State of California
AIR RESOURCES BOARD

**Final Statement of Reasons for Rulemaking,
Including Summary of Comments and Agency Response**

PUBLIC HEARING TO CONSIDER TECHNICAL STATUS AND PROPOSED REVISIONS TO ON-BOARD DIAGNOSTIC SYSTEM REQUIREMENTS FOR HEAVY-DUTY ENGINES, PASSENGER CARS, LIGHT-DUTY TRUCKS, MEDIUM-DUTY VEHICLES AND ENGINES

Public Hearing Date: **August 23, 2012**
Agenda Item No.: **12-5-2**

I. GENERAL

The Staff Report: Initial Statement of Reasons for Rulemaking (Staff Report), entitled "Technical Status and Revisions to Malfunction and Diagnostic System Requirements for Heavy-Duty Engines (HD OBD) and Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II)", released July 5, 2012, is incorporated by reference herein.

In this rulemaking, the Air Resources Board (ARB or Board) approved the adoption of amendments that primarily modify the monitoring and performance requirements of OBD II systems in diesel fueled medium-duty vehicles, the monitoring and performance requirements of HD OBD systems, and the enforcement provisions applicable to OBD II systems and HD OBD systems.

On July 5, 2012, ARB published a notice for an August 23, 2012 public hearing to consider the proposed regulatory action. The Staff Report was also made available for public review and comment beginning July 5, 2012. The Staff Report provides the rationale for the proposed amendments. The text of the proposed amendment to title 13, California Code of Regulations (CCR), sections 1968.2, 1968.5, 1971.1, and 1971.5 was included in Appendices to the Staff Report. These documents were also posted on ARB's website for the rulemaking at http://www.arb.ca.gov/regact/2012/hdobd12/hdobd12.htm.

On August 23, 2012, the Board conducted a public hearing and received oral and written comments. At the conclusion of the hearing, the Board adopted Resolution 12-29 that covered the proposed amendments to title 13, CCR sections 1968.2, 1968.5, 1971.1, and 1971.5 that were initially proposed by staff and described in the Notice of Public Hearing (45-Day Public Notice) and Staff Report, along with modifications suggested by staff in a document entitled "Staff's Suggested Modifications to the Original Proposal" Amendments" that was distributed at the hearing and that was Attachment E to the Resolution.

The modifications were made in response to comments received after the Staff Report was published on July 5, 2012, as part of the 45-day notice. These modifications include changes to the required monitoring conditions for the diesel misfire monitor requirements in the HD OBD and OBD II regulations, clarifications to the readiness status and test results requirements in the HD OBD regulation, deletion of the service information requirements in the HD OBD regulation, clarifications to the definition of "emission standard" in the HD OBD and OBD II regulations, and various changes to correct errors and improve clarity.

In accordance with Government Code section 11346.8, Resolution 12-29 directed the Executive Officer to adopt the proposed amendments to title 13, CCR sections 1968.2, 1968.5, 1971.1, and 1971.5 as proposed by staff and as modified in accordance with Attachment E to Resolution 12-29, to determine if additional modifications to the originally proposed amendments were appropriate, and if the Executive Officer so determined, to make the modified regulatory language available for public comment for a period of at least 15 days before taking final action to adopt the amendments. The Executive Officer was also directed to consider such written comments that were submitted during the public comment period, to make such modifications as may be appropriate in light of the comments received, or to present the amendments to the Board for further consideration if warranted in light of the comments.

Subsequent to the August 23, 2012 public hearing, staff proposed modifications to the originally proposed amendments to title 13, CCR sections 1968.2, 1968.5, 1971.1, and 1971.5. The text of the proposed modifications to the originally proposed amendments, and additional supporting documents were made available for a supplemental 15-day comment period by issuance of a "Notice of Public Availability of Modified Text." This Notice and the attachments thereto were mailed on January 4, 2013 to all stakeholders, interested parties, and to other persons generally interested in ARB's rulemaking requirements applicable to OBD II and HD OBD systems. The "Notice of Public Availability of Modified Text" listed the ARB website from which interested parties could obtain the complete text of the regulations that would be affected by the modifications to the original proposal, with all of the modifications clearly indicated, and the additional supporting documents. These documents were also published on ARB's website for this rulemaking http://www.arb.ca.gov/regact/2012/hdobd12/hdobd12.htm. Descriptions of and rationales for the modifications were provided in the attachment to the 15-Day Notice. The 15-Day Notice is incorporated by reference herein. Six written comments were received during this 15-day comment period.

Staff additionally made a few minor modifications in the regulatory text after the close of the 15-day comment period to correct typographical errors.

After considering the comments received during the 15-day comment period, the Executive Officer issued Executive Order R-13-005, adopting amendments to title 13, CCR sections 1968.2, 1968.5, 1971.1, and 1971.5.

This Final Statement of Reasons (FSOR) updates the Staff Report by identifying and providing the rationale for the modifications made to the originally proposed regulatory text, including non-substantial modifications and clarifications made after the close of the 15-day comment period. This FSOR also contains a summary of the comments received by the Board on the proposed amendments and the modifications and ARB's responses to those comments.

In the 45-Day Notice for this rulemaking, the ARB referenced a few new Society of Automotive Engineers (SAE) documents and updated several SAE and International Organization of Standards (ISO) documents that would be incorporated by reference in sections 1968.2 and 1971.1. The new and updated SAE and ISO documents that are incorporated by reference in the regulations are:

ISO 15765-4:"Road Vehicles – Diagnostics Communications over Controller Area Network (CAN) – Part 4: Requirements for emission-related systems," February 2011.

SAE J1699-3 – "Vehicle OBD II Compliance Test Cases", December 2009.

SAE J1930-DA "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms Web Tool Spreadsheet", March 2012.

SAE J1979 "E/E Diagnostic Test Modes," February 2012.

SAE J1979-DA "Digital Annex of E/E Diagnostic Test Modes", October 2011.

SAE J2012-DA "Digital Annex of Diagnostic Trouble Code Definitions and Failure Type Byte Definitions", July 2010.

SAE J2403 "Medium/Heavy-Duty E/E Systems Diagnosis Nomenclature," February 2011.

SAE J1939 consisting of:
J1939 Recommended Practice for a Serial Control and Communications Vehicle Network, April 2011;
J1939/01 On-Highway Equipment Control and Communications Network, May 2011;

J1939/13 Off-Board Diagnostic Connector, October 2011;
J1939/21 Data Link Layer, December 2010;
J1939/31 Network Layer, May 2010;
J1939/71 Vehicle Application Layer (Through May 2010), March 2011;
J1939/73 Application Layer—Diagnostics, February 2010;
J1939/81 Network Management, June 2011; and
J1939/84 OBD Communications Compliance Test Cases For Heavy Duty Components and Vehicles, December 2010.

Additionally, the following document has been incorporated by reference in section 1971.1:

ARB Mail-Out #MSC 09-22, "Guidelines for Heavy-Duty On-Board Diagnostic (HD OBD) Certification Data," July 7, 2009.

Existing administrative practice of ARB has been to have technical recommended practices, such as the documents listed above, incorporated by reference rather than printed in the CCR. These documents are referenced and incorporated into the California Code of Regulations because it would be cumbersome, unduly expensive, and otherwise impractical to publish them in the Code. Existing ARB administrative practice has been to have specifications, test procedures, and similar documents incorporated by reference rather than printed in the CCR because these procedures are highly complex technical documents. Because ARB has never printed these types of documents in the CCR, the affected public is accustomed to the incorporation format utilized in sections 1968.2 and 1971.1. Moreover, printing portions of the documents in the CCR when the bulk of the procedures are incorporated by reference would be unnecessarily confusing to the affected public. Additionally, the documents from SAE and ISO are copyrighted and are available only for purchase on the organizations' websites. The full documents are instead available for public inspection from the Clerk of the Board at 1001 I Street, 23rd floor, Sacramento, California 95814.

Fiscal Impacts of Proposed Changes

Pursuant to Government Code sections 11346.5(a)(5) and 11346.5(a)(6), the Executive Officer has prepared an estimate in accordance with instructions adopted by the Department of Finance, and determined that the regulatory action would not create overall costs or savings to any state agency or in federal funding to the state, costs or mandate to any local agency or school district whether or not reimbursable by the state pursuant to part 7 (commencing with section 17500), division 4, title 2 of the Government Code, or other nondiscretionary cost or savings to state or local agencies.

The Board has also determined, pursuant to CCR, title 1, section 4, that the proposed regulatory action may affect small businesses. The Board estimates that there nine alternate-fueled conversion manufacturers, some of which may be considered "small businesses", although the exact number cannot be determined. One of these manufacturers is located in California. A typical small business alternate-fueled engine conversion manufacturer converts up to 500 diesel or gasoline engines per year to run on alternate fuels. An analysis was conducted that estimates the total incremental cost of the proposed amendments on such a small business at $228 per vehicle. Such small businesses are expected to pass these costs onto the purchaser of the engine in the form of increased retail price for the converted engine.

Consideration of Alternatives

For the reasons stated in the Staff Report and the Board's response to comments in this FSOR, the Board has further determined that no alternative considered by the agency or brought to the attention of the agency would be more effective in carrying out the purpose for which the regulatory action was proposed or would be as effective and less burdensome to affected private persons than the action taken by the Board.

II. SUMMARY OF COMMENTS AND AGENCY RESPONSES

At the August 23, 2012 hearing, ARB received written comments and/or oral testimony from:

Ms. Lisa Stegink, Truck and Engine Manufacturer's Association (EMA)
Mr. Mark Stepper, Cummins Inc. (Cummins)
Dr. Rasto Brezny, Manufacturers of Emission Controls Association (MECA)
Mr. Christopher C. Jones, BAE Systems (BAE)
Mr. Yisheng Zhang, Parker Hannifin Corporation (PH)

Written comments in response to the 45-Day Notice were received during the 45-day comment period prior to the hearing from:

Mr. Joseph Kubsh, MECA
Mr. Jed R. Mandel and Ms. Lisa A. Stegink, EMA
Mr. Stephen J. Trichka, BAE
Mr. Markus Richter, Mercedes Benz (Mercedes)
Ms. Laurie B. Tuttle, Allison Transmission Inc. (Allison)
Ms. Julie Becker, Alliance of Automobile Manufacturers (Alliance)

Written comments in response to the 15-Day Changes were received during the 15-day comment period from:

Mr. Joseph Policarpio, GILLIG LLC (GILLIG)
Mr. James Wilhelm, Santa Clara Valley Transportation Authority (VTA)
Ms. Lisa A. Stegink and Mr. Timothy A. French, EMA

Daimler Trucks North America LLC (DTNA)

A written comment was received from Mr. Ashim Manchanda of Mercedes, but it was identical to a comment submitted by Mercedes during the 45-day comment period and did not pertain to any of the 15-day changes.

Another written comment was received from an individual, but that comment consisted of a sales pitch and did not pertain to any of the 15-day changes.

Set forth below is a summary of each comment regarding the regulatory action and the agency response to that comment, including an explanation of how the regulation was changed to accommodate the comment or the reason(s) for not making a change to the regulation. Comments not involving objections or recommendations specifically directed toward this rulemaking or to the procedures followed by ARB in this rulemaking are not included. The comments have been grouped by topic wherever possible.

45-DAY COMMENTS

COMMENTS IN SUPPORT

1. Comment: We support the proposal, specifically the in-use monitoring performance requirements for the catalysts, PM filter and PM sensor and the revisions to the PM filter, NOx sensor, and NOx catalyst monitor thresholds for the 2013 through 2015 model years, since it will better align the OBD requirements with the state of development of sensors (NOx and PM) integral to OBD systems. We support the proposed delay and higher NOx thresholds for the NOx catalyst on medium-duty and heavy-duty engines during the 2013 to 2015 timeframe. Though NOx sensor technology has advanced significantly over the years to the level of accuracy today (+/-10% or +/-10ppm), the additional time will allow engine manufacturers to better integrate and optimize their NOx catalyst monitors. We agree with the proposed +0.2 g/bhp-hr NOx threshold in 2017. We agree with requiring identical thresholds for the NOx sensor and NOx catalyst monitors. (MECA)

2. Comment: MECA is also working with customers to be fully integrated with PM sensors, which are not yet commercially available across all manufacturers, by the 2015 time frame. We therefore support the threshold revisions and PM sensor failure mode flexibilities to better match the capabilities of current monitoring technologies while providing more time for full implementation of PM sensors and sensor monitoring out to 2016 for medium- and heavy-duty engines. It is reasonable to provide flexibilities to vehicles that implement tighter PM monitoring limits in 2014 and 2015 to fully implement the final thresholds in 2017. (MECA)

3. Comment: We support the proposed delay of nitrogen oxide feedgas monitoring for oxidation catalysts and catalyzed PM filters and NMHC conversion monitoring for catalyzed PM filters, which will align the heavy-duty requirements with the medium-duty requirements that were recently implemented. (MECA)

4. Comment: We support requiring evaporative system monitors on heavy-duty LPG engines in the 2018 timeframe, since evaporative system monitoring is an established technology on light-duty gasoline vehicles and can easily be integrated on these heavy-duty alternate fueled engines. (MECA)

5. Comment: We believe that this proposal achieves the right balance between technically achievable monitoring thresholds and timelines that stimulate sensor technology development to achieve the objectives of the regulation and insure that catalysts and filters are delivering the necessary emission performance over their full useful life and beyond. (MECA)

6. Comment: EMA supports allowing a three-year phase-in for continuous misfire monitoring in the OBD II and HD OBD regulations, since it is essential to addressing manufacturers' concerns about their abilities to achieve repeatable and representative misfire detection. (EMA)

7. Comment: EMA supports the proposed test-out provisions for the PM filter NMHC conversion efficiency monitoring requirement, the diesel oxidation catalyst (DOC) feedgas monitoring requirement, and the fuel injector tolerance compensation factor monitoring requirement. (EMA)

8. Comment: EMA supports ARB staff's policy stated in the Staff Report that the deficiency "clock" would be reset if the required monitor emission threshold is changed. (EMA)

   Agency Response to Comments 1-8: We appreciate the comments.

DEFINITION OF "EMISSION STANDARD"

9. Comment: In light of the Superior Court's ruling in Engine Mfrs Ass'n v. California Air Resources Board, No. 2010-00082774-CU-MU (EMA v. ARB) finding the HD OBD provisions requiring manufacturers to conduct in-use self-testing of engines and to order recall to be invalid, ARB must recognize the invalidation of those provisions before attempting any further amendments to the program. Indeed, as detailed below, ARB is seeking to amend recall provisions that have been expressly ruled to be invalid and of no effect. Any such attempted amendment is necessarily invalid and of no effect as well. Accordingly, before proceeding further with any of the proposed amendments at issue in this iteration of rulemaking, ARB needs to take specific account of all of the prior amendments that have been determined to be unlawful and invalid. Not doing so will only spawn additional litigation, judicial mandates and

sanctions that should otherwise be unnecessary if ARB simply abides by the pending order of the Superior Court. (EMA)

Agency Response: Please see Agency Response to Comment 56 below. ARB has appealed the decision of the lower court, and the appellate court will review that decision *de novo.* EMA has never sought to enjoin nor has any court granted an injunction or stay requiring ARB to immediately amend its regulations as EMA requests while ARB's appeal is pending review.

10. Comment: One of the series of revisions that ARB staff have proposed to the HD OBD rule and to the OBD II rule is the addition of a newly-minted definition of the term "emission standard." ARB staff have proposed to add this definition to the regulations presumably so that ARB can try to bolster its claim (i) that the OBD malfunction criteria are emission standards, and (ii) that failures to satisfy the OBD malfunction criteria amount to violations of emission standards, which in turn can lawfully allow ARB to insist on an engine recall under Health and Safety Code (HSC) §43105.

    As an initial matter, it seems apparent that ARB staff formulated and inserted their proposed definition prior to the issuance of the final judgment by the California Superior Court on July 18, 2012, in *EMA v. ARB*. In that case, as noted above, the Superior Court ruled that the manufacturer-run in-use testing provisions of the HD OBD regulations, as well as the mandatory recall provisions (see CCR, title 13, sections 1971.1(l)(4), 1971.5(c), 1971.5(d)(l)-(4) and (6)-(7), 1971.5(e) and 1971.5(f)), are not within the scope of ARB's authority and so are invalid. Thus, the proposed regulatory revisions at issue have, in effect, been superseded and mooted by the recent decision of the California Superior Court. The OBD-related in-use testing and recall provisions that ARB seeks to amend have been judicially determined to be in excess of ARB's statutory authority and, therefore, invalid. Simply stated, ARB is seeking to amend an in-use testing and recall program that is invalid and of no effect. As a consequence, the amendments at issue are inherently invalid as well. ARB cannot revise or amend regulations that have been struck down. (EMA)

    Agency Response: Please see Agency Response to Comments 9 and 56. While continuing to reserve all arguments raised in the lower court that ARB has authority to adopt HD OBD enforcement procedures, ARB determined that the most prudent action would be for it to amend the regulation expeditiously to cure the perceived defects identified by the lower court regarding ARB's authority and to make it clear to all regulated stakeholders as expeditiously as possible that OBD systems are emission standards and fully enforceable under California law. To wait in the

expectation of the appellate court overturning the lower court's decision, ARB would unnecessarily risk that manufacturers would slip in their compliance believing that ARB had no enforcement authority. This would potentially undermine the purposes and intent of the OBD regulations and would result in potential lost emission reductions, with consequential adverse effects to the public's health and welfare.

