approved by the FRA for use by intercity passenger and commuter rail agencies and does not meet federal Buy America requirements. Additionally, this market and technology assessment is distinct from the assessment scheduled for 2027 in the proposed regulation in that it aims to proactively identify and address the barriers associated with transitioning to ZE locomotives before agencies are required to take preparatory steps for technology deployments that may later prove to be infeasible.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 24. This response incorporates Master Response 5 for discussion on funding and Master Response 16 for discussion on FRA approvals.

j) Comment 45-30-12

Ensure that a neutral and independent market analysis is completed by an informed third party, such as the Caltrans Division of Rail and Mass Transportation. The SRIA omitted and misrepresented critical information relating to the cost and availability of zero-emissions technology.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 24. See response to comment 45-10-12 for discussion on Caltrans disqualifying as a third party.

k) Comment 45-36-1

I write to request that a neutral and independent market analysis be completed by an informed third party before the California Air Resources Board (CARB) considers adoption of the proposed In-Use Locomotive Regulation. After this analysis, we encourage CARB to adopt a regulatory framework that accounts for the commercial viability of zero-emissions locomotives, the unique operating environments of each passenger rail operator, and does not require annual funding set asides or commitments for zero-emissions locomotives.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 24. This response incorporates Master Response 5 for discussion on funding.

l) Comment BH1-OT-3-1

To address our concerns, we urge CARB to work with us to conduct a market assessment before implementing the regulation. This exercise would help identify and address the obstacles rail agencies would face in deploying zero-emission locomotives. More specifically, the market assessment would analyze Federal transit and railroad requirements, technology availability of zero-emission locomotives, infrastructure requirements to support charging capability, overall cost of operation, funding capability, and the financial impact associated with not running vehicles to the end of their useful lives. We anticipate the results of this market assessment would identify weak points in the regulatory approach, which could be used to inform the development of a more workable framework.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 24. This response incorporates Master Response 5 for discussion on funding.

m) Comment BH1-OT-33-2

We appreciate CARB's willingness to conduct an analysis and reevaluate in 2027 and 2032. But we request that a neutral independent market analysis be completed by an informed third party before a rule is adopted by the CARB Board. This analysis will help to better inform the timelines, the funding, incentives, and technologies that may be necessary to meet the needs of operators across the state.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 24. This response incorporates Master Response 5 for discussion on funding.

26. Useful life vs. Grant Life

Several comments were submitted to CARB by passenger operators about the 23-year useful life requirement in the IUOR being shorter than many federal useful life standards for some FTA locomotive grant programs and how it could force operators to repay federal funds if locomotives are retired early. If a locomotive needs to be sold to pay back grant requirements, a flood of used passenger locomotives over 23 years old would limit potential buyers. It could also conflict with useful life limits and disposal requirements under the local South Coast Air Quality Management District (SCAQMD) Carl Moyer Program. The following comments discussed the 23-year useful life requirement: 45-7-2, 45-10-8, 45-11-9, 45-12-6, 45-15-3, 45-16-3, 45-17-2, 45-18-2, 45-24-9, 45-26-5, 45-36-3, BH1-OT-2-2, BH1-OT-10-3, BH1-OT-12-2, BH1-OT-30-1, and BH1-OT-33-1.

Master Response 25: CARB has made changes in response to these comments. As part of the 15-day changes posted on March 1, 2022, CARB added the AFMO (section 2478.8), which has compliance deadlines in 2030, 2035, 2042, and 2047. This option can be used in lieu of direct compliance with the SA and IUOR. The AFMO replaces the requirements to discontinue operation in California of locomotives 23 years or

older as required by the IUOR, and allows operators to offset operation of locomotives older than 23 years with early operation of ZE locomotives or ZE rail equipment, at limited rates.

Additionally, the ACP (section 2478.7), which can be used in lieu of direct compliance with the SA, IUOR, or both, also allows operators to operate locomotives in California past 23 years of age, if equivalent emission reductions to direct compliance with the SA and IUOR are achieved.

The 23-year useful life requirement would not conflict with Carl Moyer locomotive grants. Locomotives granted through the Carl Moyer Program were for a grant life with a maximum of 20 years in the 2011 guidelines, meaning the usage requirement would end after no more than 20 years. In the 2017 guideline revision, the grant life obligation for a locomotive was shortened to 15 years maximum.

a) Comment BH1-OT-41-1

The regulation as proposed is not keeping with federal requirements around useful life and replacement for real vehicles, which is one of several issues we detailed in our comment letter. It also requires the credits for zero-emission vehicles to expire in 2030, which means that after spending billions of dollars to electrify as much as possible, Caltrain would still be subject to the encumbrance of tens of millions of dollars in needed operations funding.

While we appreciate that CARB staff did offer an alternative proposal yesterday afternoon, that proposal is still not consistent with federal requirements, meaning the loss of millions of repayment costs, the ineligibility for federal funding programs and a host of other issues.

Agency Response: Changes were made in response to this comment. This response incorporates Master Response 25. See Master Response 11 for a discussion on the AFMO added in response to comments made by passenger operators. See also the response to comment 45-26-4 on ZE credits.

27. California Grain and Feed Operations

The California Grain and Feed Association (CGFA) and some of its constituents made several comments specific to their industry including: (1) failure to account for California grain and feed industry needs in the Proposed Regulation, (2) concerns over increased downtime and maintenance associated with Tier 4 and ZE locomotives, and (3) concerns of insufficient justification for including industrial operators in the Proposed Regulation.

Master Response 26: Staff disagrees that the California grain and feed industry's needs were not considered when drafting the Proposed Regulation. Industrial operators who only purchase used locomotives do not need a used ZE locomotive market to be present in 2030 to comply with the Proposed Regulation. Industrial operators are required to operate locomotives in ZE configuration only if the engines are originally built in 2030 or later. Industrial operators may instead choose to purchase or repower to a Tier 4 locomotive, which are allowed to operate in California for at least 23 years, allowing time for a used ZE locomotive market to develop. Tier 4 locomotives have been available since 2015, and may be sold used by Class I operators for industrial use. Additionally, there are grants (e.g., Carl Moyer Program pays up to 85 percent, and CORE voucher can be added) that can reduce the cost of

Tier 4 locomotives and ZE locomotives and rail equipment, such as battery-electric railcar movers. The ACP also provides an alternative compliance option in lieu of directly complying with the SA and IUOR, allowing operators more flexibility to fit their operational needs.

The SRIA, assessed costs on small businesses, including industrial operators such as grain and feed operators. The Proposed Regulation also includes a Hardship Extension provision to provide relief to small businesses that demonstrate their need.

General duty cycles of industrial locomotives have been considered, and existing ZE rail equipment and Tier 4 locomotives can satisfy requirements of these operations. Duty cycles and operations CGFA explained in their comments are well within the general duty cycles and operations of industrial locomotives. In fact, Western Milling mentions in comment 45-2-1 that Tier 4 locomotives allow Western Milling to process multiple trains in succession as needed in grain and feed operations. Staff also calculated that a battery-electric locomotive equivalent to a 2,000 hp diesel unit operating 24 hours continuously consumes 1.7 MWh energy even with a parasitic load of 80 hp to power an air compressor and cabin air conditioning the entire time. This is less energy usage than the battery capacity of the smallest battery-electric switcher sold by a prominent locomotive manufacturer (2.4 MWh battery capacity). If a CGFA member wanted to use fuel cell technology, which can operate longer with shorter refueling time, their operation would use less than 180 kW of power 99 percent of the time. This power requirement is smaller than what is being used in heavy-duty truck demonstrations, which makes it one of the least challenging operations for fuel cell equipment to meet requirements.

Staff does not agree with comments that there are reliability issues with Tier 4 locomotives. As stated above, Western Milling has been able to meet operational needs with Tier 4 locomotives. Manufacturers have addressed reliability issues that occurred in the early stages of product introduction. U.S. EPA has minimum warranty requirements, and CARB verification also has warranty requirements. Utilizing a single locomotive with no contingency plan and accepting demurrage charges are business decisions that CGFA members are currently employing. Staff are not aware of evidence that utilizing a Tier 4 locomotive would affect the business model the Grain and Feed operation is currently using.

Based on comment 45-19-7, grain and feed locomotives typically operate 16 to 24 hours per day when operating 1 to 2 times per week, which is about 800 to 2,500 hours per year. This means that a Tier 4 engine needs an engine rebuild every 10 to 30 years, which is also in line with what the U.S. EPA defines as the minimum useful life. Less than one engine rebuild in a decade is not unreasonable for engines to maintain the emissions level they were designed to achieve.

