**COMMENTS OF THE**
**MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION**
**ON CALIFORNIA AIR RESOURCES BOARD'S PROPOSED REVISIONS TO THE ON-BOARD DIAGNOSTIC SYSTEM**
**REQUIREMENTS AND ASSOCIATED ENFORCEMENT PROVISIONS**
**FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, MEDIUM-DUTY**
**VEHICLES AND ENGINES, AND HEAVY-DUTY ENGINES**

***July 19, 2021***

The Manufacturers of Emission Controls Association (MECA) is pleased to provide comments on the California Air Resources Board's (CARB) proposed revisions to on-board diagnostic (OBD) system requirements for passenger cars, light-duty trucks, medium-duty vehicles and engines, and heavy-duty engines. In particular, our comments focus on the need for regulatory certainty for sensor manufacturers as well as additional diagnostic needs for pressurized fuel tanks. Our industry continues to respond to the need for robust on-board diagnostics that can help deliver real-world emissions reductions from vehicles in-use. MECA members are commercializing technologies that can enable current and future inspection and maintenance (I/M) programs as well as continuous emissions monitoring. We will continue to work with CARB staff as changes to OBD requirements are implemented in order to use the information to improve future sensor and OBD component designs and inform future OBD policy amendments.

MECA is an industry trade association of the world's leading manufacturers of clean mobility technology. Our members have nearly 50 years of experience and a proven track record in developing and commercializing emission control, efficiency and electric technology for a wide variety of on-road and off-road vehicles and equipment in all world markets. This includes extensive experience in developing OBD sensors for gasoline, diesel, alternative fuel and hybrid vehicles in all world markets. A number of MECA members are engaged with their customers in implementing and improving sensor technologies. These sensors are used for the measurement of PM and NOx levels in the exhaust, and in some strategies, to facilitate closed loop control of the combustion process as well as monitoring of the catalyst and filter functionality. Our industry has played an important role in the environmental success story associated with light- and heavy-duty vehicles in the United States and has continually supported CARB's efforts to develop innovative, technology-advancing, regulatory programs to deal with air quality and climate challenges.

Today's OBD sensors and advanced computing can be utilized to measure and calculate information to provide data to OEMs and regulators so that they can better understand how vehicles are operating in the real world. Data collected from vehicles in-use has been expensive to obtain because of the need to install hardware and/or software on existing vehicles in order to measure emissions. OBD data can be used for many purposes, including to identify populations of vehicles for additional testing, identify the conditions in-use where vehicles are not performing as expected with regard to emissions control, help regulatory agencies develop emission inventories, and enable quicker inspection and maintenance and remediation of issues.

In addition, there may be an opportunity to reduce future certification and compliance burdens to OEMs as regulatory agencies continue to gain experience with the data generated on vehicles.

Cold Start Emission Reduction Strategy

MECA commends CARB staff for continuing to improve cold start emission reduction strategy (CSERS) monitoring requirements by clarifying the components that should be monitored. The results of both modeling and engine test experiments, including the heavy-duty low-NOx demonstration program that supported CARB's Omnibus Regulation, have shown the importance of controlling emissions from cold start and low-load operation. Engine and emission controls utilize sophisticated calibrations to manage engine-out emissions and aftertreatment heating to optimize performance and minimize tailpipe emissions. This information should be available to the OBD system and can help ensure real world emission performance of engines and vehicles. MECA appreciates that CARB staff have included a list of strategies and components that must be monitored so OEMs have certainty in the certification process. This will help emission control suppliers when they are communicating with their OEM customers to better understand their needs. Today's engine and aftertreatment emission control technologies are able to control tailpipe emissions at high efficiencies across a wide variety of real world operation. In order to do this, a combination of technologies and operational calibrations must be optimized. CARB direction on CSERS requirements will help to ensure vehicles are meeting emission standards during in-use operation.

PM Filter Monitoring

We understand that CARB is taking into consideration the comments from OEMs indicating issues meeting higher in-use performance ratio (IUMPR) for PM filter monitoring. In the last OBD Regulatory Update in 2018, CARB staff determined that it was both technically feasible and cost effective for OEMs to increase the IUMPR from 0.100 to 0.336 for MY 2019+ medium-duty engine-dyno certified vehicles and MY 2022+ light-duty and medium-duty chassis-dyno certified vehicles. Similarly, the IUMPR increased to 0.300 for MY 2024+ heavy-duty engines. OEMs have indicated issues in meeting the higher ratios (0.336 and 0.300) based on currently available PM sensor technologies while CARB staff are concerned with delaying the final ratios due to potential to lead to increased PM emissions. MECA suggests that CARB consider revisions to the PM filter monitoring IUMPR and threshold provisions included in this regulatory update.