To avoid this potential outcome, ARB took such action to clarify its authority by revising the definition of emission standard to conform to the decisional law interpretation of that term as used in Title II of the federal Clean Air Act (CAA) pursuant to HSC sections 39010 and 39601(b). ARB was not precluded from taking such action as EMA has not pursued, and no court has granted, any injunction prohibiting ARB from attempting to cure any perceived defects. Regarding EMA's claims of definitional gymnastics, the definition adopted by the Board, as stated, fully conforms to the Supreme Court's interpretation of the meaning of emission standard as used by Congress in Title II of the CAA. *EMA v. SCAQMD* (2004) 541 U.S. 246, 253 ["This interpretation is consistent with the use of 'standard' throughout Title II of the CAA (which governs emissions from moving sources)…."]. Finally, ARB timely filed its notice of the proposed amendment to the definition of emission standard and does not understand the relevance of the comment that ARB staff formulated and inserted their proposed definition prior to the issuance of the final judgment.

11. Comment: Even if the proposed revisions were not mooted by the Superior Court's recent decision, it is clear that OBD malfunction criteria are not emission standards, under either federal law or California law. Thus, as explained below, the recent determination of the California Superior Court -- that "a malfunction criterion is not an emission standard" -- remains the binding and correct conclusion. ARB asserts that it is entitled to change the operative definition of "emission standard" pursuant to HSC section 39601(b). (See ISOR, p.61.) That section, in relevant part, authorizes ARB to revise certain definitions of terms "in order to conform those definitions to federal laws and rules and regulations." But ARB's new definition of "emission standard" does not conform to the federal definition of "emission standard." Rather, it amounts to a transparent and invalid effort to end-run the Superior Court's recent decision. (EMA)

12. Comment: ARB's goal to conform to the federal definition "applied to Title II by the U.S. Supreme Court in EMA vs. SCAQMD is misplaced, since the Supreme Court was not interpreting the term "emission standard" in Title II but was interpreting the meaning of section 209(a), which preempts states from adopting or attempting to enforce "any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines." SCAQMD, 541 U.S. at 251. The phrase the Court interpreted – "any standard relating to the control of emissions" – is more expansive than "emission standard."

The question before the SCAQMD Court was whether rules imposing emission-related purchase requirements on owners of vehicle fleets in the South Coast were "standards related to the control of emissions" and thus preempted. Starting with the dictionary definition of "standard", the Court concluded that the requirements were preempted under Section 209(a) but did not say they were "emission standards" (which would be counterintuitive) since the term "emission standard" was not before the Court. The Section 209(a) preemption provision is broad to preclude states from adopting their own emission-related requirements to avoid balkanizing the regulation of the design of new motor vehicles across the country, and presumably precludes states from adopting their own OBD requirements as a preempted "standard relating to the control of emissions." An acknowledgment that OBD requirements might "relate" to emissions does not mean they are "emission standards" under federal law or that ARB can legally redefine "emission standard" to include any "design feature related to emissions." (Alliance)

Agency Response to Comments 11 and 12: Please see Agency Responses to Comments 9, 10, and 56. ARB's authority to revise the statutory definition of "emission standard" (codified at HSC section 39027) is set forth at HSC sections 39010 and 39601(b), which provides that ARB may revise certain definitions of terms set forth in Chapter 2 of the HSC (commencing with section 39010 in order "to conform those definitions to federal laws and rules and regulations.") Consistent with the discretion delegated to ARB by the Legislature, ARB has determined that a revised definition of "emission standard," which conforms to the definition expounded by the Supreme Court in *EMA v. SCAQMD*, supra., 541 U.S. at 253, is both prudent and within ARB's legal authority. ARB must have authority to fully enforce its HD OBD regulation – a regulation that EMA does not challenge as outside of ARB's authority – to ensure that significant emission reductions will be achieved from the newest, most stringent heavy-duty engine emission standards and that emission control systems on those engines are durable and reliable. While ARB's authority to enforce its OBD regulation fully has recently been called into question by the California Superior Court decision in *EMA v. ARB*, that decision is now on appeal. As stated, EMA has not requested that ARB be enjoined from attempting to cure the defects found by the lower court, and no court has issued an injunction or stay. Without conceding any arguments before the Court of Appeal that ARB has authority to enforce its regulations, ARB has every right to act preemptively and prudently to make certain that its regulations are enforceable and that it can fully meet the tasked mission and goals of the agency as prescribed by the Legislature.

The amended definition of emission standard conforms to the decisional law of the Supreme Court in *EMA v. SCAQMD.* There the Court was specifically confronted with the question of what is a standard related to the control of emissions and concluded that it relates to the amount of a given pollutant that a vehicle may emit, or a requirement that a vehicle

must be equipped with a certain type of pollution-control device or some other design feature related to the control of emissions. *EMA v. SCAQMD, supra,* 541 U.S. at 253. The Court found that its interpretive definition was consistent with the use of the term used throughout Title II of the CAA and specifically its use in section 202, the section of the CAA that specifically addresses EPA's authority to adopt motor vehicle emission standards. OBD system requirements require that the emission system not emit more than a certain amount of a given pollutant and includes design features related to the control of emissions. It is not insignificant that EPA's authority to adopt OBD standards is set forth at section 202(m) and that EPA has specifically found OBD requirements to be emission standards. See 61 Fed.Reg. 53371 (Oct. 11, 1996).

EMA itself has long recognized that OBD requirements are emission standards under both California and federal law. In the 2009 HD OBD rulemaking, EMA commented:

Many of the proposed HD OBD amendments constitute new emission standards that engine manufacturers must meet before selling their products. Thus, the standards are subject to clear mandates by the U.S. Congress in the federal CAA and by California legislature in state law. As required by CAA Section 209(b), any mobile source emission standards adopted by ARB for on-highway engines and vehicles from over 8,500 lbs. require a waiver of federal preemption from U.S. EPA, must be technologically feasible and cost-effective, and may be implemented only if the requisite lead time and period of stability are provided to manufacturers (according to CAA Section 202(a)). If ARB's standards don't meet these requirements, California cannot obtain the necessary preemption waiver from EPA. (Emphasis added.)

(See 2009 FSOR, Comment 16, page 9, as well as FSORs for 2004 Engine Manufacturer Diagnostic rulemaking in 2004, 2005 HD OBD rulemaking, and 2006 OBD II rulemaking.) In so concluding that OBD requirements are emission standards, EMA specifically relied upon not only the use of the term "standard related to the control of emissions" as used in CAA section 209(b), but also the term standard as used in section 202(a)(3)(C). For discussion of why the lead time and stability requirements of section 202(a)(3)(C) do not apply to OBD emission standards, see Agency Response to Comment 22.

The ARB did not propose that the redefined definition of "emission standard" apply solely to the HD OBD regulation. Concurrent with the HD OBD amendments, ARB amended the definition of emission standard as used in OBD II. The definition was in the first instance added to these regulations because (1) it had long been planned that ARB would be amending these regulations in 2012, and (2) because stakeholders had raised specific questions about whether ARB had authority to fully enforce

and remedy noncompliant OBD systems, which they believed could not be considered emission standards. It is ARB's staff's intent, in the very near future, to propose that the Board apply the broader *EMA v. SCAQMD* definition to other motor vehicle regulations.

13. Comment: The federal definition of "emission standard" is found at section 302(k) of the CAA. That provision of federal law states in relevant part that the terms "emission limitations" and "emission standard" mean a requirement established by the State [of California] or the Administrator [of EPA] which limits the quantity, rate, or concentration of emissions of air pollutants on a continuous basis… (42 U.S.C. §7602(k).) Plainly, ARB's proposed amended definition of "emission standard" does not at all conform to CAA section 302(k) and so is not authorized under HSC section 39601(b). As a result, the Board is not authorized to approve the proposed amended definition of "emission standard."

    In an implicit concession that its definitional gamesmanship does not conform with CAA section 302(k), ARB does not even mention the controlling federal definition of "emission standard," but instead asserts that its proposed redefinition of the term is consistent with the Supreme Court's ruling in *EMA v. SCAQMD*, 541 U.S. 246 (2004). In that case, however, the Court was called upon to interpret the scope of federal preemption under CAA section 209(a), not the definition of "emission standard" under CAA section 302(k). The scope of federal preemption encompasses "any standard relating to the control of emissions." See 42 U.S.C. §7543(a). It is, therefore, broader in scope than the specific statutory definition of the term "emission standard." More fundamentally, the Supreme Court's elucidation of the scope of federal preemption cannot form the basis for ARB's attempt to redefine the term "emission standard." That redefinition, if it is to be valid under HSC section 39601(b), must be premised on CAA section 302(k), not case law interpreting other provisions of the CAA. Thus, ARB's purported reliance on the Supreme Court's 2004 preemption decision is entirely misplaced and unavailing.

    With reference to the actually relevant terms of CAA Section 302(k), an OBD malfunction criterion or threshold is not a numerical tailpipe limit on the "quantity, rate or concentration of emissions of air pollutants" with which an engine or vehicle must comply. Rather, it is a durability or reliability standard that an OBD system component must meet so that it consistently activates a malfunction indicator light (MIL) when warranted. Consequently, it is clear that the federal definition of the term "emission standard" does not encompass an OBD malfunction criterion. As a result, ARB's latest attempt to disguise OBD malfunction criteria as "emission standards" (as opposed to performance specifications for OBD components) remains in violation of state and federal law. (EMA)

    Agency Response: Please see Agency Responses to Comments 9-12 and 56. As stated, the Supreme Court fully considered and addressed the meaning of "any standard relating to the control of emissions of motor

vehicles" (i.e., emission standard), and found the term as interpreted to be consistent with Congress' use of the term throughout Title II of the CAA in *EMA v. SCAQMD*. The definition of the term was central at the Court's decision. In so interpreting the term, the Court found that it was either not appropriate or not necessary to address the applicability of CAA section 302(k) in the context of Title II.

14. Comment: The Board must direct Staff to publish modified regulatory language deleting the proposed definitions of "emission standard," "evaporative emission standards," and "exhaust emission standards or tailpipe emission standards" from the HD OBD rule and from the OBD II rule. The Board must direct staff to delete the other sections of the HD OBD rule that have been invalidated by the Superior Court of California. (EMA)

    Agency Response: For the reasons set forth in Response to Comment 9, ARB is under no legal obligation to delete the proposed definitions of "emission standard," "evaporative emission standards," and "exhaust emission standards or tailpipe emission standards" from the HD OBD and OBD II rules.

15. Comment: OBD requirements are not emission standards and ARB may not legally define OBD as such to justify recall under Health and Safety Code section 43105. We are concerned about the new definitions of "emission standard," "evaporative emission standards," and "exhaust emission standards or tailpipe emission standards" in the light-duty OBD II regulation. ARB acknowledges the new definition is in response to stakeholders' arguments that OBD system requirements do not constitute emission standards and that ARB thus may not order a recall based on only on exceedance of the applicable emission limits. EMA recently prevailed in challenging the mandatory recall requirements under the heavy-duty OBD rule on the grounds that OBD malfunction criteria do not constitute emission standards (*EMA v. ARB*). The court ruled that a "nonconforming OBD system" defined in the ARB regulations "irrespective of whether engines in the engine class, on average, meet applicable tailpipe or evaporative emission standards," does not qualify as an "emission standard" as defined in HSC Section 39027 (i.e., "the specified limitation on discharge of air contaminants into the atmosphere"). The court reasoned that the determination that a vehicle or engine contains a nonconforming OBD system may have no relation to the existence of excess emissions affecting the environment or attainment of air quality standards.

    ARB's new definition of "emission standard" is meant to displace the existing definition in the HSC, but the Alliance believes this is both unauthorized and inadequate. ARB has no authority to displace the section 39027 "emission standard" definition. While ARB says they are allowed under HSC Section 39601(b) to conform the definition with that of the federal EPA, neither the CAA nor U.S. EPA's regulations define

"'emission standard' as it applies to OBD compliance. Moreover, neither the U.S. Code nor the Code of Federal Regulations contains a federal definition that includes "some other design feature related to the control of emissions." (Alliance)

Agency Response: Please see Agency Responses to Comments 9-12 and 56. The commenter misstates ARB's position. It is conforming the definition of emission standard to the decisional law of the U.S. Supreme Court interpreting use of the term in the Clean Air Act, not to any specific definition adopted by EPA. Indeed, the Supreme Court's decision interpreting the meaning of emission standard is fully consistent with the position taken by the American Automobile Manufacturers Association (AAMA) – which at the time represented American automobile manufacturers and preceded the Alliance as the association representing those manufacturers – in the initial OBD II waiver proceedings before EPA. In a letter dated December 1, 1995, the automobile manufacturers stated:

"Requirements for OBD systems are emission control standards under §202 of the Clean Air Act. Congress' decision to include such requirements in the emission standards section of the Act (Section 202) is a clear indication of its intent that OBD requirements are to be considered emission control standards. This intent is confirmed by the relationship between §§ 202(a) and 202(m). Section 202(m) of the Act specifically requires the Agency to promulgate OBD regulations under § 202(a)."

AAMA letter to EPA, Attachment I, page 2.

16. Comment: In the *EMA v. ARB* case, ARB sought to rely on a 1996 EPA decision waiving federal preemption under Section 209(a), where EPA considered whether certain California OBD requirements were "standards relating to emissions" subject to preemption under Section 209(a) and thus requiring a preemption waiver under Section 209(b). ARB took the position that OBD requirements were enforcement procedures rather than standards relating to emissions (1996 waiver decision at 19-20). EPA emphasized that the classification of the OBD requirements was "as a standard for purposes of section 209" (1996 decision at 20). So like the *SCAQMD* case, the EPA waiver decision interpreted the scope of Section 209(a) preemption, not that OBD requirements are "emission standards."

OBD requirements are not "emission standards," under the existing California statutory definition, any CAA definition that ARB is authorized to adopt, or any common sense definition. The existing emission standard definition in HSC section 39027 does not conflict with the CAA or its underlying regulations. The Superior Court in *EMA v. ARB* ruled that OBD requirements are not limitations on the discharge of air contaminants into the atmosphere. The CAA imposes other emission monitoring requirements such as those on stationary sources (e.g., continuous

emissions monitoring system in a smokestack), but it's common sense that such a device is used to monitor compliance with emissions standards and the monitoring requirements is not an emissions standard itself. EPA's mobile source regulations do not define "emission standard" to include OBD. (Alliance)

Agency Response: Please see Agency Responses to Comments 9-12, 15, and 56. As stated in the response to Comment 15, the relevant inquiry here is whether the Supreme Court interpreted the meaning of emission standard as applicable to mobile sources under Title II, and not EPA's waiver determination, although one could say that EPA's analysis regarding OBD systems being emission standards is fully consistent with the Supreme Court's interpretation that under Title II, an emission standard includes design features related to the control of emissions.

As stated in earlier responses, ARB continues to believe that it has the authority under existing California law to adopt OBD compliance and enforcement provisions, including taking corrective actions through recall. As stated, ARB revised the definition to help ensure that the regulations continue to be fully enforceable, will achieve needed emission reductions for the purpose of protecting the public's health and safety, and provide necessary notice to affected stakeholders that OBD requirements are unquestionably emission standards. Finally, the commenter's assertion that "EPA's mobile source regulations do not define 'emission standard' to include OBD," is misplaced. In agreement with comments of AAMA, EPA has stated that its general authority to set standards for new vehicles is found at CAA section 202 and that subsection 202(m) specifically states that federal OBD requirements shall be promulgated under subsection 202(a). In other words, federal OBD requirements are emission standards.

LEAD TIME, FEASIBILITY, AND COST-EFFECTIVENESS

17. Comment: We have frustrations with the process that has followed for these complicated and demanding regulations. These amendments were heard at the August 2012 hearing to deal with products that will be built a few months later. Many manufacturers already submitted their OBD certification documents to ARB for approval. These rules get finalized years ahead of certification dates, not months. (Cummins)

18. Comment: ARB's review of technology and changes to requirements during a biennial review cannot wait – as it is happening right now – until after the model year for new requirements have already started, and when manufacturers have invested their limited resources in meeting regulatory requirements and under time constraints to certify their products. Manufacturers need certainty in the standards and timeframe to meet them so they may use their limited resources most effectively. There are a number of ways ARB's rulemaking process, and this rule in particular, disregards the real notice and timing issues that manufacturers face. The

most obvious of these is the proposal for new continuous misfire monitoring with less than sufficient lead time. In other words, ARB is making changes to the rule and adding new requirements when it is already far too late in the design, engineering and production processes that manufacturers must utilize. (EMA)

Agency Response to Comments 17-18: Proposed amendments that apply to model years currently being built are generally relaxations of current requirements that were specifically requested by industry so that they can certify their products without issues. While the manufacturers have made a good faith effort and have advanced OBD capability beyond the 2010 requirements, their progress has fallen short of meeting the previous more stringent 2013 requirements, which is the basis for the relaxations. However, manufacturers would not have put in the effort to meet these requirements had the thresholds been higher and less stringent in the previous years. Additionally, the manufacturers would eventually be required to meet the stringent requirements in the near future, and would more likely be able to meet them within the required deadlines if they started the work early. Thus ARB staff does not believe manufacturers' efforts trying to meet the previous stringent requirements were a waste of resources like manufacturers believe. Other proposed amendments (e.g., in-use monitor performance requirements) that apply to current model years are related to previous requirements that required manufacturers to propose a plan (for Executive Offer approval) to meet the requirement, with the amendments now specifying criteria that Executive Officer has been approving for manufacturers. These amendments will not require any more resources and time for manufacturers to meet. Proposed amendments that are more stringent or designate new requirements have been given enough lead time and start with the 2016 model year at the earliest, including the continuous misfire monitoring requirement mentioned above.