Using the average usage (20 hours per day operating 1.5 times per week) and maintenance schedules provided by CGFA, Tier 4 engines need maintenance about every 17 weeks, or three times per year, and Tier 2 and dirtier engines need maintenance about every 70 weeks, or about 0.74 times per year. The difference in the maintenance cost is about $24,000 per year. Similarly, in Section 3.1.2.2, Table 3.3 of the SRIA, staff estimated that Tier 4 and ZE locomotives will cost an additional $21,100 to $29,000 in annual maintenance compared to a pre-Tier 0 locomotive. However, a pre-Tier 0 locomotive consuming 10,000 gallons of diesel a year (as

estimated by CGFA in comment 45-19-3) will cost communities over $200,000 more due to negative health effects compared to Tier 4 locomotives using the same amount of fuel. In other words, the cost would be an eight times increase in health cost to communities. In addition, CGFA stated that each unit train their member companies receive carries about $4 million worth of product, and about $200 to $400 million of products handled per year. In comparison, the additional maintenance cost of the locomotive moving these products will be about one hundredth of a percent or less of the value of products being handled. Staff assesses that an additional maintenance cost of less than $100 for every million dollars of grain and feed handled will not have a detrimental economic impact to the grain and feed industry.

Industrial locomotives are the dirtiest in California, almost entirely pre-Tier 0 locomotives dating back to the 1950s, with no emissions control systems. Pre-Tier 0 switchers are estimated to emit over 29 times more PM2.5 and over 17 times more NOx than Tier 4 locomotives. As the Proposed Regulation is an ATCM seeking to eliminate diesel toxic emissions from locomotives operating in California. There is no safe exposure limit identified for diesel toxic air contaminants, and minimizing local exposure to diesel emissions is critical to CARB's mission to protect public health. Even if locomotives operate in rural areas, receptors near locomotive operations should not be penalized for living or working in a less population dense region. NOx also has negative health effects that affect air quality on a regional scale. CGFA notes in comment 45-19-3 that the total California grain and feed industry locomotive fleet consists of 23 locomotives annually using approximately 230,000 gallons of fuel, compared to the 300,000 gallons of fuel annually used by a single freight line haul locomotive. While the total amount of fuel consumed may be small relative to other locomotive sectors, because each locomotive is a polluter, the 23 locomotives will cause about $5 million of negative health impacts to communities in 2023 alone. These negative health impacts will continue to grow with population growth. Therefore, industrial locomotives have substantial negative health impacts that must be addressed in the Proposed Regulation. Other CARB regulations have already prompted elimination of diesel toxics statewide from other sources, such as the Truck and Bus Regulation and Transportation Refrigeration Units Regulation. Locomotives also need to transition to cleaner operations. This response incorporates Master Response 5 for further discussion on incentive funding and justification of the Proposed Regulation.

a) Comment 45-2-1

Grain and feed operations need to process hundreds of rail cars on a continuous basis. Receiving windows can often range from 3 to 5 days but sometimes expand to 10 to 14 days when the rail network is stressed, this can lead to multiple trains arriving at the same time. Western Milling facilities are designed and staffed to unload one unit train at a time and are heavily reliant on dependable locomotive power to process over one hundred cars efficiently. This is currently possible with the Tier 4 locomotive units in place allowing us to process multiple trains in succession. However, we have concerns that electric power units (either shuttles or locomotives, none of which are commercially available today) and their need for down time to charge would drastically increase our need for greater capital expenditure possibly doubling our need for horsepower. In instances where a Receiver could not unload a unit train during established windows of time, financial penalties (demurrage) would be

levied by the Class 1 railroads negatively impacting Western Milling business operations in California.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 26.

b) Comment 45-19-1

The Draft Proposed In-Use Locomotive Regulation, as currently written, would impose a significant financial burden on the affected Grain and Feed facilities without a significant corresponding benefit to air quality or public health. CGFA member companies are low-emitting facilities that are predominately located in remote rural areas. Thus, the facility emissions do not contribute significantly to the regional emission inventory, do not significantly contribute to exceedances of NAAQS or CAAQS, and do not pose unreasonable health risks to local populations.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 26. As described in ISOR Appendix H, studies have found that exposure to diesel exhaust is associated with illness and premature mortality among railway workers. The Proposed Regulation would bring health benefits to those working at CGFA member companies.

c) Comment 45-19-2

The reliability, tractive effort requirements, duty cycle, maintenance needs of, and economic impacts on, the Grain and Feed industry do not appear to have been considered during the development of the draft regulation.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 26.

d) Comment 45-19-3

With 23 locomotives and 10,000 gallons of fuel per year each (average), the entire Grain and Feed industry in California uses approximately 230,000 gallons of fuel, which is less than the fuel consumption of a single-line haul locomotive of 300,000 gallons per year.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 26.

e) Comment 45-19-4

The rule is substantially based on the 2016 CARB Technology Assessment which states that the analysis is based primarily on the line haul industry since it contributes 85 percent of the emissions in this category. The reliability, tractive effort requirements, duty cycle, maintenance needs of, and economic impacts to, the Grain and Feed industry do not appear to have been considered during rulemaking. The Technology Assessment states that the technologies for line haul would be suitable for other locomotive applications, without substantiation.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 26. The Proposed Regulation is not based on

the 2016 CARB Technology Assessment, but rather the more current Technology Feasibility Assessment included as Appendix F of the ISOR published on September 20, 2022. Additionally, freight line haul is the most challenging locomotive application for ZE technologies due to its high-power requirements and long operational range. Switcher locomotives require less power and less energy, as well as less tractive effort than freight line haul locomotives. In addition, locomotive operators move old freight line haul locomotives that have reduced reliability to switcher duties, as reliability is more important in freight line haul locomotives than switchers. In all aspects, switchers have less stringent requirements than freight line haul locomotives, and technologies that meet freight line haul locomotive requirements can meet switcher requirements.

f) Comment 45-19-5

Grain and Feed operators are low-margin businesses; they purchase used locomotives from the line haul operators after the end of life. The Technology Assessment cites a linehaul fleet turnover rate of approximately 30 years, but suggests that some portion of the fleet may transition to local or regional service after 15 years. So, CARB recognized that local operators, such as the Grain and Feed operators, rely on used equipment. However, since the battery and/or hydrogen-fueled locomotives will not be available as used equipment for at least 15 years after they are required (in 2030, if the compliance dates remain unchanged) and perhaps as much as 30 years, the Grain and Feed operators cannot rely on used equipment for rule compliance. This places a significant financial burden on the Grain and Feed operators that were not considered during rulemaking.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26.

g) Comment 45-19-6

Grain and Feed locomotives are operated at significantly different loads than line haul and switcher locomotives. The substantially lower loads utilized by the Grain and Feed locomotives, combined with the smaller, lower power engines, resulting in lower fuel consumption and thus lower emissions than line haul or switcher locomotives operating for the same number of hours. Note that the line haul and switcher locomotive data was available in the CARB Technology Assessment, but the Grain and Feed data was not – another indication that CARB did not evaluate this category during rule development.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26. The Proposed Regulation already accounts for the lower loads and therefore fuel consumption of industrial operators. Emissions from industrial locomotives are calculated based on their fuel consumption: (PM or NOx emissions per gallon of diesel consumed) x (diesel consumed), and not based on the hours of operations. If a locomotive spends a long time in idle, doing little work and consuming less diesel, its emissions will be calculated to be small because of the small diesel consumption.

However, spending a large percentage of operation in idle does not reduce the emission per gallon of diesel consumed. Emissions per gallon of diesel consumed at idle is not necessarily small. In fact, if emission per gallon of diesel consumed were

recalculated with the duty cycle provided in the comment (92 percent idle), it is likely that the emissions will be calculated to be higher for the same amount of fuel consumed. In other words, a Grain and Feed locomotive burning a gallon of diesel while idling will emit more PM and NOx than a locomotive burning the same amount of fuel as a locomotive operating at higher speeds.

