STATE OF CALIFORNIA
AIR RESOURCES BOARD

Public Meeting to Consider Approval	**)**	**Hearing Date:**
of the South Coast Air Basin 2012	**)**	**January 25, 2013**
$PM_{2.5}$ and Ozone State Implementation	**)**	**Agenda Item: 13-2-2**
Plans	**)**	

COMMENTS OF THE TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

January 24, 2013

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Public Meeting to Consider Approval of the South Coast Air Basin 2012 $PM_{2.5}$ and Ozone State Implementation Plans	**)** **)** **)** **)**	**Hearing Date: January 25, 2013 Agenda Item: 13-2-2**

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Introduction

The Truck and Engine Manufacturers Association ("EMA") hereby submits its comments regarding the California Air Resources Board's consideration of the South Coast Air Quality Management Plan ("AQMP"), and specifically one of the recommended control measures contained in the South Coast's State Implementation Plan ("SIP") for attaining the federal ozone standard. The specific SIP measure at issue - - ADV–01 - - would, among other things, establish an "optional" exhaust emission standard for oxides of nitrogen (NOx) at or below 0.01 g/bhp-hr for heavy-duty vehicles. The proposed standard appears to be unworkable, inconsistent with policy choices that CARB has made to date to incentivize the accelerated use of clean new technology heavy-duty diesel engines, and at odds with other stated CARB goals (such as to reduce greenhouse gas (GHG) emissions and to promote the utilization of advanced on-board diagnostic (OBD) systems). Accordingly, CARB should not approve that proposed mobile source implementation measure as a component of the South Coast SIP.

EMA represents the world's leading manufacturers of internal combustion engines, including the engines utilized in heavy-duty vehicles. EMA was a key stakeholder in developing the current ultra-low emission standards that apply to 2010 and later model year heavy-duty engines and vehicles (i.e., a PM limit of 0.01 g/bhp-hr, and a NOx limit of 0.20 g/bhp-hr). Those

heavy-duty engine emission standards, as adopted by CARB and U.S. EPA, are the most stringent in the world, and are at the very limit of technological feasibility and cost-effectiveness, especially when taking into consideration, as one must, ARB's requirements for in-use compliance, OBD, deterioration, and measurement accuracy. EMA and its members have a direct and vital interest in ensuring that those ultra-low heavy-duty emission limits continue to be implemented in a cost-effective and harmonized manner (including with respect to newly implemented GHG emission standards), both in California and across the nation as a whole.

The proposed "optional" NOx emission limit for heavy-duty engines and vehicles cannot be implemented in a fair and reasonable manner, and, taking all of the elements of compliance into consideration, may not even be feasible. Moreover, the proposed "optional" standard could actually thwart the accelerated introduction of new technology diesel engines and vehicles, which, in turn, could frustrate important public policy objectives and pending incentive programs in California. For all of the reasons detailed below, CARB should not adopt mobile source implementation measure ADV-01.

Proposed Mobile Source Implementation Measure
ADV-01 Should Not Be Approved By CARB

One of the South Coast's recommended control measures for inclusion in the 2012 SIP is to have CARB adopt an "optional" NOx standard for heavy-duty on-highway vehicles. As proposed, the optional NOx standard would be "at least 95% lower than the current 2010 on-road exhaust emissions standard (i.e., at or below 0.01 g/bhp-hr)." The South Coast's SIP submission describes this proposed control measure as follows:

> The proposed action seeks CARB to establish an optional NOx exhaust emissions standard which represents a 95% reduction of the 2010 standard or 0.01 g/bhp-hr. The optional NOx standard serves as a benchmark for heavy-duty engine manufacturers to develop the next generation of cleaner combustion engines.

> Such engines in combination with the ability to achieve a specific level of zero-emission miles are likely to be developed in the near-term to achieve the proposed optional NOx exhaust emission standard. In addition, having optional NOx emission standards provides certainty in funding incentives, by establishing a standard for engines to meet in order to receive incentives.

(Draft Final 2012 AQMP: Appendix IV–B, p. 48.).

This proposed control measure raises a number of questions, including the overall feasibility of a 0.01 g/bhp-hr standard, the feasibility of even measuring NOx emissions at those levels, the feasibility of meeting OBD requirements at such a low NOx level, the question of whether the proposed optional standard effectively violates CARB's policy in favor of fuel-neutrality, and whether restricting incentive funding to engines meeting such an optional standard is consistent with sound public policy. EMA will address each of these issues in turn.

