

State of California  
AIR RESOURCES BOARD

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

PROPOSED REVISIONS TO THE ON-BOARD DIAGNOSTIC SYSTEM  
REQUIREMENTS AND ASSOCIATED ENFORCEMENT PROVISIONS FOR  
PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES  
AND ENGINES

Public Hearing Date: September 24-25, 2015  
Agenda Item No.: 15-7-8

**I. GENERAL**

**A. ACTION TAKEN DURING THIS RULEMAKING**

In this rulemaking action, the Air Resources Board (ARB or Board) adopted amendments that revised the on-board diagnostic II (OBD II) system requirements and associated enforcement provisions for passenger cars, light-duty trucks, and medium-duty vehicles and engines to account for Low Emission Vehicle III (LEV III) applications, to update monitoring requirements for gasoline and diesel vehicles and engines, and to clarify existing provisions of the regulations. The Board also adopted amendments to the definition of “emissions-related part” to incorporate the “Emissions Related Parts List,” as last amended June 1, 1990. The amendments to the OBD II regulation and to the OBD II enforcement regulation are codified in sections 1968.2 and 1968.5, and the amendment to the definition of “emissions-related part” is codified in section 1900 of title 13, California Code of Regulations (CCR).

The Staff Report: Initial Statement of Reasons for Rulemaking (staff report), entitled “Technical Status and Proposed Revisions to On-Board Diagnostic System Requirements and Associated Enforcement Provisions for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II),” released August 4, 2015, is incorporated by reference. The staff report contains a description of the rationale for the proposed amendments. The text of the proposed amendments to title 13, CCR, sections 1900, 1968.2, and 1968.5 was included in the appendices to the staff report. On August 4, 2015, all references relied upon and identified in the staff report were made available to the public. All documents associated with this rulemaking were made available to the public and are available on ARB’s website at:

<http://www.arb.ca.gov/regact/2015/obdii2015/obdii2015.htm> .

On September 25, 2015, the Board conducted a public hearing to consider staff’s proposed amendments. At the conclusion of the hearing, the Board approved Resolution 15-44 approving for adoption the proposed amendments to sections 1900, section 1968.2, and 1968.5 that were initially proposed by staff and described in the Notice of Public Hearing (45-day notice) and staff report, along with modifications suggested by staff in Attachment D presented at the hearing. The modifications in Attachment D were made in response to comments received

after the staff report was published on August 4, 2015, as part of the 45-day notice. The resolution directed the Executive Officer to make the modified regulatory language in Attachment D, and any additional conforming modifications, available for public comment, with any additional supporting documents and information, for a period of at least 15-days and consider written comments submitted during the public comment period, and to make any modifications as may be appropriate in light of the comments received. The Executive Officer was directed to then either adopt the final regulatory amendments or to present the amendments to the Board for further consideration if warranted in light of the comments.

After the September 25, 2015 public hearing, staff proposed modifications to the originally proposed amendments to title 13, CCR sections 1968.2 and 1968.5. Staff additionally proposed modifications to sections 1900, 1956.8, 1971.1, 1971.5, and 2485 of title 13, CCR, and sections 95302 and 95662 of title 17, CCR to resolve pending lawsuits regarding ARB's authority to adopt definitions of the term "emission standard" that revised the definition of that term as set forth in Health and Safety (H & S) Code section 39027.

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 through a "Notice of Public Availability of Modified Text and Availability of Additional Documents" (15-day notice). The 15-day notice and the attachments were distributed on March 21, 2016 to all stakeholders, interested parties, and to other persons generally interested in ARB's rulemaking requirements applicable to OBD II systems. The 15-day notice listed the ARB website where interested parties could obtain the complete text of the regulations that would be affected by the modifications, with all of the modifications clearly indicated and the additional supporting documents. These documents were also published on ARB's webpage established for this rulemaking. The 15-day notice is incorporated by reference.

The resolution also directed the Executive Officer to finalize the Final Statement of Reasons (FSOR) for the regulatory amendments and to submit the final rulemaking package to the Office of Administrative Law for review. The 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 ARB on the proposed amendments during the 45-day and 15-day comment periods and oral comments given at the Board hearing on September 25, 2015, and contains the modifications and ARB's responses to those comments.