Staff disagrees that grain and feed operations needed to be discussed separately from freight line haul and switcher locomotives in ISOR Appendix F. As discussed in section IV.A.2, switcher locomotives are used by industrial operators for moving locomotives or railcars throughout a railyard or industrial facility, which covers the operations of grain and feed operators. Thus, grain and feed operations are covered when discussing switch locomotives. CGFA stated that their locomotives spend about 92 percent of time in idling, which is higher than the U.S. EPA switch cycle that assumes 59.8 percent in idle. Locomotives spending higher percentage of time idling, such as Grain and Feed locomotives, use less energy per hour, and such operations are suitable for the current battery-electric locomotives or battery-electric railcar movers, compared to Class I-III switchers or freight line haul locomotives. Staff has not received data supporting specific claims made regarding grain and feed operations.

h) Comment 45-19-7

CARB does not appear to have considered reliability during rulemaking either. CGFA member companies have found Tier 3 and Tier 4 equipment less reliable than pre-tier, Tier 1, or Tier 2 equipment. Operating experience at CGFA member companies shows that a Tier 4 engine will operate approximately 25,000 hours between engine rebuilds, while older pre-tier, Tier 1, or Tier 2 equipment will operate up to 50,000 hours between rebuilds. Engine rebuilds, in addition to being expensive, require significant locomotive downtime. The impacts of downtime are explained in more detail below.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26.

i) Comment 45-19-8

Tier 4 locomotives also require significantly more maintenance than pre-Tier, Tier 0, Tier 1, or Tier 2 engines. A Tier 4 engine requires maintenance every 500 hours to maintain EPA certification. This involves oil and filter changes and may also involve servicing fuel injectors and other worn items. The typical service takes about 16 hours and costs $9,000. Pre-Tier, Tier 0, Tier 1, or Tier 2 engines require maintenance every 2,000 to 2,200 hours, and service costs are $3,500 per service event. Maintenance costs aside, the locomotive downtime for maintenance is costly and disruptive.

While reliability and downtime are a consideration for all industries, poor reliability and excessive downtime disproportionately affect an operator who owns only one locomotive. A large operator (e.g., UP, BNSF) is likely to have spare equipment, thus allowing it to take a locomotive out of service for maintenance or repairs. An operator with a single locomotive does not have that opportunity – a locomotive out-of-service will have severe financial consequences, in addition to the cost of maintenance or repairs. For example, if a locomotive is out-of-service at a Grain and Feed operation, the operator may:

- Incur demurrage charges of $10,000 if the railcars are not unloaded in a timely manner;
- Need to rent a locomotive for $10,000 to $15,000 per day from a line haul operator;
- Have to divert railcars to a siding for temporary storage, incurring penalties of $150 per day per railcar during storage;
- Must divert product to a facility with an operable locomotive and truck the feed and grain to the customers at additional trucking cost and emissions on a per-ton basis.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26.

j) Comment 45-19-9

The Grain and Feed operators are just-in-time businesses, as there is a little buffer in the system to accommodate service disruptions. Service disruption means that animals will not get fed. This, in turn, means that the animal feeding operation must 'depopulate' the animal herds, where animals are harvested prematurely and taken to the market undersized because there isn't enough feed. Reliability problems at the Grain and Feed facility thus adversely affect the entire food supply chain in the United States.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26. Staff disagrees that the food supply chain in the United States will be affected because there is no evidence of reliability or downtime issues for Tier 4 locomotives.

k) Comment 45-19-10

The documentation CARB has made available makes it clear that the specific circumstances, constraints, business limitations, and industry needs were not considered during rulemaking. The rule should not be applied to an industry without adequate study of the impacts of the regulation on that industry. CGFA recommends that CARB evaluate the rule's impacts on the Grain and Feed industry, and all other affected users, and publish its findings for public review and comment before proceeding with rule adoption.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26.

l) Comment BH1-OT-32-1

We appreciate our communication on the proposed In-Use Locomotive Regulation and look forward to continued negotiations on the regulations related to locomotive reliability for feed operations, the spending account, the small business hardship exemption and zero-emission technology.

Agency Response: No changes were made in response to this comment. CARB appreciates the comment.

m) Comment 15-5-1

The Draft Proposed In-Use Locomotive Regulation would impose a significant financial burden on the affected Grain and Feed facilities without a significant corresponding benefit to air quality or public health. CGFA member companies are low-emitting facilities predominately located in remote rural areas. Thus, the facility emissions do not contribute significantly to the regional emission inventory, do not significantly contribute to exceedances of NAAQS or CAAQS, and do not pose direct unreasonable health risks to local populations.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 26. See also the response to comment 45-19-1.

n) Comment 15-5-2

CGFA provided extensive comments on the draft rule in November 2022. It is not obvious that CARB has considered our comments. We ask that CARB either revise the regulation to address our prior comments or, in the interest of transparency, publish the Draft Final Statement of Reasons so that the reasons for accepting or rejecting all comments received are available for public review.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 26. Per the Administrative Procedures Act in CCR, § 11346.9(b), CARB responds to timely comments in this FSOR, which will be publicly posted and submitted to the Office of Administrative Law following the Proposed Regulation's adoption by the Board.

o) Comment 15-5-3

CGFA requests that the Public Comment period for the revised rule be extended by 30 days. With the Technical Support Document, CARB suggested that existing locomotives can be retrofitted with batteries and/or fuel cells and that the economics of such retrofit render the proposed rule more cost-effective than the previous analysis developed for the original draft rule. The 15 days allowed for this public comment period is insufficient to review the extensive documentation upon which CARB based its determination or to identify and evaluate information that may either support or contradict CARB's analysis.

> **Agency Response:** No changes were made in response to this comment. Staff released modifications and additional documentation for the Proposed Regulation on March 1, 2023, and the formal comment period was 15 days, until March 16, 2023. However, the public was also able to comment during the public Board Hearing on April 27, 2023. This allowed the public over 45 days to review documentation and submit their comments on the Board Hearing date.

p) Comment 15-5-4

In our November 2022 comments, CGFA suggested that low-use operators be exempted from the regulation (in addition to the low-use exemption allowed for historic locomotive operators), as the cost of implementation does not provide corresponding air quality benefits. The revised rule does not address our concerns or suggestion. However, CARB did make changes to the regulation that potentially benefit some operators (i.e., the Alternative

Fleet Milestone Option [AFMO]) and implied that those changes would have a negligible (i.e., less than 1%) impact on program emissions, as noted in the Summary of Proposed 15-Day Changes and Technical Support Document. As explained in our November 2022 comments, all CGFA operators combined emit less than 0.4% of the rail emissions in California. If AFMO is allowed because it results in a negligible emissions increase (1%), exempting operators that emit only 0.4% of the statewide rail emissions should be incorporated into the rule.

Agency Response: No changes were made in response to this comment. As shown in the ISOR, industrial operators contribute approximately 1 percent of the total locomotive NOx emissions statewide and shows that almost 60 percent of California industrial locomotive activities are in disadvantaged communities. In 2020, 84 percent of the locomotives used by industrial operators were pre-Tier 0. Under the Proposed Regulation, emissions from these locomotives are estimated to be reduced by 95 precent.

Staff believes it is incorrect to compare recent CGFA locomotive emission contributions with the change in emissions due to the AFMO. The percentages describe drastically different emissions. The estimated decrease in emission reductions due to the AFMO describes total change in emission reductions from 2024 to 2050. The CGFA locomotive contribution to state rail emissions describes only recent emission breakdowns and is subject to change depending on statewide locomotive operations. If CGFA operators were exempted from the Proposed Regulation, over time they would emit an increasingly large portion of statewide locomotive emissions while other operators clean their fleets and transition to ZE operations. In comparison, the projected AFMO emission reduction change from 2024 to 2050 will stay consistent at one percent.

In addition, although a low level of emission impact was a key criterion to the acceptance of the AFMO as an alternative pathway, it is not the only necessary criterion. The AFMO fulfills the same policy goals as the direct compliance pathway, as it lowers emissions and requires progress toward 100 percent ZE operation in California, with potential to move to 50 percent and 100 percent ZE earlier than through direct compliance. The comment suggests that any locomotive operator that does not pollute in large enough measure should be permitted to emit TACs in perpetuity. There is no acceptable level of exposure to DPM a TAC at issue here. The Proposed Regulation is an ATCM focused on reducing PM and NOx because exposure of California communities to PM and NOx results in serious health effects, including premature mortality. As an alternative to direct compliance with the applicable provisions of the Proposed Regulation, locomotive operators are free to select the ACP or the AFMO pathway.

q) Comment 15-5-5

If CARB is unwilling to exempt low-emitting operators (as suggested above), CGFA requests that CARB consider incorporating a delayed compliance option for operators of single locomotives. The AMFO offers a delayed compliance option for fleet operators. Fleet operators have higher emissions than single locomotive operators. As noted in the Summary of Proposed 15-Day Changes and Technical Support Document, this portion of the revised rule is expected to be utilized by rail operators transporting passengers through densely

populated areas. Logically, CGFA operators with lower emissions that operate in lightly populated rural areas should also be afforded a delayed compliance schedule alternative.

