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STATE OF CALIFORNIA
AIR RESOURCES BOARD

Proposed Revisions to On-Board Diagnostic System Requirements, Including the Introduction of Real Emissions Assessment Logging (REAL), for Heavy-Duty Engines, Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles And Engines; Proposed 15-Day Changes	**)))))))**	**Comment Deadline: June 19, 2019**

COMMENTS OF THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION ON CARB'S PROPOSED 15-DAY CHANGES TO THE PENDING HD OBD AMENDMENTS

June 19, 2019

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Introduction

The Truck and Engine Manufacturers Association ("EMA") hereby submits its comments in response to the Notice of Public Availability of Modified Text and Availability of Additional Documents and Information ("15-Day Notice") that the State of California Air Resources Board ("CARB") published on June 4, 2019, entitled "PROPOSED REVISIONS TO ON-BOARD DIAGNOSTIC SYSTEM REQUIREMENTS, INCLUDING THE INTRODUCTION OF REAL EMISSIONS ASSESSMENT LOGGING (REAL), FOR HEAVY-DUTY ENGINES, PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES AND ENGINES." Following a November 15, 2018, public hearing on the proposed amendments and modified regulatory language to sections 1968.2, 1971.1, and 1971.5 of Title 13 California Code of Regulations, CARB directed the Executive Officer to make the relevant modified regulatory language and supporting documents and information available for public comment for a period of at least 15 days. As detailed below, EMA requests additional revisions to the proposed regulatory language of sections 1971.1 and 1971.5 of Title 13 California Code of Regulations, consistent with EMA's prior comments and concerns submitted to CARB on its original regulatory proposal.

EMA is the trade association that represents the world's leading manufacturers of internal combustion engines, including heavy-duty on-highway ("HDOH") diesel engines, and the heavy- and medium-duty vehicles in which those diesel engines are installed. The engines, vehicles, and equipment manufactured by EMA's members are heavily regulated under numerous CARB regulations, including those pertaining to heavy-duty on-board diagnostics (HD OBD).

This document is organized into two sections: (i) comments in response to CARB's "Summary of Proposed Modifications"; and (ii) comments on the additional regulatory proposals not highlighted in the Summary. EMA's specific comments on the proposed 15-day changes at issue are denoted as follows:

- CARB's originally proposed regulatory language is shown in <u>single underline</u> to indicate additions and ~~single strikeout~~ to indicate deletions.

- CARB's modifications to the original proposed regulation are shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions.
- Text that CARB Staff proposed to add during the 45-day public notice period, but later retracted as part of the 15-day public notice period is denoted with both a ~~single underline and double strikeout~~.
- Text that CARB Staff proposed to delete during the 45-day public notice period but later retracted as part of the 15-day public notice period is denoted with both ~~double underline and single strikeout~~.
- EMA's proposed modifications to the text of the 15-day notice regulations are shown in *italicized, dashed underline* to indicate additions and both ~~double strikeout and dashed underline~~ to indicate deletions.

Comments on the "Summary of Proposed Modifications" Document

#13. Sections 1971.1(h)(6.2) and 1968.2(g)(8.2): EMA appreciates CARB's acknowledgement of manufacturers' concerns regarding the brevity of a 60-day deadline, and CARB'S proposal of a new submission deadline "within 75 calendar days of the availability of the calibration/software update." However, timing concerns still exist due to the fact that many manufacturers utilize a staggered release for software updates, and thus 75 calendar days may not fully address the issue for last-released calibration/software updates. Accordingly, EMA requests that CARB either provide manufacturers with more than an additional 15 days, or revise Section 1971.1(h)(6.2) to begin the calculation of the 75-day period from the date of the last-released update, as follows:

> (6.2) The manufacturer shall submit a report to the Executive Officer containing the average value and standard deviation of each collected parameter for each affected certified engine family as specified in, "Data Record Reporting Procedures for Over-the-Air Reprogrammed Vehicles and Engines", dated August 16, 2018, and hereby incorporated by reference. The manufacturer shall submit the report within ~~60~~ 75 calendar days of the availability of the *last-released* calibration/software update to affected engines. The manufacturer shall submit a separate report for each unique calibration/software update.

#28. Section 1971.1(h)(2.3): In previous comments to the 45-day notice, EMA raised concerns regarding the proposed language for location requirements for the diagnostic link connector. While CARB has proposed some additional edits to the language of paragraph (2.3), that may not address the problem in all cases. To better address the issue, EMA requests that language be added to Section 1971.1(h)(2.3) to provide an opportunity for manufacturers to request Executive Officer approval for an alternative location on a case-by-case basis.

