ATTACHMENT A

Proposed Amendments to the Exhaust Emissions Standards and Test Procedures for 2024 and Subsequent Model Year Heavy-Duty Engines and Vehicles, Heavy-Duty On-Board Diagnostic System Requirements, Heavy-Duty In-Use Testing Program, Emissions Warranty Period and Useful Life Requirements, Emissions Warranty Information and Reporting Requirements, and Corrective Action Procedures, In-Use Emissions Data Reporting Requirements, and Phase 2 Heavy-Duty Greenhouse Gas Regulations, and Powertrain Test Procedures

(Distributed at the August 27, 2020, Board hearing)

This document provides an overview of the topics CARB staff intends to propose for further public consideration as a part of a subsequent 15-day comment period. This list is not exhaustive and does not include minor technical changes that may be proposed.

Staff will continue to coordinate with stakeholders in the development of the regulatory text. This list in no way limits CARB's authority to make other changes to the proposed regulatory amendments, consistent with the requirements of California law.

Proposed Changes to Vehicle Exemptions

CARB staff will propose adding an exemption for heavy-duty diesel engines used in heavy-haul applications that are rated at or above 525 hp for an appropriate defined period of time. As such, these engines would be allowed to be produced by complying with the 2023 model year California requirements only.

These engines have relatively few sales in California and manufacturers may find it difficult to find resources to redesign these engines while also managing design changes to their other more popular engine families.

CARB staff is also proposing that this exemption would set limits on the sales volume of these higher emitting engines based on manufacturers' previous model year sales from 2015-2019 model years.

Proposed Changes to the Cycle Regression Statistics for Alternative-Fueled Engines

CARB staff will propose changes to the cycle-validation criteria for operation over the Low Load Cycle (LLC) and the Phase 2 GHG transient cycle for alternative-fueled diesel

engines. Staff believes that modification of the permissible criteria for the regression statistics is needed for these alternative-fueled engines. Since many of these engines use throttle-body fuel injection, the engines cannot keep up with the rapid torque/speed variations in the LLC and phase 2 GHG transient cycle.

Proposed Changes to the Durability Demonstration Requirements

CARB staff will propose changes to the durability demonstration requirements for medium heavy-duty and heavy heavy-duty engines in 2024 through 2026 model years. Staff is considering the addition of two more options for these two diesel categories which would allow the manufacturers to age the engine and aftertreatment system on the engine dynamometer for fewer hours combined with accelerated aftertreatment aging, in exchange for submitting in-use emission data reports for a certain percentage of their California sales for several calendar years.

Proposed Changes to the CA-ABT program for Heavy-Duty Zero-Emissions Products

CARB staff will propose changes to the applicability criteria for the heavy-duty zero-emission averaging set. Currently, the proposed amendments would make this averaging set available from 2022 through 2030 model years. The more credit that the omnibus rule provides for heavy-duty zero-emission vehicles, the fewer actions that would be required to reduce emissions from heavy-duty diesel engines. After considering the impacts of this averaging set on the overall emissions benefits projected for the omnibus rulemaking, staff is considering changes to the program so that credit generation for the heavy-duty zero-emission averaging set could be generated from 2022 through 2026 model years and that all credits generated by the program would expire before the 2027 model year. Additionally, heavy-duty zero-emission NOx credits would be allocated to zero-emission powertrains instead of zero-emission vehicles.

Proposed Changes to Emissions Warranty and Reporting

CARB staff will propose a change to more clearly describe the applicability of the Field Information Report requirements. The language that was originally proposed did not specify which model years would be affected, nor when manufacturers would have to start complying with the Emissions Warranty and Reporting requirement. The newly proposed language would clearly indicate that 2024 and subsequent model year vehicles and engines would be affected. These changes would not modify the original intent of the proposed requirements.

CARB staff will propose minor clarifications to the description of the requirements.

Proposed Changes to Heavy-Duty In-Use Testing Proposal

CARB staff will propose modifications to provide manufacturers an additional compliance margin as the more stringent emissions standards take effect in 2024 and 2027. The proposed modifications would address industry concerns, account for instrument uncertainty and test route variability, and help manufacturers comply with the new proposed in-use testing method.

CARB staff will also propose to include engine-off operation in the list of data invalidation criteria for the 3-Bin Moving Average Window method.

Proposed Changes to Useful Life

CARB staff will propose to reduce the intermediate useful life for heavy-heavy duty diesel engines from 10 years to 8 years. CARB staff's proposed NOx emissions standards for heavy-heavy duty diesel engines include 0.020 grams per brake horsepower hour (g/bhp-hr) NOx at an intermediate useful life of 435,000 miles or 10 years (whichever occurs first) for 2027 and subsequent model year engines; 0.035 g/bhp-hr at the proposed full useful life of 600,000 miles or 11 years (whichever comes first) for 2027-2030 MY engines; and 0.040 g/bhp-hr NOx at the proposed full useful life of 800,000 miles for 2031 and subsequent MY engines. As a ratio of the proposed full useful life (600,000 miles and 11 year), the intermediate useful life is 73 percent in miles and 90 percent in years.