The current proposal relaxes IUMPRs down to 0.150 for MY 2022, and delays the 0.336 ratio to MY 2026. MECA agrees that it is overdue for the measurement allowance to be lowered from approximately six times the standard when most other thresholds are targeted at 1.5 times. Staff's proposal to lower the threshold from 17.5 to 10 mg/mile for MY 2028 light-duty vehicles will effectively result in a decrease in threshold stringency because the PM standard fully phases in from 3 mg/mile to 1 mg/mile by 2028. While the absolute threshold will decrease from 17.5 to 10, the ratio of the threshold to the standard will increase from 5.8 to 10. MECA recommends that CARB maintain the current IUMPR standards, combined with future increases in the

stringency of the PM thresholds. MECA further recommends that CARB work with OEMs that have challenges meeting the IUMPR and threshold requirements through the already available process of granting deficiency status in certification. This will allow OEMs three years to remedy any monitoring deficiencies, and this will provide time for sensor suppliers to work with their customers to meet their monitoring needs.

Sensor technology commercialization has a long cycle, including testing, design and real-world deployment across many trucks in the field to make sure sensors are reliable and durable. This cycle is why stringent and predictable standards are an important signal to industry to make investments today for technologies that will be needed in the future. Subsequently reversing adopted standards leaves technology and investments stranded and creates a level of uncertainty in the need for technology innovation. MECA members are engaged in developing a portfolio of sensor options that can be installed on a vehicle to monitor emission performance. For example, several advancements in PM sensor technology have been demonstrated since the last OBD regulatory update. Some of this work was completed (unpublished data) as part of the ongoing Particle Sensor Performance and Durability Consortium (https://www.swri.org/consortia/particle-sensor-performance-durability-pspd-consortium) being managed by Southwest Research Institute. In addition, a 2020 study highlights the potential of PM sensors to yield more data and greater sensitivity measurement as low as 1 $mg/m^3$ (SAE 2020-01-0385). At the current IUMPR and thresholds being proposed, these technologies are unlikely to be needed for compliance.

Evaporative Emission Monitoring

MECA supports CARB's proposal to require a standardized function on all gasoline vehicles that will enable the generic scan tool to seal the evaporative system in preparation for an off-board leak test. MECA reiterates our previous recommendation (see EPA-HQ-OAR-2011-0135-0437) for reducing the OBD leak detection threshold for NIRCOS and encourages OBD staff to consider developing the additional data necessary to support a proposed revision to a lower and technically feasible threshold that provides equivalent emissions from sealed tanks to those from conventional fuel tanks. CARB staff recognized the importance of this issue; however, they acknowledged that more data on in-use failure rates and technical feasibility of leak detection was needed. Pressurized sealed tank systems are increasingly being adopted on HEVs and PHEVs, and data from IHS show the California market share of these vehicles in 2019 was 2.4% for PHEVs and 5.5% for HEVs. From a review of U.S. national 2019 certification data, all PHEV models utilized sealed tank systems (NIRCOS) and 77% of HEVs utilized NIRCOS. Further, the fraction of the fleet that employs PHEV and HEV powertrains continues to increase and this trend will likely continue out to 2035.

Based on these trends, MECA recommends CARB propose a reduced OBD leak detection threshold for pressurized sealed fuel systems. Current regulations specify an OBD leak detection threshold of 0.020 inch in diameter. Data provided to EPA in the comments to the 2013 Tier 3 NPRM (see EPA-HQ-OAR-2011-0135-0437) showed that any leak size > 0.002 inch in a sealed system will generate emissions higher than an open system with 0.02 inch leak orifice, vented through the evaporative emissions canister. Emissions are totally uncontrolled on sealed systems when the leak exceeds 0.005 inch diameter. It will be easier to pressurize the

tank and find a 0.005 inch diameter leak than it currently is to find a 0.02 inch diameter leak at ambient pressure. Therefore, there is no technical reason that a 0.005 inch diameter leak cannot be identified and repaired on a pressurized fuel system.

General Comments

MECA supports CARB's proposed adoption of Unified Diagnostic Services (UDS). We agree that UDS provides benefits that include increasing the number of available fault codes, improving the usefulness of standardized OBD data for repair of vehicles, and providing information to enable in-use monitoring performance.

MECA encourages ARB to continue to explore the potential concepts for future comprehensive I/M programs that would be enhanced with OBD data. MECA supports the use of on-board monitoring, and potentially telematics, to screen vehicles that were manufactured with the applicable OBD sensors. Future programs may utilize, as part of a thorough I/M program, a download of information, such as malfunction code information, from the OBD computer module to analyze vehicle operation and diagnose current and potential issues.

Conclusion

In summary, MECA commends CARB for regularly reviewing the developments in sensor technologies and monitoring strategies and taking important steps to revise the OBD regulations as needed through discussions with all stakeholders. We suggest that CARB take all possible consideration before revising OBD threshold monitoring requirements in order to support the investments needed to continue the research and development needed for improved sensor technologies. Maintaining technically achievable monitoring thresholds and timelines assures sensor technology development will achieve the objectives of the regulation and ensure that vehicles and engines are achieving their certified emission performance over their full useful life and beyond. Our industry will continue to do its part and deliver cost-effective, advanced OBD monitoring technologies to the market.

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