19. Comment: Many of the proposed HD OBD amendments constitute new or changed requirements that engine manufacturers must meet before selling their products. Thus, the requirements are subject to clear mandates by the U.S. Congress in the federal CAA and by California legislature in state law. Any mobile source emission standards adopted by ARB for on-highway engines and vehicles from over 8,500 lbs. require a waiver of federal preemption from U.S. EPA, must be technologically feasible and cost-effective, and may be implemented only if the requisite lead time and period of stability are provided to manufacturers. Section 209(b) of the CAA requires ARB's emission standards to be consistent with Section 202(a) for EPA to waive federal preemption and allow California to enforce its own emission standards. Unless ARB demonstrates that the standards are technologically feasible and cost-effective and provided sufficient lead time and stability to engine manufacturers, California cannot obtain the necessary preemption waiver from EPA. (EMA)

Agency Response: In Resolution 12-29, the Board directed staff to request a new waiver from U.S. EPA if needed, and made all the necessary findings necessary to obtain a waiver. Contrary to the unsupported assertions of the commenter, the staff report fully supports the findings of the Board that the requirements of this regulation are technologically feasible and cost-effective. Although technological feasibility and cost-effectiveness, along with a finding that the regulations are necessary, are requirements under California law (Health and Safety Code section 43013), cost-effectiveness is not a required element for granting a waiver under section 209(b) of the CAA. Additionally, the OBD requirements are not subject to the lead time and stability requirements specified in the CAA. See agency response to comments 20-22 for more details.

20. Comment: ARB must adopt OBD requirements that are technologically feasible. However, staff has failed to justify the technological feasibility of many of the proposed requirements. According to CAA Section 209(b), which authorizes California to adopt emission standards for mobile sources only if certain conditions are met, the standards must meet CAA Section 202(a), which requires that, among other things, "standards must reflect the greatest degree of emission reduction achievable through the application of technology…determine[d to] be available for the model year to which such standards apply, giving appropriate consideration to cost, energy, and safety factors associated with the application of such technology." California law also requires that emission standards be justified and technologically feasible (Health and Safety Code §43013). Manufacturers have spent and continue to spend significant resources in meeting the OBD requirements, and are forced to expend resources each time changes to the OBD rule are adopted to meet the new technological challenges. Yet many times, those challenges were proven to be infeasible requiring last minute changes and wasting manufacturers' limited resources. As ARB staff explained in the staff report, some of the thresholds and requirements that ARB adopted in 2005 for HD OBD and amended in 2009 were not feasible and must now be revised. While ARB can set technology-forcing standards, it has an obligation to set standards that reasonably can be projected to be technologically feasible. Manufacturers should not be required to expend time and effort (i.e., their limited resources and precious test cell time) in trying to develop costly monitoring strategies that are not feasible. (EMA)

Agency Response: Contrary to the unsupported assertions of the commenter, the staff report fully supports the findings of the Board that the requirements of this regulation are technologically feasible. Further, the proposed amendments have set forth technically feasible monitoring requirements, and it is not expected to make significant changes to the regulation in the future. As required, staff has identified methods that are already in-use or could be used to meet each proposed monitoring requirement, determined that such methods will likely succeed in getting there, and addressed all technical issues regarding the monitoring requirements raised by industry. Additionally, several of the amendments

relax previously adopted monitoring thresholds to a higher emission level. The 2009 amendments were not made because the initially adopted requirements were technically infeasible. Staff recommended interim relief due to the complexity of the 2010 emission control solutions being pursued by several manufacturers—including some configurations that appear to be negatively impacting OBD monitoring capability. As stated during the original rulemaking for HD OBD, manufacturers must take OBD monitoring capability into account when designing and calibrating emission control solutions to achieve a solution that meets all ARB requirements, not just some of them. Nonetheless, staff felt some interim relief was needed because of the last minute struggles some manufacturers were having in meeting the 2010 heavy-duty vehicle emission standards with the emission control solutions that they had chosen to pursue. This, in turn, left their OBD engineers with very little time to address the OBD monitoring requirements (i.e., to discover the key design factors they needed to influence and modify to allow for OBD compliance). Staff expected that the interim relief would provide additional stability and time for the OBD engineers to improve their capability and/or better influence the design to ensure an integrated and fully compliant solution, especially for those that have a less then optimal configuration in 2010. As historically has happened, manufacturers will likely gravitate toward solutions that provide for full compliance especially as they gain experience in-use as well as evaluate competitor's solutions. The resources that manufacturers have spent working towards complying with the OBD requirements, including those that staff eventually relaxed with this rulemaking, were not wasted. The vast majority of the resources were still essential for manufacturers in developing and implementing the monitor even at the relaxed, less stringent threshold. Further, for monitoring requirements where staff relaxed the thresholds, some manufacturers were on track to meet the previous, tighter thresholds, which demonstrates that the thresholds were technically feasible to achieve, but several manufacturers had not been as successful. Thus, in reviewing the industry status as a whole and taking into account that manufacturers were substantially expanding from OBD systems on one engine family to OBD systems on all engine families in the 2013 model year, staff felt that relief for a few specific monitors was warranted. Considering these modifications and relaxations only affected a small number of the total individual monitoring requirements, staff's original assessment of what was technically feasible in the scheduled implementation time frame was predominantly on target.

21. Comment: The proposed amendments must be cost-effective according to both federal and state law. Section 202(a) of the CAA requires the Board to consider cost and other related factors in setting new heavy-duty engine and vehicle emission standards. The California HSC establishes a similar mandate for ARB, requiring the Board to adopt emission standards which will result in the most cost-effective combination of control measures on motor vehicles and fuel. And California Government Code sections 11346.3 and 11346.5 require the Board to assess the proposal's

economic impact. The ARB staff has not met the burden of showing its proposal is cost-effective. Staff has both underestimated the costs to engine manufacturers and vehicle owners and has not fully analyzed the cost-effectiveness (the costs vs. the emission benefits). ARB's cost effectiveness and emissions benefit discussion in the staff report is faulty in two ways. First, it based its cost estimates on manufacturers' nationwide sales of engines and vehicles, which is misleading and improper since this is a California rule. Second, it points to ARB's previous analysis of cost-effectiveness from the 2009 amendments to the OBD rule, which were based on the 2005 adoption of the HD OBD regulation. ARB relies on past analysis nearly a decade old for its current rulemaking, which is inherently unreasonable. It is not realistic to assume that heavy-duty manufacturers will meet the extremely complex, ever-more-stringent OBD requirements and increase engine durability while holding down the cost of new products as ARB estimates. Further, ARB failed to assess the cost impact and anticipated benefits of 2012 requirements. EMA questions whether ARB could justify any of those requirements if it were to properly analyze and assess the OBD rule and its costs against the anticipated emissions benefits. ARB must conduct a thorough, updated and focused analysis on the amendments to determine their true costs for manufacturers and consumers as well as their true benefits to air quality. (EMA)

Agency Response: The staff disagrees. The staff's calculations, developed with input from engine manufacturers, did include all costs to the engine manufacturers for development, calibration, testing, personnel, and hardware costs to sufficiently cover all of the proposed requirements. Further, for heavy-duty diesel engines, all but one of the proposed changes with this rulemaking do not materially impact the costs to develop or implement a compliant OBD system, which incorporates the most recent amendments, making the cost estimates from the original rulemaking in 2005 appropriate. As discussed in the staff report and the 15-day notice, the additional costs associated with the reporting requirement for the more comprehensive diesel misfire monitoring requirements (that begin in 2016) are expected to result in an incremental retail price increase of $0.59 per vehicle. Also as discussed in the staff report and 15-day notice, for alternate-fueled heavy-duty engines, the associated costs to implement full OBD systems two years earlier than previously required are expected to result in an incremental retail price increase ranging from $23 to $228 per vehicle for these two years. Regarding cost-effectiveness being a criterion for receiving a waiver under the CAA, see agency response to comment 16 above.

22. Comment: The HD OBD regulation must provide sufficient lead-time and a period of stability. Engine manufacturers need sufficient time to develop OBD technology that is feasible and practical. California law requires that the standards must be adopted within reasonable time frames (HSC section 43013). Section 202(a) of the CAA requires that any new emission standards may go into effect only four or more full model years

after the year in which they were promulgated, and those new standards must stay in effect for at least three full model years before ARB may establish another standard. Providing reasonable notice of the requirements that manufacturers must meet and giving them enough time in which to attempt to comply with the requirements is not just a legal or academic exercise - it is essential to the way manufacturers do business. Unless California meets these requirements, it has no authority to adopt emissions standards for on-highway heavy-duty engines. (EMA)

Agency Response: The commenter submitted the same comments regarding lead time and stability during the engine manufacturer diagnostic (EMD) rulemaking in 2004, the HD OBD rulemaking in 2005, the OBD II rulemaking update in 2006, and the HD OBD rulemaking update in 2009. In each of these rulemakings, ARB had provided a detailed response indicating why the federal lead time and stability provisions do not apply to the OBD regulations (see the Final Statement of Reasons for Rulemaking for the EMD, heavy-duty OBD, and OBD II regulations). Yet, the commenter has given the same comments again for this rulemaking. Thus, the following response is essentially the same as those given in the previous rulemakings.

Regarding the commenter's lead time and stability arguments, since 1970, U.S. EPA has typically applied a "two-pronged" test of whether California standards are consistent with CAA section 202(a) as required by section 209(b)(1)(C). The standards first must be technologically feasible in the lead-time provided considering the cost of compliance, and second must be compatible with the federal test procedures so that a single vehicle could be subjected to both tests. No more should be required.

This is in accord with the legislative history of section 209. When the California waiver provisions and the "consistent with section 202(a)" language were first placed in the CAA in 1965, section 202(a) consisted of just one sentence requiring adequate lead time in consideration of technological feasibility and economic costs. In the 1977 CAA amendments, Congress amended section 209 "to afford California the broadest possible discretion in selecting the best means to protect the health of its citizens and the public welfare." (H. R. Rep. No. 294, 95th Cong., 1st Sess. 301 (1977), reprinted in 4 Leg.Hist., at 2768.) At the same time, Congress expanded section 202(a) to add several directives to U.S. EPA regarding its adoption of emission standards, including the four-year lead time requirement for heavy-duty vehicles. (Emphasis added.) Given Congress's expressed intent to strengthen the waiver provisions, it is unlikely Congress intended to apply the specific four-year requirement to California, which would effectively narrow the deference provided to the state.

This is especially true in the case of OBD requirements. Congress clearly did not intend the OBD requirements to be subject to the lead-time and stability provisions of CAA section 202(a)(3)(C). First, as indicated above,

those requirements were first enacted in 1977 and specifically applied to heavy-duty vehicle emission reductions, which at that time solely consisted of tailpipe and evaporative emission standards that Congress directed U.S. EPA to implement for new heavy-duty vehicles. (1977 CAA, section 202(3)(B).)

It was not until the 1990 CAA amendments that Congress enacted an entirely new provision, section 202(m), which directed the Administrator to adopt regulations to implement OBD requirements. Under the new provision, Congress directed the Administrator to promulgate regulations for new light-duty vehicles and light-duty trucks within 18 months of enactment. (CAA section 202(m)(1).) Additionally, at the Administrator's discretion, Congress provided U.S. EPA with equivalent authority to adopt OBD requirements for new heavy-duty vehicles. (Id.) The federal CAA further provided that the effective date for those regulations initially adopted under section 202(m) shall be the model year 1994, unless the Administrator postpones application for certain classes and categories of vehicles until the 1996 model year. The Administrator could decide to delay implementation for reasons that the OBD requirements were infeasible or to be consistent with the policies adopted by the ARB. (CAA section 202(m)(2).) Thus, theoretically, under the provisions of CAA section 202(m), the Administrator had effective authority to promulgate and implement OBD requirements for heavy-duty vehicles as early as the 1994 model year. Assuming that such requirements were adopted in June 1992 (18 months after the enactment of the CAA), Congress would have provided less than the requisite time allowed for implementation under CAA section 202(a)(3)(C). Accordingly, it would be appropriate to infer that Congress never intended that the OBD requirements be subject to the lead-time provisions of section 202(a)(3)(C).

This is confirmed by the administrative actions of U.S. EPA. Although the Administrator initially chose not to adopt OBD requirements for heavy-duty vehicles (58 Fed.Reg.9485 (February 19,1993)), OBD requirements were subsequently adopted and applied to medium-duty passenger vehicles (a subclass of heavy-duty vehicles). (64 Fed.Reg.23925 (May 4, 1999).). Adopted federal regulations provide, "Except as otherwise indicated, the provisions of this subpart apply to new 2001 and later model year Otto-cycle and diesel cycle light-duty vehicles, light-duty trucks, medium-duty passenger vehicles ["MDPVs"] . . .." (40 Code of Federal Regulations ("CFR"), subpart, S §86.1801-01. Emphasis added.) Under the Administrator's adopted definition, a heavy-duty vehicle is defined as "any motor vehicle rated at more than 8,500 pounds GVWR [gross vehicle weight rating] or that has a vehicle curb weight of more than 6,000 pounds or that has a basic vehicle frontal area in excess of 45 square feet. (40 CFR 1803-01.) MDPV is defined as "any heavy-duty vehicle . . . with a [GVWR] of less than 10,000 pounds that is designed primarily for the transportation of persons." (Id). The specific OBD requirements were set forth in section 86.1806-01 of the same regulation and provide that certain MDPVs, as well as light-duty vehicles and trucks, are required to meet the

OBD standards set forth therein. An exception applied to diesel-fueled, chassis-certified MDPVs and engine-certified diesel engines used in MDPVs, but no exception exists for Otto-cycle MDPVs, which are subject to the requirements of section 1806-01. (40 CFR 1806-01(a)(2). These vehicles were only subject to the requirements if the exhaust emission certification of the applicable test group is being carried across from a California configuration to which California OBD II requirements are applicable.) The OBD provision does not provide for a separate and distinct implementation date for MDPVs to meet the OBD requirement. Accordingly, under the terms of section 1806-01, the 2001 and later model year implementation requirements would deem to be applicable to the OBD requirement. In such a case, the lead-time provided under the regulations would be less than two years from the May 4, 1999 initial promulgation date of the regulation.

Section 1806-05, which establishes OBD requirements for heavy-duty vehicles weighing 14,000 pounds GVWR or less, including diesel-powered MDPVs, provides a similarly abbreviated lead-time period. (68 Fed.Reg. 35800, June 17, 2003, 40 CFR section 1806.05.) The regulations were adopted in June 2003 and apply to 2005 and later model year vehicles. The lead-time again is well below the minimum four years of lead-time required under section 202(a)(3)(C). For the foregoing reasons, the only reasonable inference is that Congress did not intend that the provisions of CAA section 202(a)(3)(C) apply to OBD requirements and specifically not to California adopted OBD requirements.

In granting California a waiver for the HD OBD regulation in 2008, EPA did not consider the lead time and stability provisions of CAA section 202(a)(3)(C).

MONITORING REQUIREMENTS

23. Comment: Regarding the proposed phase-in schedule for the NOx converting catalyst and NOx sensor monitors in the HD OBD regulation, while the phase-in is directionally helpful for manufacturers, ARB did not go far enough in accounting for the realities of the technologies required to meet such stringent requirements.

    There are only small differences between the “generation 2.0” NOx sensor available for the 2010 model year (tolerances of +/-15ppm in the 0-100ppm range and +/-15 percent above 100ppm) and the marginally better “generation 2.5” sensor available for the 2013 model year (tolerance +/-10ppm in the 0-100ppm range and +/-10% above 100ppm). If the generation 2.5 sensor is used to meet the proposed 2016 model year threshold of 0.2 g/bhp-hr above the NOx standard, there will be too little separation between a failure and passing conditions to assure a robust monitoring strategy. To make a proper evaluation of the NOx sensor, many important inputs are considered. The NOx sensor values are compared to a modeled NOx level, and with a perfectly tuned model

considering humidity, ammonia slip, etc., the sensor tolerance will be the only noise factor to account for. The NOx sensor signal can be used to both control the target selective catalytic reduction (SCR) efficiency and monitor the catalyst efficiency. Since two NOx sensors are the common setup, SCR efficiency is important for the evaluation and stable conditions are required to get good evaluation conditions. The NOx sensor monitor is performed in the 150-190ppm NOx range during stable conditions, and tests show that for an average NOx level of 180ppm for a good performing system (SCR efficiency at 90 percent), the sensor tolerances will impact the monitors and especially the minimum level of the sensor. A NOx sensor with a tolerance of 10 percent below nominal will present an actual conversion efficiency of 80 percent when targeting 90 percent. The OBD threshold of two times the emission standard will be reached when the conversion efficiency decreases to ~84 percent and the NOx sensor monitor will not be able to separate a fault from a good system. Too low thresholds, which results in non-robust monitors, will have a negative impact on the engine manufacturers' product and customers.