> **Agency Response**: No changes were made in response to this comment. CARB disagrees that a fleet would have higher emissions than a single locomotive, as it is dependent on the Tiers of the locomotives compared. For example, a single Pre-Tier 0 switcher emits more DPM than 24 Tier 4 switchers, and more NOx than 13 Tier 4 switchers. The Proposed Regulation includes an ACP option that can be used in place of direct compliance with the SA, IUOR, or both, if equivalent emission reductions are achieved. The ACP allows operators to reduce emissions in a variety of ways, not just through the operation of cleaner locomotives. This provides short line and industrial operators flexibility in how they choose to comply and could lessen the financial and logistical effects. See also the response to comment 15-5-4 and comment 45-35-1.

r) Comment 15-5-12

CGFA believes that compliance with the In-Use Locomotive regulation will significantly burden the Grain and Feed industry without a substantial corresponding benefit to air quality or public health. With the comments provided herein, we have identified weaknesses in CARB's fundamental analysis of the locomotive industry as it applies to the Grain and Feed operators, and we have suggested several changes to the regulation that would reduce the burden on the industry, without significantly altering the goals of the regulation.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 5 and Master Response 26. See also the responses to comments 15-5-3, 15-5-4, and 15-5-5.

s) Comment BH2-OT-37-1

The alternative technology such as electricity -- electrification, sorry, are infeasible, as we are a single locomotive operation. We have, you know, 24 hours to clear off a hundred cars and unload them. And so there's no time to charge during that 24-hour time period, that we pull, then we idle, we pull, we idle. It requires low torque, which is not suited well for electrification, and it's frankly very ineffective.

> **Agency Response:** No changes were made in response to this comment. Operators can use other compliance strategies besides operation of battery-electric locomotives. Staff disagrees that low torque application is not well suited for electrification. Locomotive torque is determined by the traction motor that is already electrified. In pages 46-47 of the ISOR Appendix F, staff explains why a duty cycle characterized by long idle and short bursts of power is well suited for ZE technologies. This response incorporates Master Response 26.

t) Comment BH2-OT-35-2

We encourage the Board to exempt the grain and feed locomotives until 2027 update and then work with the staff to figure out how these unique elements can be implemented here locally within the -- within the state and provide the authority to work with us as it goes forward.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26.

u) Comment BH2-OT-35-3

[W]e think the escrow account needs to be eliminated. [It is] unnecessary and actually will be counterproductive.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 7.

28. Evaluation of Additional Alternative Submitted by Sierra Railroad Company

Sierra Railroad Company (Sierra) submitted comments on their suggested alternative regulatory compliance pathway. The full alternative proposal can be found in comment letter 4532 and BH1-1 as posted on the CARB Board Meeting Comment Log at *https://ww2.arb.ca.gov/applications/publiccomments?p=comm&s=bccommlog&l=locomotive22*. Staff has summarized the proposal below.

The following are the key components of the Sierra Alternative Proposal:

- Require that Class III railroads upgrade to Tier 3 or higher locomotives by January 1, 2024
- Eliminate the requirement for mandatory spending accounts for all Class III railroads that timely meet the Tier 3 requirement
- Establish sufficient state and federal funding to cover 85 percent of costs for upgrading Class III railroads from Tier 3 locomotives to Zero Emission Locomotives ("ZE Locomotives")
- Set the Original Build Date for Tier 3 locomotives used by Class III railroads at January 1, 2013, two years prior to the effective date of Tier 4 specifications.
- Do not require fleet-wide locomotive conversions in a single year but instead require that the upgrading of Tier 3 locomotives to ZE Locomotives for Class III railroads occur at a minimal annual rate of 10 percent of a Tier 3 fleet beginning 2036.

Master Response 27: CARB has not made changes in response to this comment. The Proposed Regulation is an ATCM with a goal of reducing the exposure to DPM in California and especially in disadvantaged communities. CARB prioritized and evaluated sources of air toxic pollutants within these communities and is investigating all opportunities to reduce exposures to toxic air pollutants.

The alternative provided by the comment and analyzed as Alternative 4 in the ISOR did provide evidence of short-term emission reduction benefits when compared to the Proposed Regulation. However, Tier 3 locomotive PM2.5 emissions are over three times higher than Tier 4 locomotive emissions, and Tier 3 locomotive NOx emissions are over four times higher than Tier 4 locomotive emissions. The Sierra Alternative Proposal includes a cost effectiveness analysis that does not include the health costs associated with Tier 3 locomotives instead of Tier 4 locomotives.

Under the Proposed Regulation, Class III locomotive operators would need to transition to using Tier 4 locomotives in 2030 and operating in a ZE configuration starting in 2030 and beyond. Under the IUOR, only locomotives less than 23 years would be allowed to operate in California beginning in 2030. Under the IUOR, all Tier 3 locomotives would be removed from operating in California by 2037. Under the Sierra plan, Sierra's analysis showed that Tier 3 locomotives are replaced with ZE at a rate of 10 percent per year, and 100 percent ZE is achieved by 2043, which is 4 years sooner than the AFMO requirement. However, the alternative plan Sierra recommended does not require earlier transition to ZE than the current AFMO requires, nor steady replacement of Tier 3 locomotives with ZE locomotives. As a consequence, Sierra's analysis over-estimates the plan's emission reductions. To achieve Sierra's claimed emission reductions, at least 3 additional milestone requirements would need to be added to the AFMO, not just a single optional milestone. The most significant addition would be expediting the 100 percent ZE milestone by at least 4 years, to 2043. Overall, to achieve the emission reductions claimed by Sierra, the plan would need to require additional milestones that are not included in the Sierra proposal, operators would need to replace Tier 3 locomotives after as little as 8 years of usage, and achieve 100 percent ZE fleet by 2043.

When staff analyzed Sierra's proposed plan in a consistent manner with the SA/IUOR, SA/IUOR would achieve more emission reduction than just adding an optional Tier 3 milestone as Sierra proposed. This is due to Tier 3 locomotives operating longer than what Sierra claimed in their analysis. In addition, Sierra’s analysis anticipates a substantial increase in PM emissions between 2031 and 2041, as compared to the Proposed Regulation, and staff analysis shows a substantial increase in PM emissions between 2031 and 2046. While the cumulative PM10 reduction may be greater, according to Sierra’s analysis, a substantial annual increase of PM10 over such a long period—relative to the Proposed Regulation—is problematic due to the health impacts of proximate PM10 exposure. Sierra’s modeling demonstrates a similar increase for NOx over this same period—again, relative to the Proposed Regulation. Increase of either pollutant over a sustained period could impact California’s compliance with federal and state air quality standards, even if the overall cumulative reductions would be greater under Sierra’s plan.

The proposal also requests that CARB establish funding for transitioning Tier 3 locomotive technologies to zero emission. This response incorporates Master Response 5 for discussion on available funding.

Although the Proposed Regulation does not allow for the purchase of Tier 3 locomotives with SA funds, nor does the IUOR allow the operation of Tier 3 locomotives in California that are older than 23-years after 2030, staff developed the ACP to provide additional flexibility. The ACP was developed in response to concerns that comparable emission reductions could be achieved at lower cost while ZE technologies for locomotives are developed. CARB staff agrees that the Proposed Regulation should provide flexibility for entities to select the most cost-effective strategy that meets or exceeds the emission reductions that would have been achieved through direct compliance with the SA or IUOR. Though the Proposed Regulation will not incorporate the Sierra Alternative Proposal, Sierra is welcome to pursue conversion from Tier 0 to Tier 3 locomotives on their own in the short term, as

part of an ACP under the Proposed Regulation. Other operators may also opt for a similar plan.

a) Comment 45-32

Sierra commented that the summary rejection by CARB of Alternative 4 in its ISOR was legally inadequate in that CARB completely failed to address the core benefits of the Tier 3 Strategy in terms of delivering more rapid criteria pollutant reductions to California that would not only lead to corresponding health benefits in the most impacted communities but would also provide these reductions at a substantially lower cost per ton than the Proposed Regulation. Sierra also commented that CARB similarly failed to address the underlying quantitative emissions analysis contained in the Sierra Proposal despite the fact the emissions analysis was developed by qualified engineers.