#37. Section 1971.1(i)(4.3.2)(C): In previous comments regarding proposed changes to the HD OBD regulations, EMA commented that it was unnecessarily onerous to submit corrected carbon dioxide (CO_2) emissions data for each OBD certification demonstration because: (i) the regulations currently do not have a CO_2 OBD emissions limit; (ii) fuel correction typically accounts for a shift in reported CO_2 values of less than one percent, and accuracy to values of this level are not likely to be informative; (iii) EPA regulations currently require that fuel correction for reported CO_2 numbers be performed by three independent laboratories; and (iv) due to the many tests and

lengthy nature of HD OBD certification (as opposed to criteria pollutant and GHG certification), fuel samples would likely need to be analyzed multiple times over the course of the tests as new fuel is delivered to the test facility. CARB does acknowledge this challenge in stating that "Staff understands manufacturers' concerns about the additional workload, costs, and impacts on timing this may cause," however, the proposed regulatory text of Section 1971.1(i)(4.3.2)(C) still requires manufacturers to request Executive Officer approval to submit raw measured CO_2 values. In light of the increased workload to correct those CO_2 values, as well as the limited potential of this correction to provide meaningful information, EMA requests that Section 1971.1(i)(4.3.2)(C) be rewritten as follows to allow expressly for the submission of raw CO_2 values without Executive Officer approval:

> (C) Emission test data: For 2010 through ~~2021~~ 2023 model year engines, the emission test data shall include NMHC, CO, NOx, and PM emission data as applicable (based on the applicable emission threshold malfunction criteria). For all ~~2022~~ 2024 and subsequent model year engines, the emission test data shall include NMHC, CO, NOx, and PM emission data as applicable (based on the applicable emission threshold malfunction criteria), and CO_2 emission data for all monitors. For the CO2 emission data, the manufacturer may *submit the raw measured (e.g., not fuel-corrected) CO_2 values* ~~request Executive Officer approval to submit the raw measured (e.g., not fuel-corrected) CO_2 values. The Executive Officer shall approve the request upon determining, based on manufacturer-submitted information, that the raw measured CO2 values are sufficient to assess the CO_2 impacts of each malfunction~~.

If the regulations are amended at a later date to include a CO_2 HD OBD emissions limit, the data requirement could be addressed at that time to support the appropriate level of needed accuracy, depending on the magnitude of the thresholds as compared to the potential impact from fuel correction. EMA believes that a data requirement absent a set emissions limit is not appropriate or reasonable at this time.

#62. Section 1971.5(d)(4)(B)(xiv): In the 15-day notice, CARB proposed new language stating that, in making a finding regarding a remedial action, CARB's determination will be based on all relevant circumstances including "[t]he degree to which a calibration error or other calibration feature adversely impacts the accuracy of the NOx mass values that are calculated by the OBD system…" The proposed language is extremely vague and does not adequately define or provide any specificity on the "degree" that would be acceptable. EMA requests that this language either be amended to provide specific criteria, or the provision should have a delayed implementation date to 2024 to provide manufacturers adequate time to understand what this provision might entail in practice.

Additional Comments on Proposed Regulations – Attachments A and B

Attachment A – sections 1971.1 and 1971.5:

Sections 1971.1(e)(5.2.3)(D) and 1968.2(f)(1.2.3)(D)(i): In the proposed regulations of the 45-day notice, language was added to the light- and medium-duty regulations of section 1968.2(f)(1.2.3)(D)(i):

(i) For 2022 and subsequent model year medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, monitoring of the catalyst ~~shall not be~~ is not required if there is no measurable emission impact on the criteria pollutants (i.e., NMHC, CO, NOx, and PM) during any reasonable driving condition ~~where~~ in which the catalyst is most likely to affect criteria pollutants (e.g., during conditions most likely to result in ammonia generation or excessive reductant delivery).

However, this same language was deleted from the HD OBD regulations of section 1971.1(e)(5.2.3)(D):

(D) For catalysts located downstream of an SCR system (e.g., to prevent ammonia slip), the OBD system shall detect a malfunction when the catalyst has no detectable amount of NMHC, CO, NOx, or PM conversion capability. Catalysts are exempt from this monitoring if both of the following criteria are satisfied: (1) the catalyst is part of the SCR catalyst and monitored as part of the SCR system; and (2) the catalyst is aged as part of the SCR system for the purposes of determining the SCR system monitor malfunction criteria under section (e)(6.2.1). For catalysts located outside the SCR system, ~~M~~monitoring of the catalyst is not required if there is no measurable emission impact on the criteria pollutants (i.e., NMHC, CO, NOx, and PM) during any reasonable driving condition ~~in which the catalyst is most likely to affect criteria pollutants (e.g., during conditions most likely to result in ammonia generation or excessive reductant delivery)~~.

EMA requests clarity on this inconsistency.

Section 1971.1(g)(3.3.1): Due to the fact that the term "emissions neutral diagnostic" is not defined in the HD OBD regulations of section 1971.1, the proposed language of section (g)(3.3.1) is confusing and appears to prohibit emissions neutral diagnostics as currently written. In prior discussions with manufacturers, CARB indicated that clarifying language would be added in the 15-Day Notice. However, modifications have not been made to the proposed regulations to this effect. EMA requests that CARB either modify the regulatory language of section (g)(3.3.1), or add the definition of "emissions neutral diagnostic" that is used in section 1968.2 to section 1971.1.