Regarding the SCR monitor, the dynamics of the SCR system and its control present significant challenges (the same challenges across manufacturers regardless of catalyst substrate, precious metal coating, and control system design) when attempting to detect a malfunction at a threshold of 0.2 g/bhp-hr above the applicable NOx standard. SCR conversion efficiency and NH3 storage dynamics impact the diagnostic design. Modern SCR systems are capable of optimal conversion efficiency in excess of 90 percent, with outlet NOx less than 10 percent of intake NOx. Thus, a system degraded to the level required to be detect by OBD is still a highly functioning system. Compounding this problem, the instantaneous conversion efficiency of a good catalyst can change dramatically given its operating conditions (temperature, volumetric flow rate, etc.) to the point where it can resemble a bad catalyst, and vice versa. These two systems are often difficult to separate on the FTP cycle for some engine power ratings and can be nearly impossible under worst case vehicle duty cycles like those of a delivery truck which makes frequent load changes and has several ignition cycles in a short period. NH3 storage exhibits highly dynamic properties based on operating conditions like exhaust gas temperature and volumetric flow rate and is a significant contributor to the change in SCR conversion efficiency on good and bad systems. While NH3 storage is a known property of SCR, it has proven very difficult if not impossible to model accurately due to NH3 often being distributed non-uniformly along the catalyst and its distribution related to prior operating conditions. NH3 slip (resulting from desorption of excess stored NH3) is prevalent in vehicles with highly transient duty cycles due to the rapid and constant change of NH3 storage capacity and can be difficult to predict in advance, and modeling the magnitude and rate of the desorption is equally challenging. Tests have shown NH3 slips to take over 60 seconds to fully propagate through the SCR catalyst to where they can be detected by instrumentation. ARB staff's comment in the May 29, 2009 HD OBD staff report that active/intrusive methods may

be possible for evaluating SCR efficiency with little emissions impact has shown to be currently not possible based on recent experiments in an independent laboratory. These tests show that the time to adsorb and desorb sufficient NH3 to generate a reliable diagnostic signature can take multiple minutes, which is not feasible in a vehicle without constant operating conditions. Most manufacturers position NOx sensors before and after the SCR catalyst to provide real-time feedback.

The most significant factors facing the SCR sensing system are sensor accuracy and sensor cross-sensitivity to NH3. Regarding sensor accuracy, experiments used to measure the probabilities that NOx sensors with varying degrees of accuracies would correctly determine a failing system and a healthy system with a threshold of +0.2 g/bhp-hr show that generation 2.5 sensors still yield errors of 0.12% for improperly failing healthy systems and errors of 0.16% for improperly passing failing systems. Only a NOx sensor with accuracy levels of +/-5ppm from 0-100ppm and +/-5 percent from 100-1500ppm can achieve a separation with 0.00 percent errors for improper detections. Tests also showed that with higher OBD thresholds, sensor error is not significant enough to cause misdetections based on a conversion efficiency calculation. Regarding sensor cross-sensitivity to NH3, the range of NOx sensor sensitivity to NH3 varies from 70 to 250 percent when it is new up to 60 to 200 percent when it is aged. For example, 100ppm of NH3 at the downstream exhaust will be reported by a sensor with 95 percent NH3 cross-sensitivity as an additional 95ppm to the reported downstream NOx measurement. NH3 at the exhaust outlet can be due to released ammonia from the SCR catalyst due to temperature rises, a very aggressive urea injection to SCR catalyst strategy, and reduced SCR catalyst NH3 capability. For example, if the NOx sensor is cross-sensitive to NH3 at the 90% level, an increase of 10ppm NH3 at the tailpipe will increase the width of distribution by +/-5 percent, with such increase in variance width degrading the capability of NOx sensor-based NOx conversion efficiency evaluation as the error rates grow to 2.33 percent (from 1.99 percent) mis-detection and 2.54 percent (from 2.16 percent) false-detection for generation 2.0 sensors.

While the NOx sensor technology has developed much, the sensor accuracy, reliability, and durability have not kept up to a sufficient degree with the extremely stringent NOx thresholds that have been implemented over time. EMA had requested in 2009 that ARB change the NOx aftertreatment 2010 emission thresholds due to the then-accuracy of the NOx sensor technology. Even now, NOx sensor suppliers have indicated it is unlikely additional improvements in sensor measurement accuracy will be achievable. Thus, EMA proposes that the phase-in schedule be changed to require 10 percent of the 2014 volume and 20 percent of the 2015 volume meet +0.3, with an extension to +0.2 in 2017 for those engines meeting the +0.3 threshold in 2014 and 2015. (EMA)

Agency Response: ARB disagrees and did not make these changes. ARB staff has already addressed these comments in the Staff Report, but will summarize them here.

Staff has met with virtually every manufacturer and several suppliers to assess current capability and what improvements are available in the near term. Given the importance of achieving and preserving the NOx benefits of the 0.2 g/bhp-hr tailpipe standard, staff is committed to continuing to drive to the limits of technical feasibility to achieve the lowest threshold possible. Further, given industry trends towards increasing engine-out NOx emissions even higher for engine efficiency improvements or greenhouse gas reductions, staff is concerned that some may try to push too far in that direction such that tailpipe or OBD capability is sacrificed. Thus, staff was cautious about providing even interim relaxation that could be misinterpreted as showing that some ARB requirements are more important than others instead of keeping manufacturers on track to find a reasonable middle ground that meets all of our requirements, including OBD, tailpipe standards, and greenhouse gas standards (where applicable).

When talking with manufacturers and suppliers, staff identified several items that continue to show promise for achieving the previous 2013 model year threshold of the NOx tailpipe standard + 0.2 g/bhp-hr. As noted by the commenter, NOx sensor accuracy is not expected to get appreciably better, but that doesn't appear to be the limiting factor to achieving the final thresholds. Some manufacturers have shifted some focus to looking more at ammonia storage—both for purposes of better controlling emissions in the first place and also for another metric to correlate with the performance of the catalyst itself. One supplier has indicated that ammonia storage capability is affected earlier and more dramatically on deteriorated catalysts than NOx sensor-based measurements can detect, implying that monitoring strategies based on or incorporating some measure of ammonia storage would likely be more sensitive and able to detect malfunctioning catalysts sooner. Some of the strategies may even include intrusive monitors that saturate and/or deplete ammonia storage to better assess the current catalyst performance. Others have indicated they plan to look at partial volume monitoring approaches to monitor the conversion efficiency over a smaller portion of the total catalyst volume in an attempt to be able to work in an environment with higher NOx outlet concentrations. To the extent that the smaller engines (and thus catalysts) are closer to achieving (if not already achieving) the +0.2 g/bhp-hr thresholds, such an approach continues to have promise. Additionally, some manufacturers believe that they just need to get a better handle on what they are currently observing as high variability in the monitor results through better base control strategies, including adaptive algorithms, further refinement of enable conditions to eliminate driving conditions that cause big fluctuations in catalyst efficiency, and even improved statistical filtering of the results.

Lastly, staff believes that a 10/20 percent phase-in schedule in the 2014/2015 model years would not provide manufacturers enough exposure to different engines and applications during calibration and development and in-use to be able to identify and correct issues that may come up before full-scale implementation in the 2016 model year.

24. Comment: Regarding the proposed phase-in schedule for the PM filter monitoring requirements and the proposed phase-out of the failure mode exemption in the HD OBD regulation, while the phase-in is directionally helpful for manufacturers, ARB did not go far enough to address the significant challenges with using PM sensors to meet the extremely stringent thresholds and without the failure mode exemption. EMA predicted in the written comments for the 2009 biennial review that the requirements ARB set for 2013 will cause manufacturers to expend significant resources without sufficient technological success. ARB noted in the Staff Report that only one light-duty manufacturer is able to implement PM sensors in 2013 and a few heavy-duty manufacturers were going to meet this goal but abandoned those efforts. As ARB and PM sensor suppliers state, PM sensors are not ready for full scale implementation in the 2013 model year.

    The common PM filter monitoring method today involves using a delta pressure sensor, but at some point it will be hard to distinguish failures from fault free filters due to part tolerances, sensor tolerances, aging, driving conditions and different application installations. PM sensors today are being developed for heavy-duty vehicles but the technology is new and sensors are at the prototype stage. It is important that engine manufacturers continue evaluating available technology. The current technology has sensor-to-sensor variability as well as run-to-run variability that is too high for a robust monitor. Introducing new sensors require robust technology to use in different driving conditions and different vehicle applications. One PM sensor supplier has said they can meet a 1.75 times threshold for a 2013 light-duty application only if the manufacturer defines a “good” filter to be well below the tailpipe PM standard (3 mg/mi versus the 10 mg/mi standard). This means good filters delivering 4 mg/mi would be at risk of illuminating the MIL. So the minimum PM sensor detection capability would be to distinguish a 3 mg/mi filter from an 18 mg/mi (1.75 times) filter, with the resultant threshold multiplier capability closer to 6 times the standard (18/3). A manufacturer conducted PM filter monitor testing using a PM sensor on a European light-duty application intended to meet a 4.5 mg/km PM standard – PM sensor data on filters with 2.6 mg/km (“good”) and 7.3 mg/km (“threshold”, at 3 times separation in tailpipe PM from the “good” filter) showed significant overlap during real world driving. In order to detect a “threshold” filter, the threshold would have to be set at level such that a “good” filter would be detected as bad on a number of driving events. Since the data was collected from only one vehicle, vehicle-to-vehicle and sensor-to-sensor variability have not been accounted for and would further increase the occurrence of false MILs for this sensor capability. With

current PM sensor technology, the threshold would have to be at least 6 times the PM standard to distinguish a good filter from a bad filter.

Recent data show that PM sensors will not be capable of meeting the 0.03 g/bhp-hr threshold without significant risk of false failures. EMA proposed that the percentages in the phase-in schedule be halved to require 10 percent of the 2014 and 2015 volume to meet 0.05 without the failure mode exemption or 25 percent of the 2015 volume to meet 0.03 without the failure mode exemption. Further, EMA proposes that the phased-in engines not be required to illuminate the MIL or store fault codes during the 2014-2015 phase-in – instead, manufacturers would gather data in "silent mode" to be used for further development of robust monitoring technologies capable of meeting the requirements in 2016. This provides a logical allocation of the phase-in to the product mix in the early years (a reduced number of original equipment manufacturers (OEMs) with a reduced number of models) and will limit liability (due to false failures) for sensor suppliers in the phase-in years, for end users, ARB as a regulatory agency interested in acceptable of the diagnostic technology, and engine and vehicle manufacturers. Even with these modifications, manufacturers' rationality diagnostic approach and prove-out will be difficult and problematic, and manufacturers will face big challenges when trying to integrate PM sensors with delta-pressure sensing technology across all products including their use to improve in-use monitor ratios, which needs development time. The PM sensor may be an integrated assembly of an exhaust gas probe and interface module that come from separate suppliers and both have development challenges (e.g., probe-clogging concerns, module may require voltage control enhancements to more reliably clean sensor element and detect failed filter in a timely manner). (EMA)

25. Comment: Reducing the phase-in levels will drive the use of the same mature technology but limit the overall risk and problems related to emerging technology for customers. Government, manufacturers, and customers need reliable and dependable engines in vehicles. (EMA)(Cummins)

26. Comment: Reducing the phase-in levels while maintaining inadequate technology introduction strategy will provide responsible customer exposure related to such emerging technology. One comment that was made was we would move away from delta pressure sensors to PM sensors – the way we see things involves using both together. So we will be able to deliver reliable solutions in the 2016 time frame. A ten percent level in 2014 would give experience with the sensor and modifications to the aftertreatment systems and to sampling of vehicles and making sure the technology is developed. Going from 10 percent to 100 percent (or zero percent to 100 percent for low volume manufacturers) is a step change. We could better manage the introduction better if it's kept to fewer engine/vehicle models. (Cummins)

Agency Response: ARB disagrees with reducing the phase-in levels and did not make these changes. Staff believes that halving the phase-in schedule in the 2014/2015 model years would not provide manufacturers enough exposure to different engines and applications during development, calibration, and in-use to be able to identify and correct issues that may come up before full-scale implementation in the 2016 model year. Staff also believes that proposing a "silent mode" in the 2014/2015 model years would not help the situation, since engineers would not attack the problem with the same mindset or resolve to address issues if they know ahead of time that there is no risk of having incorrect monitor decisions in the field. Further, staff's discussions with PM sensor suppliers and engine manufacturers have confirmed that there is sufficient availability of sensors and engine/vehicle configurations that are more readily adaptable to a sensor in the 2014 and 2015 model year time frame to meet the phase-in requirements.

Regarding the comment that insufficient separation exists between a 'good' filter and a 'bad' filter, ARB disagrees that the cited data supports such a conclusion. First, it is inappropriate to characterize a multiplicative threshold based on the actual emission level below the standard, as the commenter does, by using the actual emission level of 3 mg/mi as the 'standard' in the light-duty example. To illustrate the point, using a similar methodology to characterize the PM filter thresholds for heavy-duty engines would find that the vast majority of 2013 model year engines were certified at the end of full useful life as emitting at less than 3 mg/bhp-hr even though the standard was 10 mg/bhp-hr. Comparing that to the OBD thresholds of 50 and 30 mg/bhp-hr for 2014 and 2015 model years, respectively, the calculation would conclude that the proposed OBD thresholds are 16 and 10 times the 'standard', well above the 6 times the 'standard' that the commenter claims is necessary.

Additionally, with respect to the first example cited of a light-duty vehicle and the monitoring capability as determined by a PM sensor supplier, staff took a quick look at certification data for 2013 model year light-duty diesels and found the vast majority of them were certified at full useful life as emitting at or below 3 mg/mi. As such, characterizing a filter with such emission levels as a 'good', or 'worst performing acceptable' (WPA) in OBD monitoring terms, is actually appropriate and common practice in industry for emission components that have a continuum of degradation such as gasoline catalytic converters or diesel PM filters. Further, the definition of a filter at 3 mg/mi as the WPA does not mean that filters emitting at a level of 4 mg/mi would be at risk of illuminating the MIL. The 'best performing unacceptable' (BPU) component would be defined as the filter emitting at or just below the OBD threshold (of 1.75 times the standard or 17.5 mg/mi in this example). As such, a filter at 3 mg/mi would be certain to not be detected as a failing part and a filter at 17.5 mg/mi would be certain to be detected as a failing part. The reaction of the system to components emitting at interim levels between the two would depend on the separation between the two in terms of the

monitored parameter (e.g., the PM sensor signal and corresponding algorithm used to translate the PM sensor signal into a measure of the filter performance). In an ideal scenario, a separation of at least four sigma exists from the mean of the WPA population to the threshold and a separation of at least two sigma exists from the mean of BPU population to the threshold. From the example cited, there is no way of estimating what level of separation exists and therefore, there is no way of concluding a 4 mg/mi filter would be at risk of illuminating the MIL. Further, based on discussions with light-duty manufacturers including the one certified in 2013 model year with a PM sensor, the sensor and associated algorithms seem quite capable of robustly discerning between filters as defined in the example above as WPA and BPU.

Regarding the example of a European light-duty application designed for a non-US market, staff's experience is that monitoring capability on such applications significantly lags behind the capability of systems designed to meet ARB's OBD requirements. Further, the numbers cited of a 4.5 mg/km standard suggest a lower PM standard than ARB currently has and the 7.3 mg/km threshold would suggest an OBD threshold of 1.6 times the standard, which is a tighter threshold than ARB has. For reference, the proposed HD OBD thresholds are effectively 5 times and 3 times the standard, respectively, for the 2014 and 2015 model years. There does not seem to be a reasonable inference to conclude that the presence of overlap (between two much lower and closer together emission levels and based on a monitoring algorithm developed for the European market) logically means that insufficient separation will exist between higher and further apart emission levels and with a likely more sophisticated and capable algorithm developed for future model years to meet ARB's HD OBD requirements.

27. Comment: The proposed amendment to require continuous misfire monitoring starting in the 2016 model year does not provide the four model year lead time required by law. The 2013 model year is already underway (beginning January 2, 2012). The proposed amendment should begin January 2, 2017 if the proposal is approved by December 31, 2012. If not, then the earliest the new requirement can be implemented is January 2, 2018.

ARB also should add a minimum load range at which misfire would be required to be continuously detected. The proposed detection at engine load 5 percent above the positive torque line is too light a load for robust misfire detection, and may result in false failures, which ARB and EMA are both sensitive to and should minimize. Crankcase sensor-based misfire detection is more difficult in heavy-duty diesel engines than light-duty due to the increased crank-twist and wide variety of torque noise factors from multiple OEM driveline designs and intermittent high accessory loads. Light-duty OEMs usually only need to calibrate one misfire algorithm for automatics and one for manual to be used across most of their fleet, while heavy-duty engine manufacturers have a wide variety of transmission/final

drive/chassis combinations with widely varying vehicle applications, which increases the chance of false misfire detections. ARB should modify the language in both the HD OBD and OBD II regulations to require detection above 20 percent peak torque up to 75 percent peak torque and between low idle and 75 percent max-rated engine speed. Misfire detection is still required elsewhere in the regulation. This slight extra carveout will not impede misfire detection as heavy-duty diesels operate mostly within the proposed monitoring torque range and generally only pass the light load region during short load transitions. ARB should also change the conditions of engine load to peak torque to simplify the detection regions, since load can vary widely at a given operating point and peak torque is less ambiguous.