As an initial matter, it is at best uncertain whether a NOx standard of 0.01 g/bhp-hr is feasible for heavy-duty engines. As evidenced by the most recent certification data from 2013 model year heavy-duty engines, today's most advanced new-technology diesel engines equipped with oxidations catalysts, wall-flow PM filters, and fully optimized selective catalytic reduction ("SRC") systems generate NOx emission levels over the FTP cycle that range from 0.07 g/bhp-hr to 0.19 g/bhp-hr, with most engines recording NOx emission levels in excess of 0.10 g/bhp-hr. Those emission levels need to be adjusted to account for deterioration, OBD compliance, and the entirety of CARB's regulatory program. Achieving an "optional" NOx standard that is more than 90% lower than the best performing new-technology diesel engines is not supported by any current emissions test data. That challenge becomes even more speculative when the requisite deterioration factors are added to the equation. Moreover, a NOx standard of 0.01 g/bhp-hr is really the practical equivalent of a NOx standard of 0.00 given the variability of engine emissions tests and emissions measurement equipment (discussed below). In that regard, zero-emission heavy-duty vehicles have not been demonstrated, even in concept.

Accordingly, until CARB can point to actual test data to support the feasibility and cost-effectiveness of such an "optional" NOx standard, it should not be approved as a recommended SIP control measure. To that end, EMA is very interested in working with CARB to conduct investigational studies to explore the potential outer limits of advanced emission-control technologies for heavy-duty applications, and to pursue other coordinated activities to help to define and shape CARB's recently updated Vision Plan for Clean Air.

Compounding the potential technological infeasibility of a NOx standard of 0.01 g/bhp-hr is the fact that current emissions measurement systems are incapable of accurately and repeatedly measuring NOx emissions at such zero-equivalent levels. To the contrary, a NOx standard of 0.01 g/bhp-hr is well within the variability of today's NOx measurement systems, and so is a standard that cannot be accurately tested for or, as a result, complied with. The goal of emissions measurement systems is to be able to record emissions consistently within a 5% window of variability. 5% of 0.01 g/bhp-hr is 0.0005 g/bhp-hr. No current emission measurement systems for NOx can obtain that degree of accuracy, let alone on a repeatable basis. Accordingly, and for this reason as well, the proposed NOx standard of 0.01 g/bhp-hr is inherently problematic.

Similarly, today's heavy-duty engines must comply with comprehensive and state-of-the-art OBD requirements. Those requirements call for the detection, measurement and response to emission levels that are set at various multiples (e.g., 1.5 or 2.0 times) of the relevant emission standard. However, current NOx sensors and related OBD systems are incapable of meeting CARB's numerous OBD requirements if those requirements are premised on a NOx standard set as low as 0.01 g/bhp-hr (which, again, is the effective equivalent of zero). This renders the proposed optional NOx standard all the more unworkable.

Given the inherent challenges of the proposed "optional" NOx standard, the question becomes whether the South Coast's proposal is really a back-door means to incentivize a shift of heavy-duty engine technologies to a specific technology choice - - one not based on traditional fuels and apparently favored by the South Coast. Selecting one technology over another, however, is not a proper use of CARB's standard-setting function, and would amount to a direct contradiction of CARB's long-standing commitment to fuel-neutrality. Engine technology and fuel choices impact many important issues in addition to NOx emission levels - - issues that include overall life-cycle emissions, relative fuel economy, infrastructure, cost-effectiveness, customer acceptance, GHG impacts, and many other important considerations. Accordingly, without conducting the wide-ranging and comprehensive analyses that would be necessary, CARB should not accept on faith what may amount to indirect advocacy in favor of the South Coast's technology choices for heavy-duty applications. And, more to the point, CARB most certainly should not premise the 2012 SIP on an unstudied abandonment of fuel-neutrality for heavy-duty engines and vehicles.

Finally, the proposed "optional" NOx limit is intended to restrict incentive funding to engines and vehicles that can meet the optional NOx standard. In reality, however, the optional standard will not just restrict incentive funding, it will eliminate the availability of incentive funding altogether, since both heavy-duty engine technologies and emissions-measurement technologies are likely incapable of meeting the zero-equivalent optional NOx standard. Moreover, setting the bar for incentive funding so low means that CARB will forego incentivizing all of the cost-effective emissions reductions that could be provided by the as-yet-to-be-developed engine technologies that could feasibly meet NOx emission levels above 0.01 g/bhp-hr yet significantly below the current standard of 0.20 g/bhp-hr. Foregoing incentives for such a wide swath of potential near-zero emission technologies seems, at best, ill-advised. In

addition, given the importance and tremendous efficacy of CARB's programs to accelerate the deployment of new technology diesel engines ("NTDE") for almost all heavy-duty applications and fleets across the State, it is difficult to understand how the effective elimination of incentive funding for virtually all ultra-clean heavy-duty engines and vehicles could help to advance the sound public policy choices that CARB has made to date to promote NTDE. It is therefore similarly difficult to understand how CARB could approve the recommended SIP measure without acting in an arbitrary and unreasonable manner.

Conclusion

Accordingly, and for all the foregoing reasons, CARB should not approve proposed control measure ADV-01 as a component of the South Coast SIP.

Respectfully submitted,

TRUCK AND ENGINE MANUFACTURERS ASSOCIATION

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