The analysis provided by Sierra asserts that, "[d]ue to its speed of implementation, Sierra's Proposal enables significant near-term emission reductions of criteria pollutants compared to CARB's Plan. With a modest level of funding support, Sierra would be able to immediately integrate 11 Tier 3 engines into its fleet in 2021, which will result NOx, ROG, and PM10 emission reductions in the 2020's. Due to its necessarily delayed implementation, the CARB Plan will not "catch up" to the Sierra Proposal and deliver comparable reductions to California until 2050." Sierra also asserts the Sierra Proposal "would deliver substantial near-term NOx and PM10 reductions at a cost of $300,000 per locomotive for a total replacement cost for 11 locomotives of $3.3M. The CARB Plan would deliver NOx and PM10 reductions starting decades later at a cost of $44M for the 11 locomotives."

Agency Response: CARB has made no changes in response to this comment. This response incorporates Master Response 27. Staff disagrees with the comment that the ACP would not allow purchases of Tier 3 locomotives. Operators could use locomotives of any Tier as long as equivalent emission reductions were achieved. For example, an operator could choose to replace pre-Tier 0 locomotives with a Tier 3 locomotive, depending on the emissions reduction requirements needed for their individual ACP.

Staff has analyzed the plan provided by Sierra and, with some adjustments to the proposal, has concluded the plan has the potential to reduce emissions in sufficient quantity to satisfy the requirements of the Proposed Regulation using the ACP. It is therefore unnecessary to provide an additional compliance pathway in the Proposed Regulation based on Sierra's proposal.

Finally, there is no limit to how many times the operator may seek a Hardship Extension, allowing small businesses flexibility in compliance if they can demonstrate financial hardship.

b) Comment BH1-OT-2-1

The Sierra Plan looks at a deployment in 2024 as opposed to a CARB plan that starts mainly in 2031. It's 84 percent more cost effective from a -- using the Carl Moyer Program methodology or about six times more cost effective per ton looked at another way. So if you implemented their 2024 versus 2031, and these are all shared in written comments as well, you could achieve 60 tons additional PM10 reduction during those first seven years and 1,600 tons of NOx reduction.

> **Agency Response**: CARB has made no changes in response to this comment. This response incorporates the response to Comment 45-32 and Master Response 27.

c) Comment BH1-OT-1-1

And the process that we're proposing, and we would love to get an engagement with CARB about, is we see the transition for Tier -- Class 3 locomotives -- I'm sorry, Class 3 railroads to transition from Tier 0, in other words high emission locomotives, to transition to Tier 3 locomotives, which are very inexpensive relative to these Class -- Tier 4 locomotives. We've already acquired 34 of these engines for making that transition to dramatically reduce emissions. It's called the Sierra Plan. You guys have received a copy of it.

> **Agency Response**: CARB has made no changes in response to this comment. This response incorporates Master Response 27.

29. Evaluation of Proposed Alternative to AFMO Requirements

Sierra spoke at the April 27, 2023, Board Hearing, submitted comments, and provided an analysis on a suggested alternative regulatory structure to the Proposed AFMO. The full testimony can be reviewed in comment BH2-OT-20 and the proposal can be found in comment letter 15-8 and comment letter BH2-2 as posted on the CARB Board Meeting Comment Log at *https://ww2.arb.ca.gov/applications/public-comments?p=comm&s=bccommlog&l=locomotive22*. Sierra has summarized the proposal as:

Regarding the Alternative Fleet Milestone Option ("AFMO") that CARB has proposed, Sierra strongly recommends the addition of an early adopter provision to the AFMO. This early adopter provision would establish an accelerated first milestone in 2025 to facilitate emission reductions up to five years earlier than the Proposed Regulation. Rather than establishing only the 2030 milestone as proposed in the 15-day change, a fleet could opt to meet either a 2025 or 2030 milestone:

- Beginning in 2025, 100 percent of annual fleet usage in California must be from Tier 3 (or cleaner) locomotives (the Sierra recommended early adopter "2025 Milestone"), or,
- Beginning in 2030, at least 50 percent of annual fleet usage in California must be from Tier 4 (or cleaner) locomotives, (the CARB proposed "2030 Milestone").

The three remaining AFMO milestones in the Proposed Regulation would remain unchanged:

- Beginning in 2035, 100 percent of annual fleet usage in California must be from Tier 4 (or cleaner) locomotives.

- Beginning in 2042, 50 percent of annual fleet usage in California must be ZE.
- Beginning in 2047, 100 percent of annual fleet usage in California must be ZE (no exceptions).

Through the integration of the early adopter provision into the Proposed Regulation, CARB would:

- Deliver greater PM2.5 and NOx emission reductions to impacted communities.
- Deliver faster PM2.5 and NOx emission reductions to impacted communities.
- Catalyze a more rapid transition to 100% zero emission locomotives.
- Dramatically reduce the costs of the transition to zero emission locomotives.

Agency Response: No changes were made in response to this comment. CARB agrees it is critical to obtain emission reductions as early as possible. Based on thorough analysis of the information provided by Sierra, CARB staff believes Sierra may be able to comply through the ACP with their proposals. The Proposed Regulation lays out a timeline for drafting and revising ACP proposals.

CARB staff does not agree that an explicit inclusion of Tier 3 locomotives, which use emission technology that was superseded by U.S. EPA over 10 years ago, is warranted as a specified goal or milestone of the Proposed Regulation. As Sierra points out, Tier 3 can play a role in providing near-term emission reductions, and Sierra is free to use them within the constraints of the compliance pathway they choose.

30. Technical Support Document: Zero Emission Locomotive Conversion

a) Comment 15-5-6

CARB continues to propose to regulate the Industrial category of locomotive operators despite failing to conduct an evaluation of the impacts on the Industrial user category. We provided evidence of this omission in our November 2022 comments. Additional evidence of this omission is found in the Technical Support Document developed to support the revised rule. Figure 1 (page 3) and Table 1 (page 4) provide data for Line Haul, Switcher, and Passenger locomotives. Switcher locomotives appear to have been the focus of the Technical Support Document; however, Industrial locomotives were not evaluated. As discussed in our November 2022 comments, the Industrial locomotives operated by CGFA members have vastly different operating profiles and schedules, power demands, fuel use, emissions, and economics than Line Haul, Switcher, or Passenger locomotives. We ask that CARB evaluate Industrial locomotives as a separate source category and evaluate the Industrial category to the same level of detail that these other categories were evaluated so that any conclusions reached can be validated and any regulations developed for the category reflect the operating conditions and constraints of the category.

Agency Response: No changes were made in response to this comment. This response incorporates Master Response 26. See response to comment 45-19-6.

b) Comment 15-5-7

In the Technical Support Document, CARB cites the following information from a 2020 Department of Energy (DOE) report: "Significant advances in battery technologies have

occurred in the last 10 years, leading to battery pack cost" decreases of approximately 85 percent, reaching $143/kilo-Watt-hour (kWh) in 2020. CARB uses this information to conclude: "Using $143/kWh, the 20 MWh battery will cost about $2.86 million. This is similar to the cost estimate from 2013 by TransPower, even with over three times the battery capacity. As battery cost falls and their energy density increases, staff estimates that the cost of a battery tender could be around $3–5 million depending on the required battery capacity.

The cost data upon which the TransPower and DOE reports are based is out-of-date, as the price of lithium carbonate (a key raw material in battery production) has increased substantially since those reports were published. Lithium carbonate traded at around $5,125 per ton in 2015. The global weighted average price of lithium carbonate was $6,128 in August 2020 and $59,928 per metric ton in August 2022, according to Benchmark Mineral Intelligence. Thus, while lithium prices were relatively flat for the period of 2015 to 2020, the price has increased more than 1000% since the TransPower report was published and more than 900% since the DOE report was published. In the last 10 years, the cost of nickel, another key ingredient for cathode production, has ranged from a low of $6,227.70 per ton in February 2016 to a high of $48,132 per ton in March of 2022 an increase of almost 800%. Given that the cost of the metals in the cathode of a battery is 34% to 51% of the total cost of the battery, by failing to consider the materials cost variations in its analysis, CARB has potentially underestimated the cost of batteries by more than 70% The global push towards electric vehicles will likely continue to drive higher lithium carbonate and nickel prices. CARB's failure to consider cost variations in critical battery component metals severely impacts the cost burden to the industry and the cost-effectiveness of any emission reductions achieved.