Additionally, changes should be made to address special operating conditions where misfire detection can be difficult, such as active PM filter regeneration, which may involve a unique modulation of injection events that alter dynamic characteristics causing variability which inhibit the misfire monitor's ability to detect faults. The frequency of filter regeneration continues to decrease as manufacturers continue to develop technology that result in reduced fuel consumption and greenhouse gas emissions. So misfire detection during this small period of filter regeneration should be exempted. Additional conditions already recognized for medium-duty vehicles in the OBD II misfire requirements should also be recognized in HD OBD requirements, including fuel cut-off, heavy-transient conditions, rough road, and intrusive tests. (EMA)

Agency Response: Regarding the lead time issue, ARB disagrees with delaying the requirement and did not make this change. Please see agency response to comment 22 for more details. Regarding the comment to change the engine load condition to peak torque condition and to add a minimum torque range for continuous misfire monitoring, ARB agreed to change the load condition to peak torque in both the HD OBD and OBD II regulations and to add a minimum 20 percent peak torque condition for the initial years of continuous misfire monitoring for heavy-duty engines in the HD OBD regulation, and included these changes as part of the 15-day notice. However, ARB staff did not add a minimum peak torque condition in the OBD II regulation, since staff does not believe medium-duty engines merit the same relief as heavy-duty engines. Specifically, the heavy-duty engine manufacturers indicated that they were concerned that engine accessory loads cycling on and off might be a significant factor in proper misfire detection especially at idle and light loads where the accessory load is significant relative to the total engine load. Further, given the non-vertically integrated heavy-duty industry, the engine manufacturers have less knowledge about and control over the variety of accessories that are mated to their engines. Medium-duty vehicles, however, are dominated by full size pick-up and van models that are essentially vertically integrated and have a very limited scope of differences in accessory loads and have more knowledge during development and calibration about the likely loads. As such, the medium-

duty vehicles should be able to be designed and calibrated appropriately to ensure robust detection even at idle and low loads while the heavy-duty engine manufacturers would likely benefit from a few years of experience before expanding monitoring to cover those low load situations. Further, the OBD II regulation language already allows disablement of continuous misfire monitoring during a small region of high engine speed and very low torque for medium-duty vehicles where gasoline misfire detection has traditionally been hard to do given the low signal-to-noise ratio in that region. Lastly, ARB also agreed that misfire monitoring should be disabled during specific conditions that can affect robust detection of misfire, and added language in both the HD OBD and OBD II regulations indicating allowable disablement conditions as part of the 15-day notice. The language provides for disablement in conditions such as those suggested by the commenter including infrequent regeneration events. However, the disablement is required to be limited only to those periods that may "significantly affect engine stability" rather than broad conditions such as 'during an infrequent regeneration event,' which could include many discrete operating conditions that do not have an adverse impact on misfire detection.

28. Comment: Our interpretation of the OBD II requirements is that continuous misfire monitoring is currently required for all vehicles (passenger cars, light-duty trucks, chassis dynamometer-certified medium-duty passenger vehicles, and engine dynamometer-certified medium-duty vehicles) equipped with combustion sensors, and will be required for all 2016 and subsequent model year engine dynamometer-certified medium-duty vehicles (even without combustion sensors). Clarifications should be made to the language, specifically adding "certified to an engine dynamometer tailpipe emission standard" to all references of "medium-duty vehicles. (Mercedes)

    Agency Response: The commenter is mistaken. The OBD II regulation requires 2016 and subsequent model year chassis dynamometer-certified medium-duty vehicles (except medium-duty passenger vehicles) to use the same diesel misfire monitoring requirements and malfunction criteria as engine dynamometer-certified medium-duty vehicles (section 1968.2(f)(17.1.6)(C)). Thus, 2016 and subsequent model year chassis dynamometer-certified medium-duty vehicles that are part of the phase-in would also be required to meet the continuous misfire monitoring requirements.

29. Comment: While we support ARB delaying the NMHC conversion efficiency monitoring requirements for catalyzed PM filters (due to lack of cost-effective monitoring strategies capable of robustly detecting this fault), we believe it should be delayed until 2016, not the proposed 2015, to provide engine manufacturers time to develop such a monitor. Considering the minimal NMHC emissions impact of the PM filter, ARB should review the manufacturers' progress in meeting this requirement in 2016 and eliminate this monitoring requirement if manufacturers

determine there is no cost-effective monitoring strategy. A catalyzed coating is used on PM filters to prevent damage to the filter due to non-homogeneous soot-burning under certain conditions. The NMHC conversion part is a beneficial side effect but not needed to meet the emission standards. Monitoring approaches such as those using hydrocarbon sensors are being looked at, but there is currently no suitable cost-effective monitoring strategy. Even if the NMHC coating deteriorates, this will result in damage to the filter, which will be detected by the PM filter monitor if emissions exceed the threshold. (EMA)

Agency Response: ARB disagrees with delaying the requirement to 2016 and did not make this change. Staff believes such secondary functions are not trivial and warrant monitoring to ensure overall effectiveness of the emission control system. Staff delayed the requirement to 2015 to give manufacturers more time to refine their systems, optimize regeneration strategies, and better investigate the impacts of the catalyzed PM filter, which will all help manufacturers to develop a robust monitor for this NMHC conversion function. Additionally, as part of the 45-day notice, ARB staff added test-out provisions for the PM filter NMHC conversion efficiency monitor, allowing manufacturers to be exempt from monitoring if no fault could cause emissions to exceed the applicable standard and if no fault could cause emissions to increase by 15 percent or more of the applicable standard. Thus, if the catalyzed part of the PM filter indeed has only a minor impact on emissions, the manufacturer would not be required to monitor this function.

30. Comment: Regarding the proposed test-out provisions for the PM filter NMHC conversion efficiency monitor, the DOC feedgas monitor, and the fuel injector tolerance compensation factor monitor, ARB should delete the phrase “full useful life” in the HD OBD regulation for consistency in language and since this is not applicable for heavy-duty. (EMA)

    Agency Response: ARB staff agrees and deleted the phrase “full useful life” from these sections in the HD OBD regulation as part of the 15-day notice.

31. Comment: ARB proposed test-out provisions for the EGR catalyst system monitor in the HD OBD regulation. ARB should also propose the same provisions for medium-duty engines/vehicles in the OBD II regulation. (EMA)

    Agency Response: ARB staff agrees and included the same provisions in the OBD II regulation as part of the 15-day notice.

32. Comment: While we support ARB delaying the DOC feedgas monitoring requirements (due to lack of monitoring strategies capable of robustly detecting this fault), we believe it should be delayed until 2016, not the proposed 2015, due to technological concerns and given that there are no directly measuring sensors or monitoring strategies to meet this

requirement. The development environment that led to ARB delaying the requirement in the last rulemaking update is largely unchanged. The development of next iteration SCR aftertreatment designs, PM filter regeneration strategies and engine NOx control strategies has been intense as necessitated by customer fuel economy demands due to high fuel prices. Rather than a period of technology stability anticipated by ARB, a period of rapid design change has ensued. Since engine out NOx strategies, PM filter regeneration strategies, and SCR NOx reduction strategies are so intertwined and changing, and since they directly affect feedgas monitoring strategies, there is insufficient time to implement monitors. (EMA)

Agency Response: ARB does not agree with delaying the requirement to 2016 and did not make this change. This requirement was originally required starting in 2010, was subsequently delayed to 2013, and now is delayed to 2015, so manufacturers were aware of this requirement for many years. As stated in the Staff Report, the staff delayed the requirement to 2015 based on manufacturers' input that their original plans to comply with the requirement based on using monitors for the NMHC catalyst NMHC conversion efficiency and/or the SCR NOx conversion efficiency were not successful, and thus alternate strategies were being sought. Staff believes this monitoring requirement is feasible, and at least one manufacturer has already shown it will meet this requirement in 2013. Data from some manufacturers suggest that there can be a significant impact on tailpipe NOx emissions if the DOC feedgas (e.g., nitrogen dioxide (NO_2)) generation property is not performing as it should, specifically in consuming/destroying as little inlet NO_2 as possible so that the amount of NO_2 relative to NO is good, which makes the SCR conversion efficiency higher. Further, based on discussions with emission control manufacturers, the catalyst properties that result in good downstream NO concentrations are more susceptible to aging and high temperature, so the property tends to degrade earlier than other properties of the catalyst (e.g., NMHC conversion efficiency). Based on this information, ARB believed monitoring of the feedgas generation property should be required earlier rather than later. Discussions with manufacturers about monitoring approaches they were investigating and other changes that would make the system more tolerant to aging and/or make SCR systems less dependent/sensitive to the NO_2 levels led staff to the 2015 model year timeframe as when these improvements and advancements could be incorporated.

Additionally, as part of the 45-day notice, ARB staff added test-out provisions for the DOC feedgas monitor, allowing manufacturers to be exempt from monitoring if no fault could cause emissions to exceed the applicable standard and if no fault could cause emissions to increase by 15 percent or more of the applicable standard. Thus, if the feedgas generation function has only a minor impact on emissions, the manufacturer would not be required to monitor this function. Lastly, to the extent it is happening, the rapid design changes noted by the commenter

should provide additional opportunity to the OBD engineers to influence the design of any redesigned aftertreatment controls to better accommodate monitoring based on what they learned through development and calibration attempts on the initial designs that fell short.

33. Comment: While we support ARB delaying the fuel injector tolerance compensation factor monitoring requirements (due to technological challenges in meeting the requirement), we believe it should be delayed until 2016, not the proposed 2015. There are already fuel pressure, timing, and quantity monitors that cover all emission-related malfunctions associated with the fuel injection system. The magnitude of the malfunction criteria for the fuel pressure monitor compared to the tolerance compensation is very different. The fuel injector tolerance compensation is made in the engine production assembly process and parameter values updated for each injector. The major purpose of the adjustment is to achieve a smooth engine speed at idle and to get the correct performance at high engine load. The tolerance compensation can cover one or more compensation parameters for quantity and/or timing and the compensation can cover both electrical and hydraulic adjustments to get the correct fuel flow characteristics. The parameter values used for compensation of the individual injectors adjusts the time for the valves and quantity (compensation often in microseconds). The compensation for the system can either be fixed values or be based on adaptive calculation during engine operation. For the fixed value compensation, the parameters will only be able to update with an off board workshop tool when replacing one or more injectors. The fixed value compensation is based on the fuel injector flow characteristics delivered from the injector. The adaptive algorithm calculates the compensation needed for keeping the nominal injector characteristics and when replacing injectors, the new compensation parameters will be updated using an off board workshop tool. For a six-cylinder diesel engine, each cylinder is 120 degrees of the flywheel during two revolutions. Compensations made in the microseconds will then result in an increase or decrease of the fuel injector-related parameters such as timing. A normal distribution of the injectors used in production in 99 percent of the cases is less than 60 percent of the total possible amount of the compensation. Taking that as well as the normal operation window into account will result in compensation being close to or less one degree for one injector, which is a significantly low adjustment compared to the monitoring levels for detecting pressure, timing, and quantity-related faults. (EMA)

    Agency Response: ARB disagrees with delaying the requirement to 2016 and did not make this change. As stated in the Staff Report, light- and medium-duty manufacturers, who are also required to monitor this feature, have indicated they have been working hard on improvements to their fuel system adaptive strategies to fully compensate or learn out any errors that may occur due to mismatches in the injector and the programmed tolerance/adjustment. This would allow manufacturers to avoid adding

new hardware, such as a communication chip in the injector that would automatically communicate its characteristics to the engine computer, and avoid other alternatives such as tighter tolerances on the injectors to meet this requirement. Staff believes that heavy-duty manufacturers could also take the same approach. The delay would give sufficient time for manufacturers to fully refine adaptive strategies so that they can compensate for any mismatches that occur or to determine that such strategies are ineffective and implement an alternative method such as those previously mentioned. Additionally, as part of the 45-day notice, ARB staff added test-out provisions for this monitor, allowing manufacturers to be exempt from monitoring if no fault could cause emissions to exceed the applicable standard and if no fault could cause emissions to increase by 15 percent or more of the applicable standard. Thus, if the fuel injector tolerance compensation factor has only a minor impact on emissions, the manufacturer would not be required to monitor this function.

34. Comment: Regarding the proposed test-out option for the OBD II NMHC catalyst feedgas generation monitoring requirements, the regulation language should be changed to consider only NOx emissions, not other emissions constituents, when determining if the vehicle is exempt from the monitoring requirements. (Mercedes)

    Agency Response: ARB disagrees and did not make this change. Tailpipe emission standards exist for all criteria pollutants, including NOx, NMHC, CO, and PM, and OBD systems in general are designed to detect failures that increase any of those pollutants. To meet ambient air quality standards, further reductions especially in NOx, NMHC, and PM are needed. Accordingly, it would be inappropriate to provide exemptions from monitoring to components that have no appreciable increase in NOx emissions but do have an appreciable increase in one or more of the other criteria pollutants.

35. Comment: Regarding the proposed test-out option for the OBD II PM filter NMHC conversion monitoring requirements, the regulation language should be changed to consider only NMHC emissions, not other emissions constituents, when determining if the vehicle is exempt from the monitoring requirements. (Mercedes)

    Agency Response: ARB disagrees and did not make this change. See response to comment 34 above for the rationale as to why such a change would be inappropriate.

36. Comment: ARB did not change the current malfunction threshold of 2.0 times the standards for the 2013 model year NMHC catalyst conversion efficiency monitor in the HD OBD regulation. Though ARB stated in the Staff Report that one manufacturer apparently has been able to meet this requirement, the purported success of one manufacturer does not

demonstrate a technological feasible standard, and all manufacturers cannot meet this in the 2013 model year.

Current monitoring technology cannot robustly monitor NMHC converting capability at 2.0 times the NMHC standard with IRAF correction factor applied without a significant risk of setting false MILs. There is a significant risk if manufacturers are required to meet this infeasible emissions threshold-based monitoring requirement for reasons as follows:

a.) There is a tradeoff between engine-out NMHC and NOx emissions, resulting in higher NMHC levels in order to meet the 0.2 g/bhp-hr NOx standard; and
b.) As a result of higher engine-out NMHC levels, oxidation catalysts operate at a higher efficiency in order to meet the 0.14 g/bhp-hr NMHC standard.

There is no monitoring technology available to meet ARB's emission threshold monitoring requirement. SAE Technical Paper 2005-01-3602, "Diagnostics for Diesel Oxidation Catalysts," evaluated the feasibility of monitoring DOC/DPFs to specific emissions threshold levels and the feasibility of both the exhaust oxygen sensor and catalyst temperature monitoring approaches. Some of the major findings and conclusions are as follows:

a.) DOCs age by shifting light-off to a higher temperature. Exotherm from higher temperature-aged and fresh catalysts were indistinguishable at higher catalyst temperatures. As a result, the exotherm monitor must be operated in a narrow window around the catalyst light-off temperature (200 to 400 degrees C).
b.) HC levels in diesel exhaust are too low to generate any appreciable exotherm to monitor at the required threshold levels. The DPF regeneration event does not provide optimal monitoring conditions since temperatures are above the catalyst light-off temperature.
c.) The error stack-up of RTD temperature sensors create significant uncertainty for monitoring the DOC/DPF. The uncertainties evaluated were due to sensor variability, sensor aging, measuring circuit, sensor length and mounting orientation, and analog-to-digital processing. The cumulative error for these uncertainties was related to a 3 sigma error band that manufacturers must account for in determining threshold monitoring capability.
d.) A monitoring approach using oxygen sensors to infer HC conversion efficiency by determining the difference in oxygen concentration before and after the catalyst was evaluated and found to be less accurate than the exotherm monitoring approach for diesels. This was because lambda sensor accuracy deteriorated rapidly for lean air/fuel ratios. Data was presented to show this effect. An analysis was provided to show the uncertainty of HC conversion measurements to be between 2000 to 3000 ppm during typical diesel lambda values of 1.5 to 2, as compared to an exotherm measurement uncertainty of 1000 to 1500 ppm HC found in the catalyst light-off temperature range.

e.) Adding all the noise factors together for a normalized exotherm metric, separation between a marginal and threshold catalyst was very poor, resulting in false MILs and undetectable failures.

The paper concluded that emissions threshold-based monitoring of the HC conversion capability of the DOC was not feasible. On the other hand, manufacturers have found an exotherm monitoring approach to be feasible for functional monitoring of the DOC.

ARB conveyed some monitoring approaches in the September 11, 2008 workshop report to justify the current threshold monitor requirement. ARB indicated that intermediate levels of catalyst deterioration that cause increases in light-off temperature and lower conversion efficiencies can be detected. Looking at the catalyst behavior during active regeneration (e.g., by investigating how much time and/or fuel is needed to generate an exotherm, tracking the actual temperature rise from the exotherm versus the expected, and using better temperature sensors), ARB staff believes manufacturers will be able to better determine the characteristics exhibited as an NMHC catalyst degrades, even if it is still capable of eventually getting to a high enough exotherm to achieve regeneration of the PM filter. Although there is some validity to monitoring catalyst light-off, there are also significant limitations. For example, manufacturers must warm-up the catalyst as quickly as possible after a cold start in order to minimize HC slip. As a result, as stated in the SAE paper referenced above, the exotherm monitor must run in a fairly narrow temperature and time window around catalyst light-off, making it very difficult to complete the monitor and detect a partially deteriorated catalyst, especially when you take into account other noise factors that affect catalyst light-off.

