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November 13, 2018

Leela Rao
California Air Resources Board
Manager, On-Board Diagnostics Program
Development Section
9480 Telstar Avenue
El Monte, CA 91731

RE: Proposed Amendments to California's Heavy-Duty Engine On-Board Diagnostic System Requirements and On-Board Diagnostic System Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines

Dear Ms. Rao:

The Motor & Equipment Manufacturers Association (MEMA)[1] submits the following comments regarding the California Air Resources Board's (CARB) proposed amendments to California's Heavy-Duty Engine On-Board Diagnostic System Requirements (HD OBD) and On-Board Diagnostic System Requirements for Light and Medium-Duty Vehicles and Engines (OBD II). MEMA outlines below our support, our concerns and suggestions for improvement.

MEMA represents over 1,000 vehicle suppliers that manufacture and remanufacture original equipment (OE) and aftermarket components and systems for use in passenger cars and HDVs. The motor vehicle components manufacturers are the largest sector of manufacturing jobs in the U.S. directly employing over 871,000 workers in all 50 states – 31,190 of those jobs are in the State of California.[2] Our members develop and produce a multitude of technologies and a wide-range of products, components and systems that make vehicles more efficient and reduce emissions.

MEMA supports state and federal policies that enable the introduction and the improvement of innovative emissions reducing technologies. Consequently, MEMA is generally supportive of pragmatically stringent OBD policies for both heavy-duty and light vehicles.

Suppliers have a vested interest in developing and implementing the best available technology into the market and to effectively monitor and diagnose vehicle's emissions control systems. Most importantly, implementing robust OBD systems are important to

[1] MEMA represents vehicle suppliers through its four divisions: Automotive Aftermarket Suppliers Association (AASA), Heavy Duty Manufacturers Association (HDMA), Motor & Equipment Remanufacturers Association (MERA) and, Original Equipment Suppliers Association (OESA).
[2] MEMA, "Driving the Future: The Employment and Economic Impact of the Vehicle Supplier Industry in the U.S." (Jan. 26, 2017), available at https://www.mema.org/sites/default/files/MEMA_ImpactBook.pdf

ensure reliable emissions control systems, particularly in markets that are price sensitive and where downtime is a critical issue. Pragmatic strengthening of OBD requirements is an important tool in improving vehicle emissions compliance by identifying potential emissions technology problems and malfunctions sooner. More stringent OBD policy increases the need and demand for more advanced emissions-reducing technologies and encourages motor vehicle suppliers to improve the design, durability, and function of these emissions-reducing technologies.

Consequently, MEMA supports CARB's regularly updating HD OBD and OBD II regulations. While CARB's proposed amendments to title 13 of California Code of Regulations (sections 1971.1, 1971.5, and 1968.2) provides many improvements that MEMA supports, MEMA has concerns with a few of the proposed requirements, has recommendations on where CARB should provide clarifying information to the industry, and recommendations on further refining of the regulatory definitions.

As such, MEMA further recommends that CARB:

- Evaluate where HD OBD requirements can be streamlined to reduce costs to industry;
- Revise NOx data storage and retrieval requirements to include only tailpipe NOx mass parameters;
- Provide further clarifications and guidance on the intrusive diagnostics and the in-use monitoring performance ratio (IUMPR provisions);
- Allow a fleet phase-in period for implementation of Real Emissions Assessment Logging (REAL); and,
- Harmonize CARB's regulation terms with SAE and ISO document terms.

Evaluate Where HD OBD Requirements Can Be Streamlined to Reduce Costs

MEMA is concerned that CARB may have underestimated the costs of the proposed HD OBD regulations to industry. As motor vehicle parts suppliers, we support pragmatic strengthening of the OBD requirements. However, MEMA is concerned that CARB's proposed expansion of the HD OBD program could consume a significant percentage of the engine and vehicle manufacturers' resources that otherwise would be directed toward emissions control technologies. Some of the proposed provisions are costly and complex additions that do not necessarily help with the benefit-to-cost ratio of the OBD program. We outline a few of these provisions below. MEMA urges CARB to reevaluate the costs of the HD OBD and evaluate where the HD OBD requirements can be streamlined for the highest benefit-to-cost ratio.