## **B. MANDATES AND FISCAL IMPACTS TO LOCAL GOVERNMENTS AND SCHOOL DISTRICTS**

ARB has determined that this regulatory action will not result in a mandate to any local agency or school district the costs of which are reimbursable by the state pursuant to Part 7 (commencing with section 17500), Division 4, title 2 of the Government Code.

## **C. CONSIDERATION OF ALTERNATIVES**

For the reasons explained in the staff report, in staff's comments and responses at the hearing, and in this FSOR, ARB determined that no alternative considered by the agency would be more effective in carrying out the purpose for which the regulatory action was proposed, or would be as effective as and less burdensome to affected private persons, or would be more cost-effective to affected private persons and equally effective in implementing the statutory policy or other provisions of law than the action taken.

## **D. UPDATE TO INFORMATION IN STAFF REPORT**

Staff is making a correction to some information in the staff report. In the staff report, staff indicated that among the 30 companies worldwide that manufacture California-certified light- and medium-duty vehicles, one company is considered a "small business." After publishing of the staff report, staff determined this initial information was incorrect, and that none of the 30 companies are considered small businesses. This correction does not affect any other information in the staff report.

Staff is also making a correction to a reference title cited in the staff report. The staff report indicated "U.S. Market Light Vehicle Deliveries – March 2015 Final Results" as a reference when determining the economic impact of the proposed amendments to the OBD II regulations. Staff actually used (and submitted as part of the references to the rulemaking record) the April 2015 information, not the March 2015 information. Staff is now correcting the reference title to "U.S. Market Light Vehicle Deliveries – April 2015 Final Results."

Staff is also correcting the titles of several of the documents incorporated by reference in the OBD II regulation that were listed in the staff report. Specifically, the staff report did not correctly cite the titles associated with: International Organization for Standardization (ISO) 15765-4, SAE International (SAE) J1962, SAE J1939, SAE J1939-01, SAE J1939-11, and SAE J1939-15, and staff is accordingly amending the titles of those documents to correctly reflect the actual titles of those documents in section II.B. of this document (entitled "Non-Substantial Modifications").

## II. MODIFICATIONS MADE TO THE ORIGINAL PROPOSAL

### A. MODIFICATIONS APPROVED AT THE BOARD HEARING AND PROVIDED FOR IN THE 15-DAY COMMENT PERIOD

Various modifications to the original proposal were made in order to address comments received during the 45-day public comment period, and to clarify the regulatory language. Pursuant to the Board direction provided in Resolution 15-44, ARB released the 15-day notice on March 21, 2016, which placed documents into the regulatory record and presented the additional modifications to the regulatory text.<sup>1</sup> The 15-day notice described each substantive modification to the original proposal and the rationale for the modifications.

### B. NON-SUBSTANTIAL MODIFICATIONS

Subsequent to the 15-day public comment period mentioned above, staff identified the following additional non-substantive changes to the regulation:

- Section 1968.2(c) “Calculated load value” definition: Corrected the title of SAE J1939 from “Recommended Practice for a Serial Control and Communications Vehicle Network” to “Serial Control and Communications Heavy Duty Vehicle Network – Top Level Document.”
- Section 1968.2(c) “Diagnostic or emission critical” definition: Corrected the phrase “criteria (1) and (2)” to “criteria (2) and (3)” at the end of the definition. The sentence of concern clarifies the terms “input component” and “output component,” which are mentioned in criteria (2) and (3) but not in criterion (1).
- Section 1968.2(d)(2.4): Corrected the number “40” to “41” in criterion (2). As part of the 45-day notice, criterion (2) in this section required that the confirmed fault code be erased “no later than the end of the driving cycle in which no malfunction has been detected in 41 consecutive warm-up cycles and the malfunction indicator light (MIL) is presently not illuminated for any malfunction.” To make clearer that only warm-up cycles where the MIL is not illuminated should be counted, staff made changes to criterion (2) as part of the 15-day notice to read “no later than the end of the driving cycle in which no malfunction has been detected in 41 consecutive warm-up cycles and the MIL has not been illuminated for any malfunction for 40 consecutive warm-up cycles.” The number “40” should have been “41” to match the first mention of “41” in criterion (2), so staff is fixing this typo.
- Sections 1968.2(e)(6.3.3) and (e)(6.3.4): Corrected the section references in these sections. As part of the 15-day notice, staff made changes to the gasoline fuel system monitoring requirements, including moving the language in section 1968.2(e)(6.2.6) to (e)(6.2.4)(C). However, staff mistakenly did not make the associated changes referring to these new section references in sections 1968.2(e)(6.3.3) and (6.3.4). Thus, staff modified the language in