ARB also offered an alternate approach involving monitoring the catalyst during cold start by tracking the light-off and/or temperature rise characteristics during intrusive actions intended to quickly bring the catalyst up to the desired temperature after a cold start. This approach has limitations as well, as there are many factors other than the condition of the DOC that can affect catalyst warm-up. It should be noted that the intrusive actions involved in diesel lightoff strategies encompass a multitude of actuators, so the DOC is only one component that generated increased heat to the exhaust. Most manufacturers find that the cold start component monitor for the DOC can only detect a completely failed DOC and hence constitute a functional, not a threshold, monitor.

ARB also indicated that manufacturers simply work on reducing engine-out NMHC levels such that degraded catalysts will have less of an emissions effect. However, as previously stated, measures taken to lower engine-out NMHC will result in higher engine-out NOx levels. This jeopardizes both the ability to comply with the NOx emission standard and the ability to meet NOx catalyst monitoring requirements due to the resulting higher NOx conversion efficiency that would be needed. Manufacturers must strike a fine balance for engine-out NMHC and NOx

levels to ensure that both requirements are met and cannot simply jeopardize one to meet the other.

Even if ARB believes virtually all manufacturers have continued to make improvements to regeneration emissions allowing them to meet the threshold, EMA still is concerned that the requirements are not technically feasible and reasonable. ARB should increase the 2013 model year threshold to a level (EMA believes 4.0 times the NMHC standard is sufficient) such that the monitor would only meet the functional monitoring requirements. (EMA)

Agency Response: ARB staff disagrees and did not make any changes to the NMHC malfunction thresholds. These comments were already addressed in the Staff Report and in the 2009 HD OBD Final Statement of Reasons, which ARB will restate here.

The purpose of interim higher thresholds for monitors such as the NMHC catalyst are not to make such monitors gross functional checks in early years and stringent threshold checks in later years. Higher interim thresholds are intended to start the manufacturer down the path of a threshold-type monitor albeit with reduced stringency to provide time to refine the monitor over time. Raising the thresholds to ensure solely functional checks for every manufacturer would likely lead to implementation of cruder diagnostics that would not lend themselves to refinement to final thresholds and would not give manufacturers as much insight and experience as to what will be necessary to get to the final threshold. Further, the higher interim thresholds still set a ceiling for the emission impact a component can have before it must be monitored, and the existing threshold of 2.0 times the standard ensures that manufacturers that more heavily rely on the NMHC catalyst will indeed need to have a monitor capable of identifying such a level of deterioration. While staff understands there are tradeoffs between NOx and NMHC emissions, manufacturers have always had to deal with such tradeoffs and strike a balance that is best suited to meet all ARB requirements (including OBD) and not just to meet tailpipe standards. Those that have chosen emission configurations that are less dependent or sensitive to the NMHC catalyst will be able to let the catalyst deteriorate further before the need for detection of a fault. This is consistent with all OBD monitors in that designs that are less sensitive to faulty components are easier to make compliant because they can tolerate additional deterioration before the OBD thresholds are exceeded. As stated in the Staff Report, contrary to the commenter's position, virtually all manufacturers have moved towards higher engine-out NOx emission levels (and consequently, lower engine-out NMHC emission levels) to maximize efficiency and use of SCR systems as staff suggested was possible, thus requiring detection of a more degraded NMHC catalyst than before. Further, virtually all manufacturers have continued to make significant improvements to regeneration emissions both by increasing the time between regenerations and lowering the emissions during the actual regeneration

events. This leads to reduced influences from the infrequent regeneration adjustment factors (IRAF), making it less of a factor in determining the threshold catalyst. Nonetheless, if a manufacturer were to choose a solution that still was very sensitive to NMHC catalyst degradation (due to high engine-out NMHC and/or high IRAFs), it is appropriate that such a solution be monitored at a reasonable emission level and not at something that is four times a standard that is already generous for diesel engines.

Further, in the Staff Report, staff identified possible monitoring techniques for the catalyst including some that, despite the commenter's position on the difficulty of doing so and the cited SAE paper's conclusion that it is infeasible, are currently being used by manufacturers to achieve compliance. As stated in the Staff Report, at least one manufacturer has already successfully demonstrated the ability to detect a degraded catalyst prior to emissions exceeding the 2013 model year thresholds by monitoring the exotherm of the catalyst during regeneration events. Additionally, as the commenter noted, with this and every other diagnostic, there are always other influences that must be filtered out and distinguished by use of enable conditions and the control and diagnostic algorithms themselves to differentiate properly-functioning components from malfunctioning components, including accounting for sensor tolerances and errors.

Lastly, staff also indicated that some manufacturers have indeed taken monitoring capability into account when selecting their emission control configuration and have chosen solutions which represent the best compromise for that manufacturer to comply with all of ARB's requirements. Such choices do involve trade-offs in one area versus another but are no different from the types of choices manufacturers routinely consider when balancing emissions, OBD, fuel economy, durability, drivability, and performance.

HEAVY-DUTY HYBRIDS

37. Comment: ARB should delay the OBD requirements for heavy-duty hybrids and align the timing of OBD implementation with that of U.S. EPA (i.e., require full OBD compliance starting in the 2016 or 2017 model year). (EMA)(BAE)(Allison)(PH)(Cummins)

38. Comment: EMA recommends additional time be offered to hybrids to allow development of hybrid system and engine technology and the associated diagnostic strategies that can comply with the monitoring requirements. Specifically, through the 2015 model year (though 2016 for hybrids being produced prior to 2013 model year), diesel engine systems used in hybrid applications should maintain existing OBD capability and calibrations for diesel engine systems with no liability for failure to meet the OBD requirements (e.g., detection thresholds, in-use performance ratios). Manufacturers would accept responsibility to meet EMD/EMD+ system monitoring requirements for NOx aftertreatment, PM filter, fuel system,

and EGR system. There should also be no requirement to demonstrate that monitors complete on the applicable FTP/SET for engine/hybrid system operation. Engine manufacturers should be allowed to seek Agency approval to re-calibrate monitoring strategies if evidence shows false failure occurs with existing OBD systems and to implement (different) diagnostics for unique engine calibrations that may be developed for hybrid use. During the same timeframe, hybrid component/system diagnostics should be based on (i) what hybrid manufacturers believe necessary for service and (ii) monitoring of other gross systems that manufacturers already are monitoring and that are necessary to meet performance and other needs. Engine manufacturers should not be required to certify diagnostics on the emissions created by a hybrid system until the nature of such emissions are better understood and there is data to direct appropriate policy on the diagnostics desired.

EMA is concerned that ARB's proposal will result in little or no use of hybrid applications in California, depriving the state of the fuel efficiency and other benefits that hybrid technology has to offer. Creating requirements in an HD OBD regulation for hybrid drive systems, without address certification and other issues, is premature. (EMA)

39. Comment: The current timing will negatively impact the U.S. economy and make the U.S. lose the leading edge in heavy-duty hybrids. Many heavy-duty hybrid manufacturers are relatively new. There are a lot of OBD requirements, but it is challenging for hybrid manufacturers since they have no prior experience with OBD. We have to collaborate with engine OEMs, but given the challenges for engine OEMs to meet the 2013 requirements, they will not have time and resources to work with hybrid manufacturers. With the 2014 start date, some hybrid manufacturers will be forced to leave the market, resulting in thousands of lost U.S. jobs. This will have a ripple effect because these OEMs spend lot of money to work with the suppliers for this technology. This could lead to a significant delay on emissions reduction in the U.S. The U.S. could have been more energy independent and a cleaner country. Hybrids account for only one percent of the U.S. heavy-duty market. (PH)

40. Comment: Keep in mind that ARB delayed OBD on alternate-fueled engines until 2018 and delayed some critical HD OBD requirements for small volume diesel manufacturers until 2016 or later. (Cummins)

41. Comment: While we understand the need for and support OBD requirements on heavy-duty hybrids, ARB's proposed 2014 model year compliance requirement does not provide adequate lead time to achieve that goal and will likely result in a substantial reduction in the numbers and types of heavy-duty hybrids in California in the coming years. Alignment of the ARB regulations with U.S. EPA will provide time needed to adequately address heavy-duty hybrid system effects on OBD system performance and perform certification efforts, time needed for the heavy-duty hybrid market to respond and comply rather than excluding them

from the California market, and time needed for collaboration between the heavy-duty hybrid industry, engine manufacturers, ARB, U.S. EPA, and SAE to develop standards and protocols for the hybrids.

The proposal to not align with U.S. EPA is not supported by adequate industry data. ARB's proposal is fundamentally inconsistent with staff's proposal for alternate-fueled engines (e.g., compressed natural gas), which are given until 2018 to comply. There is no rationale for ARB to provide four fewer years of lead time for heavy-duty hybrids compared to alternate-fueled engines. It should be noted alignment with U.S. EPA will still result in an earlier compliance date for hybrids compared to alternate-fueled engines. The reasons ARB gives for providing more lead time for alternate-fueled engines also apply to heavy-duty hybrids, specifically those regarding the role of technology in the heavy-duty industry and that HD OBD compliance could lead to discontinued production. The distinction made by ARB between heavy-duty hybrids and alternate-fueled engines is arbitrary since ARB doesn't provide any meaningful explanation of why alternate-fueled engine compliance is more difficult and requires more lead time than hybrids.

Lead time is needed for many reasons. Engine manufacturers are still developing HD OBD systems, with the first requirements taking effect in the 2010 model year, imposition of some HD OBD requirements for all engines starting in 2013, and full HD OBD compliance in 2016.

Final production HD OBD compliance engines and associated data are not yet available to heavy-duty hybrid system manufacturers. The volume of heavy-duty hybrids produced annually is small, which limits the ability of heavy-duty engine and hybrid system manufacturers to recover the costs associated with HD OBD compliance. For example, the total U.S. sales of heavy-duty hybrids from 1999 to 2010 were about 11,000 units.

The heavy-duty industry is not vertically integrated like the passenger vehicle industry, with multiple manufacturers like chassis manufacturer and component manufacturers involved in putting the final configuration together. The engine and hybrid system are produced by different and independent companies. The engines are designed to comply with the OBD requirements in conventional non-hybrid vehicles. Hybrid systems are designed to modify the engine duty cycle to achieve reduced fuel consumption and lower greenhouse gas emissions, but currently do not have the data to demonstrate the certified engines still meet the OBD requirements when used with the hybrid systems. It's even more complex with the different heavy-duty system calibrations due to the many different types of buses and vocational vehicles where hybrid systems may be used, which may affect engine compliance with the OBD requirements.

ARB's points appear to be: (1) one-year of lead time is enough to transform a non-vertically integrated industry into a vertically integrated industry while solutions of the designing challenges of HD OBD-compliant

heavy-duty hybrids are simultaneously achieved; and (2) availability of HVIP funding is sufficient to offset costs associated with developing HD OBD compliance hybrids within one year lead time. These are all not supported by data and by the realities of the current heavy-duty hybrid marketplace. ARB's claim regarding the lack of progress by heavy-duty hybrid system manufacturers since 2009 are groundless. The heavy-duty hybrid industry, U.S. EPA, and ARB have been working toward solutions for HD OBD compliance, including attending an SAE-sponsored workshop on August 10, 2012. Data were provided to ARB staff by BAE, Allison, and other hybrid propulsion manufacturers.

ARB did not conduct a proper analysis of the economic impact in the Staff Report or analysis of alternatives by not analyzing the impact of harmonization with the U.S. EPA requirements on air quality, costs, and cost effectiveness of the HD OBD regulation and not analyzing the impact of diminished heavy-duty hybrid available in California on California entities that operate heavy-duty vehicles (e.g., transit districts, other public agencies, private businesses). ARB contradicted itself in the Staff Report with regards to heavy-duty hybrid availability in California by stating that some hybrid system manufacturers are expected to not expend resources for compliance in 2014 and thus not offer hybrids for sale in California beyond 2013, but then stating later that they assume all manufacturers will comply with ARB requirements when discussing the economic impact.

We would support limiting Hybrid and Zero-Emission Truck and Bus Voucher Incentive Project (HVIP) funding to vehicles that comply with ARB"s HD OBD requirements if ARB aligns with the U.S. EPA timeline to ensure hybrid availability in California. (Allison)(BAE)

42. Comment: Time is needed to establish the relationships between the multiple businesses and establish standards that help us do this in single part certification.

There is currently only one engine manufacturer that makes engines certified for use on transit buses in North America and are focused on ensuring a successful launch of HD OBD across their non-hybrid products. (Source: Frost and Sullivan, Mary 2010 Report) – so small (compared to 2 million light-duty hybrids over the same period) that engine manufacturers have not prioritized hybrid approved engine calibrations. Data from the American Public Transit Association 2011 Public Transit Vehicle Database dated October 2011 shows the volumes of CNG and hybrid purchases in California from 2006 to 2011, with 225 hybrid purchases (zero hybrids in 2011) versus 1544 CNG purchases, which does not support ARB's focus on hybrids versus alternate-fueled engines. So there is need for a similar delay for hybrids.

The transit bus industry is not capable of vertical integration in the future, since all North American transit bus OEMs are integrators with no direct ties to engine OEMs. Thus, if ARB's goal is for vertical integration, the

transit bus companies should be exempt from HD OBD requirements until vertical integration is feasible and imminent.

One of ARB's points is that engine manufacturers, who have spent last 4 years trying to respond to the newly imposed HD OBD requirements for their conventional engines, would have also allowed time and resources to support and evaluate interactions with all hybrid systems and make necessary changes in their control systems to secure an additional 1% hybrid market share. These are all not supported by data and by the realities of the current heavy-duty hybrid marketplace. ARB's claim regarding the lack of progress by heavy-duty hybrid system manufacturers since 2009 are groundless, as evidenced by the numerous changes proposed this year to section 1971.1, which includes for the first time a definition for hybrid vehicle. BAE Systems provided detailed information to ARB in May and December of 2011 about their current system diagnostics and service manual but have yet to receive any feedback from ARB regarding their acceptability other than the proposed HD OBD regulation modifications. Since it's been over 8 months since the last submission, it is unlikely ARB will be able to devote the resources necessary to work with manufacturers to certify 2014 model year hybrid OBD systems, even if it were feasible for manufacturers to attempt certification.

Regarding ARB's belief that funds from the HVIP are sufficient financial incentives to accelerate OBD compliance, we disagree – the HVIP program will not incentivize heavy-duty hybrid OBD compliance and will not drive vertical integration of heavy-duty hybrid solutions. BAE agrees with ARB's statements on the ARB webpage for the HVIP program that heavy-duty hybrids are important and supports the goal of HD OBD-compliant hybrids, but we need more lead time. (BAE)

43. Comment: A heavy-duty vehicle typically has external sources for the chassis, transmission, brake system, body, specialized auxiliary equipment, and hybrid system components. The heavy-duty vehicle may just be a "cab chassis" as it leaves the first OE assembler (powertrain, chassis, cab) before further assembly at a body builder (upfitter) to add more equipment and the specialized body for a particular work truck, then may go through a second upfitter before sale. The degree and nature of the highly-proliferated, highly-customized heavy-duty vehicle industry has no parallel in passenger vehicles.

The proposed rule will likely result in negative economic impacts in California for the coming years. (Allison)

Agency Response to Comments 37-43: ARB disagrees with further delaying of the requirements as the U.S. EPA has done, and did not make the changes. Regarding the comment requesting three more years of lead time without having to meet OBD system requirements, ARB disagrees that further lead time is warranted and would not lead to more

effective systems. The requested relief includes no requirement to monitor any of the hybrid system components that can affect emissions or other diagnostics, no requirement for the certified engine OBD system to remain compliant and continue to comprehensively monitor all of the engine emission controls after it has been mated with a hybrid system, and no requirement for any of the engine OBD system monitors to even be able to run and make a pass/fail decision anymore. Absent such fundamental requirements, the system could not be relied upon to identify engines/vehicles in need of emission-related repair even in cases where gross emission faults exist. Further, given many of these vehicles also use ARB incentive monies designed to accelerate the introduction of clean technologies to help offset the purchase of a heavy-duty hybrid, changes that would allow otherwise compliant engines to become less capable in detecting emission-related faults would be inconsistent with ARB's clean air goals.

Regarding the comment that the one year delay will not provide enough time given hybrid manufacturers have little experience with OBD and engine manufacturers will still be devoting most of their resources to 2013 engine OBD systems and have little time to support hybrid system manufacturers, ARB disagrees that further delays will resolve the issues. As noted previously, the requirements for the 2013 model year have been known to industry for many years and even with that, little improvement has been made in understanding the OBD implications of interactions between the engine and hybrid. Further, the hybrid systems will likely continue to be a very small portion of total engine/vehicle sales and as such, will continue to struggle to get large levels of resource support from the engine manufacturers regardless of the start date. Because of this, ARB expects that the hybrid system manufacturer will need to do a significant share of the work to not only implement OBD on its own components but also to investigate which engine diagnostics are adversely affected by the addition of the hybrid system. This task would include things like identifying key areas of engine operation that are significantly altered or eliminated by the addition of the hybrid system, collecting data on whether engine system diagnostics are still running and completing as expected, and even implanting faults in the major engine emission controls and verifying they are still detected properly. While these tasks will likely require interaction with the engine manufacturer, each could be largely accomplished by the hybrid system manufacturer to understand the nuances of each hybrid system and bring to light issues which then need to be resolved by the hybrid system manufacturer, the engine manufacturer, or even jointly. With the current regulatory structure, should it be necessary, these issues could qualify for deficiencies and further work to better quantify and resolve them could spill over into subsequent model years.