NOx Data Storage and Retrieval Requirement Should Be Slightly Revised

CARB's HD OBD proposed rule would require manufacturers to store on the engine controller NOx mass engine out and tailpipe, engine out energy, distance traveled, engine run time, and fuel consumption. These data will be stored in four arrays at a frequency of 1 Hertz. The four arrays include: 1) active data collection for 100-hour array; 2) stored 100-hours array; 3) a lifetime array; and, 4) a lifetime engine activity array. In addition, the NOx engine out and tailpipe emissions error must not be more

that 20 percent or 0.10 g/bhp-hr. These data will be publicly available and may be used for a variety of diagnostic and research purposes.

MEMA urges CARB to revise the first sentence in 1971.1(h)(5.3.4) so that it applies only to tailpipe NOx emissions.[3] Engine-out NOx mass emission rate is not usually measured by the test facility. As a result, for engine-out NOx mass, it is sufficient to just require the use of the most accurate NOx concentration and exhaust flow rate values that are calculated within the applicable electronic control unit.

Clarification in the Intrusive Diagnostics and IUMPR Provisions

CARB's HD OBD proposal would require manufacturers to submit a monitoring strategy plan for intrusive diagnostic systems or intrusive monitoring (AECD) by amending 1971.1(d)(3.1.4). Under certain circumstances, this strategy plan would be reviewed and approved by the Executive Officer (EO).

These circumstances that need to be reviewed and approved by the EO include:

- The diagnostic system does not affect the effectiveness of the emission control system during reasonable in-use driving conditions;
- If effectiveness is reduced, the system may run only after the malfunction indicator light (MIL) is illuminated for the fault from a non-intrusive diagnostic;
- If the standard procedure is not representative of real-world driving or the intrusive diagnostic enhances the emission control effectiveness, an alternative test procedure must be submitted by the manufacturer or if requested by the EO.[4,5]

CARB's proposal also includes an increase in the IUMPR by amending 1971.1(d)(3.2.2)(A) and (B). Often the driving factor for the necessity of intrusive monitoring (AECD) is driven by the need to meet IUMPR requirements. The increase in the ratio is tied closely to the potential need for an intrusive monitoring strategy which may only be possible with a temporary increase in emissions.

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[3] "Staff is proposing that the engine-out and tailpipe NOx mass parameters that would be calculated by the OBD system to fulfill the requirements in section 1971.1(h)(5.3) and data stream requirements in section 1971.1(h)(4.2) would be required to not have an error of more than 20 percent, or alternatively 0.10 g/bhp-hr." Initial Statement of Reasons, 104.

[4] Initial Statement of Reasons, 23-24.

[5] The diagnostic system does not affect the effectiveness of the emission control system during reasonable in-use driving conditions; If running the intrusive diagnostic reduces the effectiveness of the emission control system during any reasonable in-use driving conditions, the intrusive diagnostic runs only once after the MIL is illuminated for the fault by a non-intrusive diagnostic. If running the intrusive diagnostic enhances the effectiveness of the emission control system (e.g., increase catalyst conversion efficiency for a few minutes at the beginning of a driving cycle) during any reasonable in-use driving conditions, the manufacturer shall meet the following requirements: If the manufacturer determines that emissions using the standard test procedures **are not representative of real world driving**, the manufacturer must submit a plan to the Executive Officer for approval of the use of alternate test procedures. Executive Officer approval of these alternate test procedures shall be based on the determination that the alternate test procedures would result in test cycle emissions representative of in-use driving conditions. If the Executive Officer determines that emissions on the standard test cycles are not representative of real-world driving, the Executive Officer may direct the manufacturer to use alternate test procedures.

MEMA's concern is that monitoring more frequently is not completely necessary to detect for potential malfunctions and does not always add additional value to the emissions control system performance or function. Further, requiring increased frequency can increase the need for EI-AECD (emissions-increasing AECD) which can have a negative effect on overall vehicle emissions or increasing the monitoring frequency increases the potential for false fail indications.