> **Agency Response:** No changes were made in response to this comment. CARB uses the best available data and projections. Details can be found in the SRIA released on September 20, 2022, and in the Technical Support Document released on March 1, 2023. Staff does not agree that the battery cost is underestimated by more than 70 percent. Other than the short-term raw material costs, the comment does not provide any evidence or data of increasing battery cost per kWh since 2020, or whether battery cost follows the raw material cost. The comment does not provide any evidence that the increase in electric vehicles will drive up raw material prices, nor whether the recent increase in the raw material prices are due to increase in electric vehicle demand or other geo-political reasons.

c) Comment 15-5-8

The Technical Support Document describes the two favored ZE technologies as battery and fuel cell-battery hybrid. However, besides the outdated costing information discussed above, the Technical Support Document provides little information regarding batteries. Considering that CARB concludes that all ZE options will likely include batteries for some or all the power, it is surprising that in the development of the Technical Support Document, CARB did not consult any mining companies, metals brokers, or mining industry analysts to understand how metals pricing or availability are expected to change in the coming years. Perhaps, given the pace of battery development, improvements in battery efficiency and energy density will compensate for the increase in raw material cost; however, CARB also did not consult with any battery manufacturers to understand the trends in the industry when developing the Technical Support Document. At a minimum, CARB should revise both the technical and

cost-benefit analyses in consideration of current and realistic future lithium and nickel pricing and provide an assessment of potential improvements in battery efficiency.

> **Agency Response:** No changes were made in response to this comment. CARB uses the best available data and projections, and the historic data shows a clear continuous downward trend in battery cost and density. Staff did not consult raw material extraction companies because there has been no correlation between the raw material price and the battery price decrease for the past decade. For any price analysis, staff used the battery price in 2020 without any price decrease projection. The 2027 and 2032 assessments will reflect battery price changes if there is any significant change in battery price trend.

d) Comment 15-5-9

In the Technical Support Document, CARB referenced the Canadian Pacific's hydrogen-powered locomotive's first revenue run in October 2022 as proof of concept of a hydrogen-fueled fuel cell locomotive. While this is an exciting development, the details of the test run are nonexistent in the referenced article. One test run of unknown duration, load, efficiency, reliability, repeatability, or equipment durability/longevity is insufficient evidence that the concept is commercially viable for Industrial locomotive users who require reliable equipment over a 30-year operational life. While Canadian Pacific may have the financial resources to absorb a $3 million loss if its fuel cell locomotive does not perform to expectations and has to be scrapped, CGFA member companies do not have the same deep pockets. CARB should consider following up with Canadian Pacific to find out if the locomotive in question is still in operation four short months after the publicized test run.

> **Agency Response:** No changes were made in response to this comment. CARB does not prescribe any one technology for compliance with the Proposed Regulation, and CGFA member companies are free to use battery-electric, fuel cell, or other ZE technologies that fit their needs. In the Technical Support Document released as part of the 15-day change package on March 1, 2023, as well as in the ISOR Appendix F Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, staff listed various examples of ZE locomotives that are in development or being sold. Staff is aware of the need for reliable equipment and has taken reliability into account when projecting timelines for the technology development. The 2027 and 2032 assessments will further address the progress of these projects, but the fact that a ZE freight line haul project is progressing demonstrates the effectiveness of such technologies even though freight line haul operates in a much more challenging duty cycle than locomotives CGFA member companies operate.

e) Comment 15-5-10

[N]one of the examples provided in the Technical Support Document demonstrated the long-term durability or reliability of the equipment. Of specific interest is vibration. According to the U.S. Department of Transportation, "…the vibration and shock experienced in the rail environment is significantly higher than current hydrogen fuel cell applications, such as light-duty vehicles and stationary applications. This makes vibration testing on all aspects of hydrogen fuel cell systems critically important, including the electronics in the fuel cell system, fuel storage tanks, pipes, and connections." None of the demonstration projects operated long enough to evaluate the impact of vibration on the durability of the fuel cells or

auxiliary equipment. None of the projects operated in normal commercial operation and none were operated long enough to establish the maintenance requirements.

Agency Response: No changes were made in response to this comment. Vibration is a commonly addressed issue in the locomotive manufacturing industry. Manufacturers have been isolating vibration since the advent of transportation, and the subject is well understood by those experts. Staff included multiple prototype and demonstration stages when projecting the ZE locomotive development timeline to address reliability testing, shown in the ISOR Appendix F Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation, page 51. The 2027 and 2032 assessments will further evaluate the progress made in ZE locomotive technologies and infrastructure.

f) Comment 15-5-11

[A]ll the projects discussed in the Technical Support Document are demonstration projects that required bespoke engineering and all cost significantly more than the cost estimates that CARB has put forth in its economic analysis for the revised rule. Some of these projects have not even been built yet. We offer the following additional comments:

- Gas Technology Institute (GTI) Hydrogen Fuel Cell Switcher Locomotive – This example is discussed as a proposal, and no evidence was provided that a working locomotive was developed or operated.
- Ballard Fuel Cell System Development for Freight Transport Applications – This example is from the trucking industry, not the rail industry. While such an example may indicate the potential for technology transfer, it does not prove the long-term commercial viability of a locomotive application. As noted above, the vibration in the trucking industry is not the same as the vibration expected in the rail industry. It is concerning that CARB is relying on a 2016 report from Ballard, the manufacturer, and not an independent study.
- Rail Propulsion Systems (RPS) Battery Switcher Locomotive – This locomotive was tested briefly and retired, as it was not a fully functional locomotive.
- Wabtec Battery-Electric Locomotive – This was a $45 million project that developed one diesel-battery hybrid locomotive that operated for a total of 13,300 miles. While the overall project probably funded more than one locomotive (and thus the cost is misleading), the cost of the locomotive conversion itself was not disclosed in the cited reference. In this demonstration project, the batteries were employed in populated areas, and the diesel was used outside of the populated areas – but the actual distance operated under battery power was not disclosed in the reference. In addition, diesel engines were used to recharge the batteries. It is not clear if the batteries were recharged using line power at any time, as would be required for a full battery operation. The locomotive was operated only 13 times over 2 years and was not placed into normal commercial operation.
- University of British Columbia Fuel Cell Switcher – This project was proposed in 2021, but according to multiple websites, work on the project had just begun in November 2022. Thus, the locomotive hasn't even been constructed yet.

Agency Response: No changes were made in response to this comment. The Technical Support Document is intended to show the fundamentals for selected methods and application examples in locomotives. Comprehensive cost analyses are included in the SRIA, which uses the projected prices for fully commercialized ZE locomotives.

The Technical Support Document analyzes the conversion of diesel-electric locomotives to ZE or ZE capable locomotives by locomotive owners and operators, and is not relying solely on completed projects. The Gas Technology Institute (GTI) Hydrogen Fuel Cell Switcher Locomotive has been under development as of the document publication date. The Technical Support Document does not state that the locomotive is built. When CARB staff conducted a site visit in February 2023, progress has been made on the project.

The Ballard fuel cell system is an example of a major fuel cell system an OEM is actively developing for freight rail application that locomotive operators could potentially use. The technology transfer is already happening, as evidenced by their applications in the GTI Fuel Cell Switcher, passenger trains, and Canadian Pacific Fuel Cell Line Haul locomotive project, as explained in the ISOR Appendix F Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation.

The Rail Propulsion Systems (RPS) Battery Switcher Locomotive is an example of the conversion of a diesel-electric locomotive to a ZE locomotive. The project was intended as a test locomotive, and none of the issues identified during the test call into question the underlying battery technology used in the project. RPS could redesign and upgrade the test locomotive to address the test issues, which would require additional funds beyond the scope of the initial project.