Regarding comments that the rule will have negative impacts to the economy and leading role the U.S plays in heavy duty hybrid vehicles, ARB disagrees. In order to secure and maintain a leading role in the

hybrid arena and have products that meet or exceed the needs of all hybrid stakeholders, (e.g., manufacturers, vehicle operators/operators, those subject to unhealthful air quality, government), hybrid vehicles need to be as clean and efficient and have the most capable OBD systems as possible. The commenters' proposals to further delay the requirements put off inevitable and necessary development to maintain the existing leading position the U.S. heavy duty hybrid sector may have. The regulatory requirements as adopted put the affected stakeholders on a reliable path to have more capable hybrids introduced into the field as soon as possible. While this may cause some near-term tradeoffs and changes in product offerings, ARB expects they will be offset by the long-term gains and success.

ARB also disagrees with the commenters who state that the rationale for delaying OBD on heavy-duty alternate-fueled vehicles should also apply to heavy-duty hybrid vehicles. Staff originally delayed the implementation of OBD systems on heavy-duty alternate-fueled vehicles based on past light-duty experience where it was common practice that an alternate-fueled vehicle was produced by converting an OBD compliant stoichiometric spark-ignited gasoline vehicle to a similarly operated alternate-fueled vehicle that relied on the same emission controls and operating strategies. Although such a conversion could adversely impact the emission level that certain major monitors were designed to detect faults at (e.g., no longer detect EGR low flow faults before 1.5 times the tailpipe standards but rather at the same level of low flow but with a corresponding higher tailpipe emission level), the system was still otherwise predominantly fully functional in detecting all required faults. However, staff subsequently made changes to accelerate implementation of full OBD systems on alternate-fueled engines as early as lead time would allow upon staff gaining further experience with typical heavy-duty alternate-fueled conversions which can include dramatic changes to the emission controls and operating strategies (e.g., changing compression-ignition engines to spark-ignition engines, changing lean diesel operation and associated emission controls to stoichiometric alternate-fueled operation with different emission controls). Such significant changes mean the staff's previous assumptions that the original gasoline or diesel engine OBD system would mostly be fully functional were no longer valid and, accordingly, staff took action to move to full OBD system implementation as early as possible. Likewise, hybrid conversions generally result in dramatic changes to the in-use engine operating conditions that can severely disrupt the standard emission controls and strategies as well as cause substantial issues with the OBD system that is already present on the engine. Given the potential for much larger detrimental impacts to existing certified systems, combined with ARB financial support for purchase of the vehicles, it would have been inappropriate to exempt hybrid vehicles from maintaining existing OBD system capability for an extended period of time.

Regarding the comments that transit buses are not vertically integrated and thus warrant additional relief, staff does not agree that transit buses should be exempt from meeting the HD OBD requirements. ARB's goal is not to have all products vertically integrated but rather to have the engine and hybrid system properly designed to be compatible with each other to have the resultant system comply with all emission requirements including OBD. With respect to OBD, transit buses are no different from any other heavy-duty hybrid or non-hybrid application and thus will require a similar approach as other applications to implement a full OBD system for the engine and hybrid system. Transit buses do, however, often operate in densely-populated areas that are economically and environmentally challenged, and such areas would likely benefit the most from fully compliant systems that minimize in-use emissions.

Concerning the comment that ARB provided only one year of lead time to implement OBD systems on hybrid vehicles, this statement is incorrect since the HD OBD regulation has required monitoring of the hybrid components since regulation was first adopted in 2005 and these issues have been discussed at length during the 2009 HD OBD rulemaking update. Regarding the comment that it is ARB's belief that the availability of HVIP funding is sufficient to offset the costs associated with developing OBD systems on hybrids, ARB never claimed this but believes that the HVIP funds, intended to accelerate the introduction of clean technologies, should not be used to support hybrid systems that lead to increased in-use emissions. Funding should instead be used to accelerate introduction of technologies that offer benefits above and beyond what is required by emissions standards, which include greenhouse gas standards, criteria pollutant tailpipe standards, and OBD requirements. Further, while the commenter denies ARB's claim of the heavy-duty hybrid manufacturers' lack of progress in meeting the OBD requirements since 2009, ARB notes that the issues identified back in 2009 as needing work and resolution to make hybrid systems compatible with OBD systems do not seem to be any closer to being resolved today. Concerning the commenters' indication that ARB contradicted itself in the Staff Report by stating heavy-duty hybrid manufacturers are not expected to expend resources to comply in 2014 and then stating later that they assume all manufacturers will comply, the commenter misunderstood the language in the Staff Report in that we never asserted that we believe all hybrid manufacturers will comply with the OBD requirements in 2014.

Lastly, ARB disagrees with the comment that ARB's goal is for vertical integration of the industry. ARB's goal is to have hybrid vehicles that have maximum efficiency and meet all of the ARB standards (including tailpipe standards and OBD requirements) to ensure low emissions in-use. While ARB does believe that this will likely require more interaction between hybrid system manufacturers and engine manufacturers, ARB does not believe that this necessitates vertical integration of the heavy-duty industry. A significant amount of integration already occurs between hybrid system and engine manufacturers, though this likely focuses solely

on meeting acceptable driveability and performance requirements and without a corresponding level of effort dedicated to ensuring the combined system meets tailpipe standards and OBD requirements.

OTHER REQUIREMENTS

44. Comment: ARB's proposed revised definition of "diagnostic or emission critical" in the HD OBD and OBD II regulations appears to include all or most sensors and other potential devices used in connection with the engine, and potentially will require a proliferation of calibration identifiers (CAL IDs) and calibration verification numbers (CVNs). The language is ambiguous and raises concerns that more CAL IDs and CVNs may be required. The definition should be revised to minimize the number of controllers required to report CAL IDs and CVNs, which seems to be the ARB staff's intent in the Staff Report, and should state not only what is "diagnostic or emission critical" but also what is not, which may require specific exceptions be written in. (EMA)

    Agency Response: The commenter is mistaken regarding the OBD II regulation – ARB did not propose any revisions to the definition of "diagnostic or emission critical" in the OBD II regulation as part of this rulemaking, and thus did not make any changes in response to these comments. However, for the HD OBD regulation, ARB agrees with the commenter and made additional revisions to the definition of "diagnostic or emission critical" to address the concerns as part of the 15-day notice. ARB staff intends to propose similar changes to the OBD II regulation at the next OBD II biennial review.

45. Comment: In the OBD II regulation, the PM filter frequent regeneration monitor and the PM filter incomplete regeneration monitor should use the denominator specifications requiring at least 500 cumulative miles of vehicle operation, the same as the other PM filter monitors. (Mercedes)

    Agency Response: ARB disagrees and did not make this change. The OBD II regulation currently requires manufacturers to submit alternate criteria to increment the denominator for the PM filter frequent regeneration monitor and requires manufacturers to increment the PM filter incomplete regeneration monitor if, in addition to the general denominator criteria, a regeneration event is commanded for at least ten seconds. The commenter believes that the requirements should be streamlined to require all PM filter-related monitors to use the same denominator criteria, though they did not indicate the specific reason for the streamlining. The PM filter incomplete regeneration monitor is supposed to detect faults "when the PM filter does not properly regenerate under manufacturer-defined conditions where regeneration is designed to occur", and thus should require that the system is commanding regeneration to occur in order to determine if a fault is present. The PM filter frequent regeneration monitor detects faults that cause regeneration to occur more frequently than normal, and thus should not be tied to a

denominator that increments when at least 500 cumulative miles of vehicle operation have occurred, which is the estimated time a regeneration event is expected to occur once. Thus, ARB staff believes the current denominator criteria for both monitors are appropriate.

46. Comment: The HD OBD and OBD II regulations should be modified to be consistent with the SAE J1939-73 standard language that existed since the late 1990s for the reporting of J1939 test results. Specifically, if the OBD system fault memory is cleared in a J1939 system, the test results should report either zero for the test results and test limits or "test not complete", and starting in 2016, the test results should report "test not complete". (EMA)

    Agency Response: For the HD OBD regulation, ARB agrees and made the changes as part of the 15-day notice. For the OBD II regulation, ARB did not make the changes, since this issue only applies to engines or vehicles using the SAE J1939 protocol and that protocol is limited to use only on heavy-duty diesel engines.

47. Comment: We are concerned about the proposal in the OBD II regulation to require medium-duty vehicles certified on the chassis dynamometer to meet the monitoring requirements and malfunction criteria applicable to passenger cars, light-duty trucks, and medium-duty passenger vehicles starting in the 2016 model year. We are concerned this will not be feasible for some monitors due to the significant increase in stringency of the requirement, particularly for aftertreatment monitoring. Chassis dyno-certified medium-duty vehicles use similar emission control technology as engine dyno-certified medium- and heavy-duty vehicles. In fact, the diesel engines used in medium-duty vehicles are most often used in engine-certified medium- and heavy-duty applications. So they will be faced with the same monitoring feasibility issues as their engine-certified counterparts. There is no reason chassis-certified vehicles then should be subject to more stringent malfunction criteria than engine-certified vehicles. Among the advantages of chassis dyno-certified medium-duty vehicles is the ability of ARB to readily conduct confirmatory testing of compliance with the OBD requirements. But this proposal would deter manufacturers from certifying medium-duty vehicles on the chassis dynamometer in the future. ARB should instead require chassis dyno-certified medium-duty vehicles to meet the same requirements as engine dyno-certified medium-duty vehicles. (EMA)

    Agency Response: ARB disagrees and did not make the changes. Gasoline and diesel medium-duty vehicles are subject to less stringent chassis dynamometer tailpipe emission standards than light-duty passenger cars and trucks. Further, the chassis dynamometer test cycles exercise the engines over a smaller range of speed and loads compared to the engine dynamometer test cycles. As such, the OBD II threshold, which is a multiplicative factor applied to the tailpipe standard, is also correspondingly less stringent than the OBD threshold for light-duty

passenger cars. Additionally, the OBD II regulation currently requires manufacturers of diesel engines who choose to certify to the chassis standards to submit a proposal for equivalent OBD thresholds to those defined for engine dynamometer-certified products. At the time that language was created, there were no diesel medium-duty products choosing the path of chassis certification. However, since that time, virtually every diesel medium-duty product has switched to chassis certification, and staff has obtained knowledge about the fault detection capabilities of these systems. Based on the past few years of certification, several manufacturers have already demonstrated fault detection capability at the equivalent multiplicative factor to which the light-duty passenger cars are subject and this is more telling about stringency and feasibility than arguments about the relative stringency of chassis based detection to engine based detection. As such, the same relative thresholds are both feasible and appropriate to ensure emission-related faults are detected in a timely manner to minimize excess emissions in-use.

48. Comment: EMA requests that ARB either remove infrequent regeneration-based monitors from readiness groups or create a new readiness group to capture all infrequent regeneration-based monitors. EMA is concerned that these monitors, which run only once every 300-500+ miles, are causing properly functioning vehicles to frequently appear "not ready" for I/M testing, which causes problems for inspection facilities, end users, and manufacturers. While various monitors depend on PM filter regeneration to complete, PM filter regeneration occur at intervals of hundreds or thousands of miles, or tens to hundreds of hours so that these monitors also take similarly long to complete. Additionally, Infrequent monitors are spread among several readiness groups, so it may take a long time for all (or all but one) readiness groups to complete after code clearing events, which may occur when the control module is reprogrammed or a vehicle serviced at a repair facility prior to an inspection. Jurisdictions with I/M programs that currently test medium-duty diesel vehicles typically adopt the gasoline vehicle practice of allowing zero or one "not ready" monitor readiness group to pass. As a result, properly functioning diesel vehicles in California are at risk of failing inspection, especially after codes are cleared. If a vehicle fails, the customer may be inconvenienced and frustrated by such a failure and by the steps necessary to address the "failure" and prepare the vehicle for inspection, including unnecessary time and expense devoted to "solving" the problem. For example, a customer who has completed an OBD repair may still fail I/M and may be told to drive the vehicle for a certain number of miles or hours before returning to the I/M station. This may be repeated if insufficient miles or hours have accumulated to have all monitors pass readiness. (EMA)

    Agency Response: ARB disagrees with separating out the infrequent regeneration-based monitors and did not make the changes. Section 1971.1(h)(4.1) requires manufacturers to store whether or not primary emission controls on the engine have been monitored by the OBD system

since the system's fault memory was last cleared. These data constitute the "readiness groups" referenced in the comment. The data are important for users of the OBD system (e.g., repair technicians and inspectors) to know whether the OBD system has judged specific emission controls as passing, failing, or condition currently unknown. Eliminating individual emission control readiness data or combining the data into one indicator will specifically hinder the ability to learn that the emission control's level or performance is currently unknown. It is true that monitors for some emission controls may operate only once every couple hundred miles, and thus readiness is more likely to be unset for a period of time after the memory has been cleared (e.g., after repair work is done). However, eliminating the data because of how it might be misused in a future Inspection and Maintenance (I/M) program is counterproductive and unnecessary.

Jurisdictions throughout the U.S. that have I/M programs based on OBD-system inspections have the responsibility to understand how OBD systems work and the nature of the data they produce. Further, it is these jurisdictions that have the authority, subject to U.S. EPA approval, to determine their own procedures and policies concerning pass, fail, and system readiness requirements. Each jurisdiction develops these rules and procedures with the understanding that it needs to balance inspection effectiveness with readiness criteria that will not be overly burdensome for the vehicle operator to satisfy.

In this light, the U.S. EPA has already worked with jurisdictions (including California) that use OBD-based inspections for medium-duty diesel vehicles, and with vehicle and engine manufacturers, to address the very issues raised by EMA through proper use of the data as opposed to its elimination as is suggested in the comment. The guidance, titled "Best Practices for Addressing OBD Readiness in IM Testing of Diesel Vehicles Under 14,000 Pounds Gross Vehicle Weight Rating" was published by the US EPA on March 7, 2013, and is available online: (e.g., *www.obdclearinghouse.com/index.php?body=get_file&id=1612*).

No jurisdiction in the U.S. currently has an OBD-based inspection and maintenance program for heavy-duty vehicles (greater than 14,000 lbs); however, similar principles and concepts can and would be applied should such programs be implemented in the future.

49. Comment: The service information requirements in the HD OBD regulation should be deleted since ARB adopted amendments to section 1969 in 2006 incorporating heavy-duty engine service information requirements and since it's inappropriate for two separate ARB regulations to separately promulgate rules and separately administer them on the same topic. (EMA)

    Agency Response: ARB agrees and deleted the service information requirements from the HD OBD regulation as part of the 15-day notice.

50. Comment: The diesel medium-duty and heavy-duty OBD timing for production engine/vehicle testing of monitoring requirements should be extended from the proposed six months after the start of engine or vehicle production to nine months in order to address manufacturers' real concerns and challenges in getting testing completed. Concurrently, the retroactive deficiency allowance should be extended from six months to nine months after the start of production. Such changes are necessary because of the unique nature of diesel engines and systems, with diesel OBD systems often having twice as many MIL-illuminating fault codes to demonstrate (up to 500+ fault codes) compared with gasoline engines, and many diesel monitors requiring extended vehicle operation and/or extended soak periods to detect faults. Engine manufacturers typically have been unable to complete testing within the six month requirement, with staff often extending the testing periods. It is important to manufacturers that issues identified beyond the six-month period be allowed to be considered for retroactive deficiencies. (EMA)

    Agency Response: ARB disagrees and didn't make the changes. One of the main goals of the production engine/vehicle testing of monitoring requirements is for manufacturers to find problems and implement fixes as early as possible to minimize the number of engines/vehicles with these problems on the road. The problems found during this testing were never meant to make it to production, and finding them early in the model year would minimize any adverse impacts. Extending the deadline for this testing would result in manufacturers finding problems too late to effectively achieve this. Extending to 9 months would essentially allow the entire model year to be built before the problem was discovered and reported to ARB, which greatly undermines the intent to find problems early enough to correct them, if necessary, during the model year.

51. Comment: For the HD OBD regulation, EMA proposes that deficiencies identified in 2010 (or later) be allowed to be carried over for three years (instead of the currently required two years) without additional EO approval, with the option of one additional year if substantial hardware changes are necessary, and with the allowance extending into the 2013 and 2014 model year only. This issue deals with deficiencies that apply to a particular technology and where further refinement is needed in order to make the technology fully compliant. The extra year would allow manufacturers to achieve compliance without having the "hard stop" of having to pull the product out of production. (EMA)

    Agency Response: ARB staff agrees with extending the allowance for deficiencies first identified in 2010 or 2011, and revised the HD OBD regulation as part of the 15-day notice.