Line haul tractors could reach the intermediate useful life of 435,000 miles in 2 to 5 years depending on whether the vehicle is operated with team drivers or a single driver. However, vocational vehicles would take many more years than tractors to reach the intermediate useful life in miles since they are not driven as many miles per year as tractors. For example, a vocational vehicle that accrues 43,000 miles per year would take 10 years to reach the intermediate useful life in miles. Such a vehicle would be subject to the 0.020 g/bhp-hours NOx standard-based in-use testing program for 10 years. Since the full useful life is 11 years, the same vehicle would be subject to the 0.035 g/bhp/hr NOx standard-based in-use testing program for only one year. Thus, the burden of compliance with the in-use testing requirements would be more stringent for vocational vehicles compared to tractors. To mitigate this, staff is proposing to reduce the intermediate useful life in years to 8 years, which would keep the ratio of the intermediate useful life to the full useful life in years and miles equal at 73 percent.

Proposed Changes to On Board Diagnostics (OBD)

The amendments proposed with the 60-day notice provide OBD malfunction threshold flexibility to diesel engine manufacturers that produce cleaner-than-required products in the 2022 and 2023 model year timeframe. In order to be eligible, the proposed amendments identify specific requirements that need to be met. CARB staff

will propose adding a similar OBD malfunction threshold flexibility for cleaner-than-required heavy-duty Otto-cycle engines that are certified in the 2022 and 2023 model years. Specific eligibility criteria would also be identified for heavy-duty Otto-cycle engines.

CARB staff will propose additional amendments for heavy-duty engines certified to the existing Optional Low NOx standards or the proposed lower NOx and PM standards in title 13, California Code of Regulations, section 1956.8. Specifically, for 2022 and subsequent model year engines certified to a NOx standard of 0.10 g/bhp-hr or lower and engines certified to a PM standard of 0.005 g/bhp-hr or lower, staff is considering the following amendments:

- Engine cooling system thermostat monitor: For section 1971.1(g)(1.2.1)(A)(ii), which allows manufacturers to lower the malfunction threshold temperature if fuel, spark timing, and/or other coolant temperature-based modifications would not cause an emissions increase of 50 or more percent of the applicable standards, the manufacturer would use 0.2 g/bhp-hr for the applicable NOx standard and 0.01 g/bhp-hr for the applicable PM standard.
- Monitoring exemption "test-out" criteria: For the "test-out" sections applicable to diesel engines (sections (e)(3.2.6)(B), (e)(5.2.3)(B)(i), (e)(8.2.4)(A)(iii), (e)(8.2.4)(B)(i), (g)(3.2.2)(F)(ii)), manufacturers would use the following criteria to determine if a specific component or function is exempt from the monitoring requirements:

(i) Instead of the criterion where no malfunction can cause NOx emissions to increase by 15 percent or more of the applicable NOx standard, the manufacturer would use the criterion where no malfunction can cause NOx emissions to increase by 0.03 g/bhp-hr or more.

(ii) Instead of the criterion where no malfunction can cause NOx emissions to increase by 30 percent or more of the applicable NOx standard, the manufacturer would use the criterion where no malfunction can cause NOx emissions to increase by 0.06 g/bhp-hr or more.

(iii) Instead of the criterion where no malfunction can cause NOx emissions to exceed the applicable NOx standard, the manufacturer would use the criterion where no malfunction can cause NOx emissions to exceed 0.2 g/bhp-hr.

(iv) Instead of the criterion where no malfunction can cause PM emissions to increase by 15 percent or more of the applicable PM standard, the manufacturer would use the criterion where no malfunction can cause PM emissions to increase by 0.0015 g/bhp-hr or more.

(v) Instead of the criterion where no malfunction can cause PM emissions to exceed the applicable PM standard, the manufacturer would use the criterion where no malfunction can cause PM emissions to exceed 0.01 g/bhp-hr.

CARB staff will propose amendments to relax the NOx nonconformance criteria for deficient emission threshold monitors on heavy-duty engines certified to the Optional Low NOx standards or the proposed lower NOx standards in title 13, California Code of Regulations, section 1956.8. Specifically, when considering the finding of nonconformance after enforcement testing of deficient emission threshold monitors under sections 1971.5(b)(6)(A)(iv) and (v), for engines certified to a NOx standard of 0.10 g/bhp-hr or lower, the Executive Officer would consider the monitor nonconforming if 50 percent or more of the engines tested do not illuminate the MIL when NOx emissions exceed 0.04 g/bhp-hr above the emission level at which the malfunction was detected when the OBD system was approved.

Proposed Changes to Auxiliary Power Unit

CARB staff will propose to correct a referencing error in the amended requirements of Appendix B-3 that was originally posted on June 23, 2020 where we inadvertently referenced title 13, section 2421 rather than section 2423(n).