The Wabtec Battery-Electric Locomotive project was a $45 million project that funded one locomotive and other ZE equipment, and staff disagrees there is any misleading information. The project showcases the potential of ZE technologies and shows the fundamentals of battery-electric locomotive conversion. The Wabtec Battery-Electric locomotive was designed to operate with two other diesel-electric locomotives, and more details such as "the battery locomotive charged at the rail yard and recharged during the trip through regenerative braking" are available in other references identified in the ISOR Appendix F Technology Feasibility Assessment for the Proposed In-Use Locomotive Regulation. The project led to the commercialization of the Wabtec FLXdrive battery-electric locomotives, and it would be misleading to downplay the importance of the project because the demonstration locomotive was not placed into commercial operation in its initial configuration. Information on the actual distance operated under battery power could be simply calculated through its publicized battery capacity, and staff included an overview of battery capacity suitable for switcher applications in the Technical Support Document, pages 11 through 13. The 2027 and 2032 assessments will review the progress made in ZE locomotive technology and infrastructure further.

31. Miscellaneous

a) Comment 45-3-1

I oppose all regulation directed by CARB. Unelected bureaucrats should not be allowed to exercise such authority. This only belongs to the legislature.

Agency Response: No changes were made in response to this comment. The comment is outside the scope of this rulemaking, irrelevant, or not specifically directed

at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action. Therefore, CARB is not required to respond.

b) Comment 45-10-2

Our Climate Action Plan adopted in 2021 set us on a path to fully transition our locomotive fleet to lower-emission renewable fuels, to upgrade the remainder of our fleet to Tier 4 contingent on grant funding being made available, and to demonstrate and eventually transition to zero-emissions – once the technology is ready and funding is available, allowing Metrolink to eliminate diesel emissions entirely.

Agency Response: CARB made no changes based on the received comment. CARB reviewed the Climate Action Plan, a set of voluntary measures adopted by Metrolink, and determined that it would likely meet the emission reduction requirements of the Proposed Regulation. If the Climate Action Plan were to demonstrate emission reductions in the amounts specified in the Proposed Regulation, and if it were submitted and approved by CARB as an ACP, it would then provide enforceable emission reductions, making it a viable compliance pathway. Staff appreciates the work that Metrolink has already done and has committed to do in the coming years.

c) Comment 45-23-22

[T]he imperatives for short-term compliance that would be established by the Proposed Rule are contrary to CARB's own long-term goals. Driving the railroads towards purchasing the next generation of long-lived diesel locomotives, if or when they are available, as opposed to focusing on developing alternative zero emission technologies, is directly contrary to CARB's stated objective of transitioning to "zero-emission" technologies.

Agency Response: No changes were made in response to this comment. The Proposed Regulation is focused on reducing PM and NOx emissions. The near-term reduction of PM and NOx through the purchase of Tier 4 or cleaner locomotives while ZE technology matures will lead to significant decreases in health impacts and cancer risk. After 2030, Tier 4 locomotives will be operated in California for a maximum of 23 years after purchase. As discussed in Appendix H of the Proposed Regulation ISOR, CARB characterized cancer risk within one mile of two representative California railyards. The study compared cancer risk of baseline conditions versus if locomotives operating at those railyards were all Tier 4. Results showed that cancer risk from exposure to diesel locomotive PM emissions would be decreased by over 90 percent with an all Tier 4 fleet.

d) Comment 45-23-23

[F]rom a practical perspective, CARB's proposed yearly "administrative fee" of $175 per locomotive, paid by the locomotive operator, demonstrates a fundamental lack of understanding of the rail industry and fails to address how CARB would avoid charging the fee for the same locomotive multiple times. For example, one railroad may own and operate a locomotive for part of the year, but that same locomotive (while still owned by the same railroad) may also be operated in California by different railroads for different portions of the year. Further complicating the issue, the locomotive at issue may be owned by a railroad that has no presence in California. Leaving aside the desirability of any administrative fee, it would

be unreasonable to suggest that this administrative fee should be paid multiple times for the same locomotive every year by different railroads. In the example provided this would multiply the total fee, rather than fairly apportioning the single fee between operators.

> **Agency Response:** No changes were made in response to this comment. The administrative payment is per locomotive reported by each operator. The payment covers the implementation costs for the Proposed Regulation, such as the time it takes staff to audit reporting data. If a locomotive is operated in California by several different operators, it would appear on multiple annual reports and thus would be required to pay the administrative payment by multiple parties because of the additional time it takes to track and audit a locomotive used by multiple operators.

e) Comments 45-23-46 through 45-23-56

No changes were made in response to these comments. The comments discussed the Notice of Preparation of a Draft Environmental Document for the Proposed Regulation, documentation that was not released for comment during any formal comment period. Staff is not required to respond. Summaries and responses to all comments on the Draft Environmental Analysis are herein incorporated by reference.

f) Comment 45-23-59

To those knowledgeable about the law, the industry, and the science, the Proposed Rules are not a practical way to further reduce locomotive emissions in a manner that is consistent with the law. Instead, it proposes arbitrary and capricious targeting of the railroad industry.

> **Agency Response:** No changes were made in response to this comment. The Proposed Regulation is lawful and will be effective in reducing locomotive emissions.
>
> CARB disagrees that the Proposed Regulation is "arbitrary and capricious targeting of the railroad industry." California has made great strides in transitioning other freight sectors to ZE operation and as such, locomotives in California will soon be the dirtier mode of freight transport. Additionally, as outlined by Executive Order N-79-20, offroad equipment, including locomotives, must transition to ZE operation by 2035, where feasible.

g) Comment 45-23-78

We respectfully disagree with your suggestion that the statements you identified were "unsubstantiated." To the contrary, several of the statements identified by CARB were addressed, with supporting citations, in the Comment. Other data was obtained directly from your agency. And still other statements relate to identified deficiencies in CARB's own analysis and thus do not lend themselves to external support from AAR – they request further support and analysis from CARB. Moreover, subsequent conversations during which CARB has suggested that AAR is obligated to provide CARB with data, statistics, and analysis for use while preparing its Proposed Rules are an improper attempt to shift CARB's regulatory burden from itself to AAR and is contrary to California law.

> **Agency Response:** No changes were made in response to this comment. Staff agrees that AAR is not obligated to provide CARB with data as part of this rulemaking process and disagree that staff suggested otherwise. Throughout the regulatory

process, CARB spoke with locomotive operators and held workshops and meetings to discuss the proposal and the data CARB was relying on for the ISOR. On multiple occasions, operators disagreed with data or the analysis that staff provided. Each time, staff asked for data supporting why the commenters disagreed and no such data was received. Without additional data, staff relied on the best available information they had.

h) Comment 45-26-24

While CARB understands that locomotives operating on the general railroad system must comply with federal requirements and regulations, the proposed regulation does not address the regulatory impact of the provisions of the proposed order. There is no acknowledgement of the additional safety measures, including fire safety, that are required for passenger equipment nor the reliance of passenger rail agencies on federal funding with domestic content requirements.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 11 and Master Response 16. The comment is correct that the Proposed Regulation does not include provisions for safety or reliance; FRA leads this effort. However, the Proposed Regulation does allow operators to apply for compliance extensions in the case that compliant equipment is unavailable to operators for reasons outside of their control, such as a delay in FRA approvals.

i) Comment 45-26-25

In 2013, the Federal Railroad Administration (FRA) published a letter to the railroad industry outlining process for the regulatory approval of railroad motive power that uses "alternative fuel" sources, to include battery-electric and hydrogen technologies. The process outlined underscores the fact that there is not enough market demand to drive the need for standards to address these technologies at this time, as the current and projected applications are focused on pilot and prototype projects. Because of this, each product must go through an organic approval process with FRA that is highly dependent on the specific design and application of a given technology. On average, this process has taken about three years for each project, but does not account for the fact that FRA has a limited capacity of subject matter expertise to devote to such projects, and an increase in demand could lead to longer timelines associated with approval, particularly for passenger operations which represent a higher safety risk. The proposed regulation does not address this process in its analysis and no letter or formal communication from the FRA is included in the proposed regulation acknowledging the proposed regulation's timeline.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 16. The Proposed Regulation allows operators to apply for compliance extensions in the case that compliant equipment is unavailable to operators for reasons outside of their control, such as a delay in FRA approvals.

j) Comment BH1-OT-23-1

And you know what CARB? We need you to do better and be better. I'm tired of being in this toxic relationship with them. If they want to go, let them go. If they really love us, we could have both. We could have zero emissions and healthy communities, we could have both. So if they don't want to commit, if they don't want to be, if they don't really love us, let them go. Get your stuff and get on packing.