MEMA urges CARB to clarify the process for which a manufacturer would submit a monitoring strategy plan. CARB should provide, after discussions with industry, further definitions and guidelines for "real-world driving conditions" and "reasonable in-use driving conditions" to make clear when a standard procedure is not representative of real-world driving conditions. MEMA also requests that CARB provide a definition for an "alternative test procedure" in order to provide descriptions of alternate monitoring strategies and frequency to detect "real-world" failures of emissions control systems, components, and Alternate Emissions Strategies (AES).

Further, there may be instances where non-intrusive strategies may be less accurate than the intrusive strategies they replace. In such instances, it is possible that the intrusive strategies could be more effective. Therefore, MEMA recommends that CARB clarify that such systems, where intrusive strategies are more effective than the non-intrusive strategies, would be eligible for approval by the EO.

A Fleet Phase-in Period is Recommended for Implementing REAL

MEMA supports the concept of REAL to allow CARB better modeling, technology performance evaluation and better characterize emissions performance. However, CARB's proposal requiring the implementation of REAL beginning in MY2022 may be premature. On-board sensors' computing capability needed to implement REAL may not be ready for fleet-wide implementation by MY2022. Industry needs more time to fully develop these sensor technologies to implement REAL. MEMA recommends CARB consider a fleet phase-in period for the implementation of REAL.

The Initial Statement of Reasons (ISOR) indicates that past programs have been proposed and implemented on limited amounts of data due to costs and time constraints. According to the ISOR, the proposal for implementing REAL by MY2022 was also based on a very limited set of data and may not have been based on a sufficient sample for the population and diversity. Limited vehicle data, aided by laboratory equipment, has led to a misassumption that this on-board data logging (REAL) can be reliably achieved throughout the vehicle's full useful life (FUL) by MY2022.

There are data presented in the ISOR that presents questions. For example:

- The 65-vehicle test (Figure 1)[6] indicates that the majority are over the NOx emissions limit. It is unclear as to why the WVU (Figure 3)[7] and CARB test data indicate most are under the NOx limit.

[6] Initial Statement of Reasons, 108.
[7] *Id.* at 114.

- Ammonia (NH3) can lead to significant error in the NOx reading and as the ISOR indicates, this is a problem industry is working to resolve. It is unclear if ammonia was measured.
- The data indicates there was a limited number of tests runs which may indicate that the data is statistically inconclusive.
- It is unclear as to whether CARB verified the vehicle warranty and service history or whether there were original parts in the vehicles.

MEMA urges CARB to consider a phase-in approach versus a fleet-wide implementation of REAL requirements in 2022. A phase-in period could begin in 2022 with an OEM's single engine certification, the requirements could then increase to 25 percent of the fleet in 2023, 50 percent of the fleet in 2024, and 75 percent of the fleet in 2025 until finally 100 percent of the fleet in 2026.

Harmonize CARB Regulation Terms with SAE and ISO Document Terms

MEMA recommends that within CARB's proposed regulation, CARB's definition terms are harmonized with the appropriate SAE and ISO document definitions and accepted acronyms. This is to aid future Vehicle Emissions Control Information (VECI) label requirements and promote better understanding and harmonization across the Global Market community. Creating new definitions can cause confusion in the industry and with customers. It is important that industry terms can be applied and used across product lines and more universally across global products.

Conclusion

MEMA is generally supportive of pragmatically stringent OBD policies for both heavy-duty and light vehicles and, as a result, supports many of the OBD improvements in CARB's proposal. MEMA urges CARB to evaluate where these HD OBD amendments can be streamlined to reduce costs to industry, revise the NOx data and storage and retrieval requirements to include only tailpipe NOx mass parameters, provide clarifications on the intrusive diagnostics provisions, consider a fleet phase-in period for the implementation of REAL, and further harmonize the regulatory definitions. MEMA appreciates CARB's consideration of our feedback on this important proposal. Please contact Laurie Holmes at (202) 312-9247 or lholmes@mema.org if you have any questions or would like additional information.

Sincerely,

Ann Wilson
Senior Vice President, Government Affairs