Proposed Changes to Title 17 Vehicle Category Description

CARB staff will propose to correct the tractor sub-category in subsection (a)(2)(B) in Section 95663. The proposed amendment is necessary to fix the inadvertent error by moving the "Heavy haul tractor" from gross vehicle weight rating column to the sub-category column to be consistent with other sub-categories.

Proposed Changes to Greenhouse Gas Test Procedures

CARB staff will propose to exclude military vehicles in new subsection (h)(6) to clarify that military tactical support vehicles are excluded in the Phase 2 GHG trailers requirements in Section 1037.5. Excluded vehicles. Military vehicles are already excluded in 13 CCR 1905 and 17 CCR 95301 (Tractor-Trailer GHG regulation's applicability).

CARB staff will propose to clarify that new trailer tires are required in certification applications and upon initial sale in Section 1037.515.

CARB staff will propose to modify the emission control identifier DWSW description from "Dual-wide trailer tires with steel wheel" to "Dual-wide trailer tires with high strength steel wheel" since trailer manufacturers would not get any weight reduction value for using dual-wide trailer tires unless they use a high strength steel wheel in Appendix III to Part 1037.

Proposed Changes to California Environmental Performance Label Specifications for 2021 and Subsequent Model Year Medium-Duty Vehicles, Except Medium-Duty Passenger Vehicles

CARB staff will propose to clarify that the area for "vehicle fuel type" should have a zero radius for all corners in subsection (9)(1) to ensure consistency among manufacturers.

Proposed Changes to the California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles

CARB staff will propose modifications to the maximum number of retested engines to 2 shift days to fulfill the 3 hours of non-idle operation located in 86.1910.A.6. If this can not be completed in 2 shift days, a new test vehicle would be required to be tested.

CARB staff will propose additional amendments to 1065.935 requirements for the PEMS units to remain within instrument detection and instrument drift criteria during in-use emissions testing to ensure accurate valid data collection.

Proposed Changes to Cost Estimates Information in the Staff Report

CARB staff will propose additions to the staff report by including, the final report on the Stage 3 Low NOx Demonstration published by Southwest Research Institute after completing the Low NOx demonstration Program. The document provides feasibility and technology demonstration information to meet the Low NOx standards.

CARB staff will propose additions to the staff report by including "Estimated cost of diesel emissions-control technology to meet the future California low NOx standards in 2024 and 2027" published by The International Council On Clean Transportation (ICCT). The document provides estimates by ICCT describing how the costs are less than estimated in the Proposed Amendments.

CARB staff will propose cost scenarios for optional elements in the Proposed Amendments such as the optional 50 state program, optional low NOx standards, and optional powertrain certification procedures in the staff report for informational purposes.

Proposed changes to the CA-ABT program

CARB staff will propose changing the open enrollment period for the CA-ABT program to any time during 2022 through 2024 model years. Under the proposed changes, manufacturers would have the option to remain in the federal-ABT program for 2022 and 2023 model years in order to use and/or generate federal credits. Manufacturers choosing this option would not be eligible to participate in any of the

CA-ABT elements such as the HD zero-emission averaging set in 2022 and 2023 model years.

Additionally, staff is adding a new NOx family emission limit at the intermediate useful life (FEL_{IUL}) for 2027 and subsequent heavy heavy-duty engines to provide further flexibility in the CA-ABT program.

Proposed Changes to Scheduled Maintenance

CARB staff would propose changes to the scheduled maintenance to give manufacturers an option for more flexibility in scheduling supplemental maintenance for emission-related components and systems. This flexibility, which would be allowed for the transitional model years of 2024, 2027, and 2031, when the emissions standards become more stringent, would give manufacturers time to analyze the components and systems to ensure compliance at the lower standards for the lengthened useful life periods.

Currently, manufacturers are already able to request new scheduled maintenance under the existing provisions in section 86.094-25 (b)(7)(ii), of the Test Procedures. Specifically, the provisions allow requests for new scheduled maintenance for cases when an existing component is redesigned, or when an entirely new technology is used in a component, or when an existing component may be influenced as a direct result of the implementation of any new technology. In any of these cases the manufacturer would have the opportunity to petition CARB for more frequent maintenance intervals as needed. However, the request must be approved prior to the introduction of the new maintenance. The proposed changes would instead offer an option for manufacturers to set the recommended supplemental scheduled maintenance without submitting the request, and waiting for approval under the existing provisions. Thus, CARB staff is proposing this change to ease the burden of compliance for the transitional years when the emissions standards are lowered.

Proposed Changes to the Definition of Heavy Heavy-Duty Engine

CARB staff will propose to modify the definition of a heavy heavy-duty engine in title 13, California Code of Regulations, section 1956.8 (k) Definitions Specific to this Section. This modification will clarify that gasoline-fueled Otto-cycle engines are not classified as heavy heavy-duty engines. The existing certification test procedures and federal requirements already contain this exemption, and thus, the proposed modification will align the definition in section 1956.8 of a heavy heavy-duty engine and the exemption for gasoline-fueled engines with the existing provisions in the certification test procedures and the federal requirements.