52. Comment: The medium-duty OBD II NOx enforcement threshold (+0.2 additive) in the OBD II enforcement regulation (section 1968.5(b)(6)(A)(ii)(d)) are significantly tighter than the HD OBD threshold

(2 times multiplier) for the same malfunction threshold (section 1971.5(b)(6)(A)(ii)(a)). Using a standard of 0.2 as an example, the OBD threshold is 0.2+0.3=0.5, with the medium-duty OBD II enforcement threshold being 0.5+0.2=0.7 and the HD OBD enforcement threshold being 0.5x2=1.0. The medium-duty OBD II NOx enforcement threshold should be changed to +0.4 above the malfunction threshold, which is still tighter than the HD OBD threshold but will allow more in-use separation and better measure of a non-conforming system. (EMA)

Agency Response: ARB staff disagrees and did not make the change. Medium-duty vehicles have been subject to OBD requirements since 1997 while OBD requirements for heavy-duty engines started in the 2010 model year. So while both classes have relatively the same time with newer emission control technologies, the medium-duty sector is much further along in OBD system capability as well as have much more constrained applications (as opposed to the horizontally-integrated nature of the heavy-duty industry) that make it more likely for manufacturers to correctly calibrate emission-threshold-based OBD monitors on medium-duty vehicles versus their heavy-duty counterparts.

15-DAY COMMENTS

DEFINITION OF "EMISSION STANDARD" AND "NONCONFORMING OBD SYSTEM"

53. Comment: ARB's proposed redefinition of the term "emission standard" does not conform to any specific federal law or regulation, and so is unlawful. ARB asserts that its proposal to redefine "emission standards" – solely "for the purposes of HD OBD compliance" – is consistent with dicta from a U.S. Supreme Court case, EMA v. SCAQMD, 541 U.S. 246 (2004). But ARB's position reflects a fundamental misunderstanding of the SCAQMD case, which did not alter the definitions of terms found in any federal laws or regulations. In SCAQMD, the Court was interpreting the CAA's provision broadly preempting states from adopting or enforcing "any standard relating to the control of new motor vehicles or new motor vehicle engines…" CAA § 209, 42 U.S.C. § 7543. The issue before the SCAQMD court was whether or not state restrictions on the purchase of certain vehicles by fleet owners constituted "standards related to the control of emissions." The respondent in the case, South Coast Air Quality Management District, took the position that the phrase "standards related to the control of emissions" referred only to emission-related sales restrictions imposed directly on vehicle/engine manufacturers. The SCAQMD Court ultimately held that the phrase "standards related to the control of emissions" does apply to state purchase restrictions, and therefore such restrictions are subject to the preemptive effect of CAA § 209. ARB's attempt to use the SCAQMD case as support for its proposed change to California's definition of "emission standards" is faulty. The CAA § 209 phrase "standards related to the control of emissions," on its

face, has a different and broader meaning than the term "emission standards" in the California HSC. Congress sought to preempt states from adopting or enforcing any sort of measure with any connection to motor vehicle emissions, and therefore inserted an expansive phrase into CAA § 209 to suit that specific purpose. The fact that the Court gave this broadly-worded phrase an appropriately broad meaning, in the context of an express preemption provision, does not mean that the Court imparted a new definition to the meaning of "standard" everywhere that it appears in the CAA. (EMA)

54. Comment: The proposed additional revisions to the terms "emission standard" and "nonconforming OBD system" are invalid under California law, arbitrary and capricious, and clearly violates the directly applicable ruling of the California Superior Court in EMA vs. CARB (Case No. 34-2010-82774), which held that OBD sensor malfunction criteria are not emission standards and cannot serve as a basis for mandatory engine recalls under California HSC Section 43105. So they should not be approved. (DTNA)

    Agency Response to Comments 53-54: See the agency response to comments 11-12 above.

55. Comment: ARB's position here relies on the Court's in-passing statements to the effect that CAA "standards" encompass "some other design feature related to the control of emissions" in addition to numerical limits on the emissions of pollutants. While such statements make sense in the context of the Court's review of the broadly-worded phrase in CAA § 209, they are nothing more than dicta outside of that context. The SCAQMD Court was not asked to determine the technological scope of the term "emission standards" or any comparable term in federal laws or regulations, nor was it asked to decide whether OBD requirements are "emission standards" for all purposes under federal laws and regulations. Such questions were simply not before the Court, and not briefed by the parties in SCAQMD; yet ARB seeks to seize on this dicta and use it as the basis for changing its regulations. Supreme Court dicta is not the equivalent of a federal statute or regulation, and so is not a proper basis for redefining terms under the California HSC in any event. Thus, ARB's effort to redefine terms to meet its own agenda – an agenda to grant to itself expanded recall authority beyond that intended by the California legislature -- is inconsistent with HSC section 39601(b) and, as a result, invalid. In reality, ARB's pending proposal to redefine statutory terms is nothing more than an exercise in bootstrapping. ARB wants the authority to order mandatory engine recalls if OBD sensors do not trigger MILs when various OBD sensor malfunction criteria are exceeded. But ARB faces a fundamental problem in that regard due to the fact that mandatory engine recalls are only available under HSC section 43105 when there has been a violation of emission standards, and OBD sensor malfunction criteria are not "emission standards," as defined under California law. To "fix" that, ARB seeks to invent for itself a new and expanded definition of

"emission standard," which ARB hopes will be broad enough to encompass OBD sensor malfunction criteria. In that way, ARB can attempt to bootstrap itself into a position of unilaterally-expanded authority to compel mandatory engine recalls. While ARB's attempted power grab is certainly bold and transparent, it is nonetheless invalid. A basic requirement to any attempt by ARB to redefine terms is that ARB "conform those definitions to federal laws and rules and regulations." (HSC §39601(b).) In its eagerness to expand its recall authority unilaterally, ARB failed to adhere to that basic requirement. As a result, the proposed amended definitions are invalid and should not be approved. (EMA)

Agency Response: Please see the agency response to comments 9-12 above. As stated there, the Supreme Court's interpretation of what is a standard related to the control of emissions (i.e., an emission standard) was at the heart of its decision in *EMA v. SCAQMD*. The Court's interpretation of that term, in the Court's own words, was fully consistent with Congress' use of the term throughout Title II of the CAA. ARB was fully within its authority to conform the definition of emission standard to the definition of the term as used in Title II of the CAA, as interpreted by the Supreme Court.

ARB disagrees with the commenter that ARB only has authority to take corrective action, including recall, for violations of emission standards. Although EMA prevailed on this question before the lower court in *EMA v. ARB,* that decision is presently undergoing appellate review, and the appellate court will consider *de novo* ARB's arguments that it has authority to fully enforce its regulations. No injunction or stay has been put into place by either the lower court or the appellate court that prevents ARB from prudently amending the HD OBD and OBD II regulations to ensure their enforceability. In amending the regulations, ARB reserves its right in the *de novo* review in the appellate court to pursue all arguments raised in the lower court as to its authority under the Health and Safety Code to fully and completely enforce its regulations pursuant to the directives of the Legislature.

56. Comment: ARB claims that it is redefining the term "emission standard" solely "for the purposes of HD OBD compliance" (solely "as it applies to OBD compliance and the remedies provided for in the Health and Safety Code for noncompliance"), which presumably means that the existing definition of "emission standard" as codified at HSC section 39027 will apply for all other purposes. ARB's provisional authority under HSC section 39601(b) to redefine terms does not include the authority to give a different meaning to the same statutory term solely to suit ARB's fluctuating purposes. To the contrary, ARB's effort to ascribe a different meaning to the same statutory term solely for the purpose of manufacturing expanded recall authority for itself is nothing short of arbitrary and capricious, and is far outside the scope of ARB's delegated authority. Consequently, ARB's proposed exercise in semantic gamesmanship is, again, unlawful and invalid. (EMA)

Agency Response: Please see the agency response to comments 11-12 above. Contrary to the commenter, nowhere in the regulation or supporting documents does ARB claim that the revised definition will only apply to the HD OBD regulation. As stated above, the definition has been initially included as part of the OBD regulation because of issues and concerns raised by stakeholders regulated by the OBD regulations, and the fact that it has long-planned to reopen the HD OBD and OBD II rules for amendment in 2012. ARB's intent in specifically applying the revised definition to the two OBD rules was to prudently act to make it clear that the regulations are fully and completely enforceable under California law. As stated in the agency response to comment 11-12, ARB staff will in the near future be bringing to the Board for its consideration a proposal that the revised definition be applicable to other motor vehicle regulations.

57. Comment: ARB's proposal to redefine the term "emission standard" solely for the purposes of HD OBD compliance and enforcement is a transparent attempt to short-circuit the Superior Court's ruling. It is an attempt that is bound to fail. No amount of definitional gymnastics can contort a malfunction criterion for an OBD sensor into an "emission standard" as properly defined under current California or federal law. Thus, ARB's latest and last-minute revisions to its HD OBD program should be recognized for what they are - - a bald attempt to disregard the directly applicable ruling of the California Superior Court, and an even more transparent grab for expanded recall authority that ARB is not entitled to under the controlling California statutes. ARB should not continue with this misguided course of action, as its only result will be additional legal proceedings. (EMA)

Agency Response: Please see Response to Comments 9-12 above and 56. As stated, ARB has appealed the decision of the lower court, and the appellate court will review that decision *de novo.* While continuing to reserve all arguments raised in the lower court, ARB determined that the most prudent action was to amend the regulation expeditiously to make it clear that OBD systems are emission standards and fully enforceable under California law. ARB took such action pursuant to authority expressly granted to it under HSC sections 39010 and 39601(b). ARB was not precluded from taking such action as EMA has not pursued, and no court has granted, any injunction prohibiting ARB from attempting to cure any perceived defects identified by the lower court regarding the ARB's authority. Regarding EMA's claims of definitional gymnastics, the definition adopted by the Board fully conforms to the Supreme Court's interpretation of the meaning of standard as used by Congress in Title II of the CAA.

HEAVY-DUTY HYBRIDS

58. Comment: ARB should delay the implementation of the 2014 single party certification requirements and OBD compliance for heavy-duty hybrid transit buses to coincide with the EPA implementation in 2016/2017. The 2014 requirement means GILLIG will be unable to provide fuel efficiency hybrid transit buses to California transit properties. GILLIG, which purchases engines from Cummins and hybrid systems from Allison and BAE, has hybrid suppliers that are uncertain if their OBD systems will meet ARB requirements in 2014. GILLIG is unable to obtain a commitment from any of our suppliers to carry the single party certification for the combined heavy-duty engine/hybrid powertrain system combination. If we continue down this path, California transit properties will be forced to purchase less efficient larger displacement diesel engine conventional transmission powertrains instead of hybrid powertrains, which are capable of fuel economy improvements of 25 percent over the conventional configuration. The economic impact of higher fuel consumption will be felt for the 12-year bus life with a larger environmental impact. (GILLIG)

59. Comment: The ARB regulations should match those of EPA. While we hoped for faster commercialization, lower costs and greater technological improvements with increased market penetration of diesel hybrid vehicles, the market expansion has been slower than anticipated. Any regulatory efforts that discourage further hybrid use will keep the hybrid market in this immature state for a longer time, leading to less development of the kind of technology integration that would make comprehensive OBD much more practical to design and certify. While we appreciate the delay to 2014, this requirement is still unrealistic in the heavy-duty transit bus market. Not extending the compliance deadline like EPA will eliminate further expansion of heavy-duty diesel hybrid transit buses in California and will force transit properties to buy straight diesel engines, resulting in higher greenhouse gas emissions and increased fuel usage.

    VTA understands the frustrations that the subsidies provided in the HVIP program have not been met with sufficient efforts in technological integration that would allow for straightforward compliance with the OBD requirements. However, no heavy-duty transit bus is included in the approved HVIP vehicle list, and the hybrid systems used in vehicles on the list have been found unsuitable (the Eaton system used on most does not fit when the engine is in the rear) for any heavy-duty bus. The heavy-duty bus market is much smaller and more unique than medium truck and cutaway buses, so even if there is progress in the trucking hybrid market, developments there would not be automatically transferred over to the bus side. Heavy-duty transit hybrid volumes from Allison and BAE are low nationwide, so their leverage with Cummins, the only engine manufacturer in the heavy duty transit field, is low. So there is nothing hybrid suppliers can do if Cummins does not want to work with them. From a business standpoint, cooperating with Cummins may be hard, since the engineering

needed would be as great or more compared to other markets but with much lower potential sales in California (a Cummins-Eaton design would cover most of the truck market, but Cummins would need to work with both BAE and Allison for the heavy-duty transit market). The reason hybrid technology is not gaining greater market share in the heavy-duty transit is the high costs, and making the case for higher costs not for emissions but for getting likely rare warnings of emissions equipment issues is difficult.

While it is possible hybrid system controls could unintentionally subvert engine emission systems, this is speculative. Another ARB department is investigating this via in-use vehicle testing, but the testing protocol won't be determined until the end of 2013 at the earliest. So it's premature to require fixing a problem that may be non-existent. The environmental benefits of hybrids are not in dispute, with lower emissions due to reduced fuel consumption and engine shutdown at idle. However, there may still be idle allowed in case of constant stop-and-go traffic and for bus comfort at layovers up to the 5-minute limit, with the idle time as much as OBD compliant diesel trucks, so ARB's concern that emission control strategies that require input from the idle stage in order to calculate overall emissions will be affected is unlikely. Further, any deterioration of the battery as hybrid systems age (resulting in higher emissions) will be noticed as lower fuel mileage by transit providers and would spur them to immediately address the issue. BAE and Allison anticipate this and both offer 5-year warranties on their battery packs and offer battery rebuild kits expected to be needed after 6-7 years of service based on experience at other transit properties nationwide. Further, the likely worst case for battery pack deterioration are NOx emissions at the same levels of straight diesel buses, and PM emissions are currently not affected either way by the hybrid system due to modern control strategies focused on exhaust aftertreatment, though they are reduced by engine shutdown at idle.

ARB's proposal to allow some deficiencies in 2014 is a high risk strategy for manufacturers, depending on staff's judgment of the good faith effort, and is difficult to achieve. One manufacturer now has some OBD designed but is unlikely to have only the few deficiencies allowed, while the other manufacturer is further behind with their lower-cost system that is the only competition that can drive hybrid prices down, a prerequisite for getting the necessary diesel hybrid market growth in heavy-duty transit. Asking them to reduce their current engineering efforts in areas such as electrification of onboard components (to reduce fuel consumption and greenhouse gas emissions) and the engine shutdown at idle feature to work on OBD would likely make them withdraw from the California market. Even if there is one heavy-duty transit hybrid drive manufacturer that meets ARB's requirements, the California transit properties would be at the mercy of the higher cost supplier. Lower prices makes diesel hybrids a better choice, while higher prices to recoup OBD development costs would make buying diesel hybrids a bad choice for the transit properties. ARB staff had already recognized that the path to achieve hybridization of

California's transit buses involves increased competition, which leads to lower prices, which lead to increased sales, which lead to further development of the technology, which lead to the ability to have single certification of OBD equipment. (VTA)

Agency Response to Comments 58-59:This comment extends beyond the scope of the modifications made available in the 15-Day Notice because it does not raise any objections or recommendations directed to those specified modifications. Nevertheless, ARB provides the following response.

ARB supports the efforts to promote hybrid technologies in the heavy-duty vehicle sector and believes they are necessary to ARB's plans to reduce greenhouse gases and criteria pollutants. Hybrid technologies, however, need to be carefully implemented to ensure low emissions, and OBD systems are an integral and critical part of every emission control solution. To ensure proper operation of emission controls and the OBD system, there needs to be a high level of integration between the engine and hybrid systems. Integrating hybrid systems without this attention can have detrimental effects on the system, and ARB therefore expressly disagrees with the commenter's statement that it is "speculative" whether hybrid system controls could subvert engine emission systems. In fact, recent certification data of OBD-equipped engines for hybrid applications indicates that certain monitors had to be disabled to prevent the false detection of malfunctions while the ability of other monitors to correctly detect faults had not been verified.

ARB disagrees with the statement that its proposal to allow some deficiencies in 2014 is a high risk strategy and is difficult to achieve. Despite the lack of significant progress in the development of heavy-duty hybrid OBD systems by manufacturers of heavy-duty vehicle powertrains, ARB seeks to keep hybrids in the marketplace while maintaining a clear target for full compliance. This would involve certifying noncompliant OBD systems with deficiencies under the OBD regulation, which ARB plans to use to encourage continued certification of hybrid powertrains for the 2014 and subsequent model years. The need for deficiencies was anticipated during the development of ARB's proposal and accordingly the proposal includes more latitude in the deficiency provisions for hybrid related issues for the 2013 through 2015 model years. ARB has worked and is committed to continue working with heavy-duty engine and hybrid system manufacturers and other stakeholders to identify hurdles to certification with the intent to have industry on the path of rapid progress toward full compliance over the next few years, while advocating products to be available in the interim so that the industry is able to meet its goals for near-term procurement of hybrid buses. Indeed, discussions with these manufacturers have indicated that many of the issues applicable to hybrid buses may be addressed using the deficiency provisions in the regulation, which are not limited in quantity as long as there is an ongoing good faith effort in complying with the regulation and continuing improvement to the

overall capability of the system, though there is a limit to the number of years the deficiencies can be carried over. Also see agency response to comments 37-43.