---

<sup>1</sup> California Air Resources Board. Notice of Public Availability of Modified Text and Availability of Additional Documents. Posted March 21, 2016. Available online at: <https://www.arb.ca.gov/regact/2015/obdii2015/obdii2015.htm>

section 1968.2(e)(6.3.3) from “malfunctions identified in section (e)(6.2.4)” to “malfunctions identified in section (e)(6.2.4) (except malfunctions identified in section (e)(6.4.2)(C), which is provided for per section (e)(6.3.4) below,” and modified the section reference in section 1968.2(e)(6.3.4) from “section (e)(6.2.6)” to “section (e)(6.2.4)(C).” Further, the phrase “sections (d)(3.1)” was corrected to “section (d)(3.1)” in sections 1968.2(e)(6.3.3) and (e)(6.3.4).

- Section 1968.2(e)(8.2.4): Made clarifying changes to the section. The language that was proposed as part of the 15-day notice was intended to allow manufacturers to be exempted from detecting exhaust gas recirculation (EGR) system high flow faults during idle conditions if the vehicle stalls immediately at idle, as long as the OBD II system is able to detect EGR system high flow faults during non-idle conditions. However, if the manufacturer is unable to detect this failure during non-idle conditions, the language further allowed manufacturers to be exempt from monitoring of this failure altogether, if the vehicle stalls during idle due to this fault. The 15-day language did not clearly convey these conditions and staff therefore modified this section to more clearly explain the intent of the modifications to this section.
- Sections 1968.2(e)(15.2.3)(I)(ii)b. and (f)(15.2.3)(I)(ii)b.: Corrected the phrases “net watt-hours of energy” and “net watt-hours” to “net energy.” These same corrections were made by staff to sections 1968.2(e)(15.2.3)(I)(iv) and (f)(15.2.3)(I)(iv) as part of the 15-day notice, but staff mistakenly did not make these changes to these other sections.
- Section 1968.2(f)(1.2.2)(B): Deleted two mentions of the phrase “NMHC or NOx.” The language in several other sections in section 1968.2(f) mistakenly referred to specific emissions (e.g., “NMHC emissions,” “PM emissions”) while the newly proposed malfunction criteria for LEV III applications include emission thresholds for all four emission constituents (non-methane hydrocarbon (NMHC)+ oxides of nitrogen (NOx), carbon monoxide (CO), and particulate matter (PM) emissions). The language in these sections were corrected as part of the 15-day notice, but staff mistakenly did not make the same change to section 1968.2(f)(1.2.2)(B).
- Section 1968.2(f)(5.3.1)(A): Added the word “and” between “(5.2.1)(B)(i)” and “(5.2.2)(A)” for better readability.
- Section 1968.2(f)(11.1.4)(A): Corrected the phrase “For vehicles that use a system other than the cooling system and ECT sensor” to “For vehicles that use an engine and/or engine component temperature sensor or system in lieu of the cooling system and ECT sensor”. The language in sections 1968.2(e)(10.1.4) and (f)(11.1.4) (the gasoline and diesel engine cooling system monitoring requirements) was modified as part of the 15-day notice to clarify that the sections applied to “Vehicles that use an engine and/or engine component temperature sensor or system... in lieu of or in addition to the cooling system and ECT sensor for an indication of engine operating temperature for emission control purposes.” While complementary changes were made to the subsection in section 1968.2(e)(10.1.4)(A) (changing “For vehicles that use a system other than the cooling system and ECT sensor” to

“For vehicles that use an engine and/or engine component temperature sensor or system in lieu of the cooling system and ECT sensor”), staff mistakenly did not make these same changes to the subsection in section 1968.2(f)(11.1.4)(A).