> **Agency Response:** No changes were made in response to this comment. The comment is outside the scope of this rulemaking, irrelevant, or not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action. Therefore, CARB is not required to respond.

k) Comment BH1-OT-38-1

We are – someone stated it takes a hundred times longer to charge it up – charge up the vehicles. No, we could have wireless technology and/or the over-the-head wires, but right now, we are simultaneously needing to decarbonize transportation and the grid, so they could be working together. Solar panels along the entire rail line could be the answer. You could charge up as you go by with wireless technology. It would solve everything as far as the emissions go. The longer that you wait and postpone these targets, the worst our issues become with the environment. We are hitting tipping points that have no return. We must address it as quickly as possible. The waiting around is not – is not an option.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 17.

l) Comment 45-24-11

The Metrolink Board of Directors has already adopted aggressive goals through the Climate Action Plan. This plan outlines the target dates to deploy zero-emission technologies, highlights efforts to leverage the cleanest Tier 4 locomotives that already exceed future air-quality attainment goals and describes the planned transition to renewable diesel that will remove eight million gallons of fossil fuel annually from the California supply chain.

> **Agency Response:** No changes were made in response to this comment. This response incorporates the response to comment 45-10-2.

m) Comment 15-1

[R]estrict trains from using other areas as sync points and/or staging areas and restrict them from not being able to in effect to create an unzoned temporary rail yard. In my previous conversation with your agency the thought was to not allow them to idle longer than 15 minutes and be able to monitor the engine data. I fear the review process will not be proactive and few and far between and do not trust the railroad to comply, especially in my situation. I would like to see regulation that they are not permitted to do this type of staging on a regular basis other than in the rail yards where it is permitted.

> **Agency Response:** No changes were made in response to this comment. This response incorporates Master Response 1 for discussion on strengthening idling requirements. Staff agrees that locomotive activity occurs in many non-railyard

locations throughout the state, exposing community members in all areas near a railroad track to greater health risk. Instead of restricting staging activity outside of railyards, CARB believes it is more feasible and beneficial to focus on transitioning locomotives to ZE operation, such that it would not be a public health concern.

Operations may require locomotives to idle outside of railyards to meet safety and logistical requirements. The Proposed Regulation requires locomotive operators to state a reason for idling in every single instance where idling exceeds the 30-minute limit. Throughout implementation, CARB staff will refer instances of non-exempt idling to its Enforcement Division. If a community member believes a non-ZE locomotive is idling greater than 30 minutes for a non-exempt purpose, they may file a complaint. The Proposed Regulation will give CARB the authority to investigate such issues, and to enforce compliance through financial penalties. Complaints should be sent to: *https://calepa.ca.gov/enforcement/complaints/*.

n) Comment 15-4-1

Re.Sec. 2478.2 Exemptions, I would suggest the following language:

"Locomotives that meet the following requirements are exempt from this Locomotive Regulation and all its reporting requirements.

(a) Locomotives propelled by engines with a total continuous rated power of less than 1,006 horsepower(hp). For locomotives..."(continue as proposed).

Explanation: When I read this proposal, it was not clear that these exemptions released the Operator from all aspects of this Regulation, including registration and recordkeeping. Inclusion of the term "continuous" rated power will eliminate some confusion in the assessment of steam locomotives which typically are not rated in horsepower, but in tractive effort.

> **Agency Response:** No changes were made in response to this comment. 40 CFR § 1033.140 defines Rated Power and how total Rated Power is calculated and the Proposed Regulation is consistent with the CFR. Staff believes that the Exemptions section of the Proposed Regulation clearly states that if exempt under section 2478.2, no requirements of the Proposed Regulation apply.

o) Comment 15-7-5

Caltrain is interested in running a pilot with a battery-equipped electric multiple unit (BEMU) on the portion of its corridor yet to be electrified provided funding for a BEMU and demonstration project is secured prior to our option expiring in August of 2023. As we stated in our previous letter, Caltrain is available to work with CARB to move forward on enabling sufficient funding for pilots and ZEV transition for passenger rail agencies.

> **Agency Response:** No changes were made in response to this comment. This comment is not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action, as it is about incentive programs. Therefore, CARB is not required to respond. However, staff encourage Caltrain to work with CARB pilot and demonstration programs. This response incorporates Master Response 5 for details on incentive funding.

p) Comment 15-9-2

Through this rulemaking, it is clear that CARB has done significant research into the need to reduce locomotive pollution and the availability of zero-emission locomotive technology. Staff have valuable insights that other air regulators would benefit from. We ask that CARB staff work with local air districts, in particular the SCAQMD and the San Joaquin Valley Air Pollution Control District (SJVAPCD), to give direction and guidance on how to develop the strongest possible railyard rules.

The South Coast and San Joaquin Valley have tremendous need to reduce pollution from railyards, but the South Coast's proposed new railyard rule is not ambitious enough and SJAVPCD has not started a rule to reduce railyard pollution. South Coast's Indirect Source Review (ISR) rule for new railyards is expected to go to the Board in October 2023, and the agency expects to start developing a rule for existing railyards in 2024. We believe SCAQMD and SJVAPCD would benefit from CARB's knowledge since California is leading in this work.

> **Agency Response:** No changes were made in response to this comment. This comment is not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action, as it is about local Air District programs. Therefore, CARB is not required to respond. However, staff welcomes requests to meet, including from Air Districts. Through the development of this Proposed Regulation, CARB is releasing its health, technology, and economic studies, as well as its analyses of the current operational characteristics for locomotive operators in California. This information should provide support for local agencies seeking to understand the role of locomotive emissions in air quality, and to reduce locomotive emissions where feasible.

q) Comment 15-9-3

CARB should work with funding agencies, including the California State Transportation Agency (CalSTA) and the California Transportation Commission (CTC), to ensure that funding is directed toward supporting zero-emissions rail projects. Priority should be given to projects that benefit impacted communities, and to rail projects using overhead catenary and battery-electric technology. CARB should also work with the California Energy Commission (CEC) and utilities to plan for infrastructure that will support rail electrification.

> **Agency Response:** No changes were made in response to this comment. This comment is not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action, as it is about incentive programs. Therefore, CARB is not required to respond. However, information on incentives and the Proposed Regulation may be found in Master Response 5.

r) Comment BH2-1Zoom

Is CARB satisfied that OEMs are prepared to furnish repower kits for all makes/models of locomotives operating in CA in a timely fashion? EPA was obliged to grant hundreds of (10-year) exemptions in 2009 pursuant to 40 CFR 1033.61(d) due to the unreadiness or unwillingness of OEMs to provide remanufacture kits to be certified for all locomotive families and model years otherwise subject to Section 1033.901.

Agency Response: No changes were made in response to this comment. The In-Use Locomotive Regulation does not require repower kits and does not impose requirements on OEMs. The use of a repower kit is one among many compliance strategies. Locomotive operators are free to choose the strategies that work best for them. The 2027 and 2032 assessments will further address ZE repower kit availability.

s) Comment BH2-2Zoom

Idling really depends on the Tier of the Engine and the timing of the Emissions system. When an engine is in an active burn it can n[o]t be shut down.

Agency Response: No changes were made in response to this comment. This comment is not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action. Therefore, CARB is not required to respond. Staff appreciates the informative comment on idling.

t) Comment 15-2-2

I believe that CARB regulations, especially those on vehicles a decade old and older, restrict the mobility and job opportunities of the less fortunate by driving up prices on used cars and the repair of used cars.

Agency Response: No changes were made in response to this comment. The comment is outside the scope of this rulemaking, irrelevant, or not specifically directed at the proposed CARB action or to the procedures followed by CARB in proposing or adopting the action which concerns locomotive not cars. Therefore, CARB is not required to respond.

u) Comment 15-2-4

This comment letter included questions about using the AFMO for compliance with the Proposed Regulation.

Agency Response: No changes were made in response to this comment. The comment letter is out-of-scope with regard to the proposed second 15-day changes. Therefore, CARB is not required to respond.

v) Comment 15-2-6-9

The commenter included several documents for the record to further emphasize the importance of reducing locomotive emissions.

Agency Response: No changes were made in response to this comment. Staff agrees that reducing emissions is important, and thanks the commenter for their submittals.

V. Peer Review

Health and Safety Code section 57004 sets forth requirements for peer review of identified portions of rulemakings proposed by entities within the California Environmental Protection Agency, including CARB. Specifically, the scientific basis or scientific portion of a proposed rule may be subject to this peer review process. CARB determined that this rulemaking does

not contain scientific basis or a scientific portion subject to peer review, and thus no peer review as set forth in Health and Safety Code section 57004 was or needed to be performed.