Sections 1971.1(h)(5.3.1)(A) and (5.3.4): EMA requests that CARB add a provision to allow for technologies in which the emission-control systems do not utilize engine-out NOx sensors. There are concepts in development that might not need a NOx sensor engine out to meet current tailpipe or diagnostic requirement for conversion efficiency. In such cases, the specific requirement in section 1971.1(h)(5.3.4) might force new engine concepts to add an expensive engine-out NOx that would only be used for meeting the tracking requirement. EMA recommends the following language for sections 1971.1(h)(5.3.1)(A) and (5.3.4):

(A) NOx mass – engine out (g), *except as provided in section (h)(5.3.4)*;

(5.3.4) The engine-out and tailpipe NOx mass parameters that are calculated by the OBD system to fulfill the requirements in section (h)(5.3) and data stream requirements in section (h)(4.2) must not have an error of more than +/- 20 percent, or alternatively at the manufacturer's discretion, 0.10 g/bhp-hr when divided by the net brake work of the engine.

This requirement applies only to the NOx mass parameters in sections (h)(5.3) and (h)(4.2). Manufacturers shall report the most accurate values that are calculated within the applicable electronic control unit (e.g., the engine control module). The NOx mass values shall furthermore be calculated using the most accurate NOx concentration and exhaust flow rate values that are calculated within the applicable electronic control unit. Manufacturers shall not include a humidity correction factor when calculating NOx mass. The Executive Officer shall determine compliance 28 with this requirement by comparing data from the OBD system and the test facility that are submitted by the manufacturer as described in section (j)(2.26). Specifically, the Executive Officer shall compare the total tailpipe NOx mass calculated by the OBD system for the test cycle with the total NOx mass measured by the test facility and give consideration to the consistency of the behavior of the two sets of instantaneous NOx mass values over the test cycle. Notwithstanding the compliance determination based on the data submitted as described in section (j)(2.26), manufacturers may not include any calibration/software feature which adversely impacts the accuracy of the calculated NOx mass values relative to the accuracy demonstrated at the time of certification when the engine operates in conditions outside of the certification testing environment. *In the case of emission-control systems that do not utilize engine-out NOx sensors to meet the required tailpipe and diagnostic requirements for conversion efficiency, the manufacturer may request Executive Officer approval to track and report an alternative to the NOx mass-engine out data of section (h)(5.3.1)(A). The Executive Officer shall approve the request upon determining, based on manufacturer-submitted information, that the alternative information is sufficient to satisfy the NOx emission tracking requirements.*

Section 1971.1(i)(5.1): EMA requests that CARB add a definition for the new term "Worst Acceptable Limit" that has been added to Section 1971.1(i)(5.1). CARB has a responsibility to add clear definitions for newly-created terms used in the regulations to provide clarity for regulated entities. Additionally, EMA requests the inclusion in Section 1971.1(i)(4.1)(C)(iii) of the option to run on the SET cycle to allow for more efficient regeneration, as follows:

(iii) If a regeneration event is expected to occur during demonstration testing of a specific monitor under section (i)(4.1.2), (4.1.3), (4.2.1), or (4.2.2), the manufacturer may request Executive Officer approval to run a manual PM filter regeneration event before the malfunction is implanted for that specific monitor. Executive Officer approval shall be based on the manufacturer submitting data and/or engineering evaluation demonstrating that a regeneration event will most likely to occur during demonstration testing of the monitor (e.g., based on soot model information). If the Executive Officer approves the manual regeneration event, the manufacturer shall manually trigger a PM filter regeneration event while operating the engine on an FTP *or SET* cycle and before the implanting the malfunction.

Attachment B – section 1968.2:

Section 1968.2(g)(4.2.2)(B)(iv): In the proposed 15-Day Modified Regulation Order language in Attachment B, the modified text for Section 1968.2(g)(4.2.2)(B)(iv) reads:

(iv) For all 2022 and subsequent model year medium-duty vehicles equipped with diesel vehicles: NOx mass emission rate - engine out and NOx mass emission rate – tailpipe.

EMA believes that there is a typographical error, and the text should be revised to read as follows:

(iv) For all 2022 and subsequent model year medium-duty vehicles equipped with diesel ~~vehicles~~ *engines*: NOx mass emission rate - engine out and NOx mass emission rate – tailpipe.

Conclusion

The 15-Day Notice has provided the opportunity to review and comment on CARB's modified regulatory language regarding the various HD OBD requirements. As described above, EMA believes that additional edits to the proposed regulatory text are needed to provide the requisite degree of clarity to the industry, and to help reduce unnecessary burdens.

EMA appreciates the opportunity to provide comments on the proposed regulatory changes. We look forward to continuing to work with CARB to ensure clear, consistent regulations that meet the stated regulatory goals without undue burden to manufacturers.

Respectfully submitted,

TRUCK & ENGINE
MANUFACTURERS ASSOCIATION