- Section 1968.2(f)(15.1.1): Added the word “section” before “(d)(2.2.3)” for better readability.
- Section 1968.2(g)(1.2.2): Corrected the title of SAE J1962 from “Diagnostic Connector – Equivalent to ISO/DIS 15031-3:December 14, 2001” to “Diagnostic Connector.”
- Section 1968.2(g)(1.9): Corrected the title of ISO 15765-4 from “Road Vehicles - Diagnostics Communication over Controller Area Network (DoCAN) - Part 4: Requirements for emissions-related systems” to “Road vehicles – Diagnostic communication over Controller Area Network (DoCAN) – Part 4: Requirements for emissions-related systems.”
- Section 1968.2(g)(1.9.1): Corrected the title of ISO 15765-4 from “Road Vehicles - Diagnostics Communications over Controller Area Network (DoCAN) - Part 4: Requirements for emission-related systems – Amendment 1” to “Road vehicles – Diagnostic communication over Controller Area Network (DoCAN) – Part 4: Requirements for emissions-related systems – Amendment 1.”
- Section 1968.2(g)(1.10.1): Corrected the title of SAE J1939 from “Recommended Practice for a Serial Control and Communications Vehicle Network” to “Serial Control and Communications Heavy Duty Vehicle Network – Top Level Document.”
- Section 1968.2(g)(1.10.2): Corrected the title of SAE J1939/1 from “On-Highway Equipment Control and Communications Network” to “On-Highway Equipment Control and Communication Network”.
- Section 1968.2(g)(1.10.3): Corrected the title of SAE J1939/11 from “Physical Layer, 250K bits/s, Twisted Shielded Pair” to “Physical Layer, 250 Kbps, Twisted Shielded Pair.”
- Section 1968.2(g)(1.10.5): Corrected the title of SAE J1939/15 from “Reduced Physical Layer, 250K bits/sec, UN-Shielded Twisted Pair (UTP)” to “Physical Layer, 250 Kbps, Un-Shielded Twisted Pair (UTP).”
- Section 1968.2(g)(2.2.1): Corrected the phrase “220 N” to “220 Newtons.”
- Section 1968.2(g)(4.3.2): Corrected the section reference from “(g)(4.2.5)(F)” to “(g)(4.2.3)(F).” This section lists the section references of the data stream parameters required to be included in the freeze frame conditions. While the specific data stream parameters included have not changed, the section reference corresponding to each data stream parameter have, so the sections references in this section were modified to correspond to the new section references as part of the 15-day notice. However, staff mistakenly included the incorrect section reference “(g)(4.2.5)(F),” which does not exist in the regulation – the correct reference is “(g)(4.2.3)(F).”
- Section 1968.2(g)(4.7.4)(A): Corrected the word “response” to “respond.”

The above described modifications constitute non-substantial changes to the regulatory text because they more accurately reflect the intent of the requirements, more precisely identify the titles of the ISO and SAE documents, and correct the numbering of sections, spelling errors, and grammatical errors, but do not materially alter the requirements or conditions of the proposed rulemaking action.

### **III. DOCUMENTS INCORPORATED BY REFERENCE**

The regulations adopted by the Executive Officer incorporate by reference the following documents:

- “Emissions-Related Parts List,” June 1, 1990, section 1900(b)(6);
- “California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light Duty Trucks, and Medium Duty Vehicles,” as last amended December 6, 2012, section 1968.2(c) and 1968.2(h)(6.2);
- “California Exhaust Emission Standards and Test Procedures for 2018 and Subsequent Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes,” as last amended May 30, 2014, section 1968.2(c);
- ISO 15765-4:“Road vehicles – Diagnostic communication over Controller Area Network (DoCAN) – Part 4: Requirements for emissions-related systems,” February 2011, section 1968.2(g)(1.9);
- ISO 15765-4:“Road vehicles – Diagnostic communication over Controller Area Network (DoCAN) – Part 4: Requirements for emissions-related systems – Amendment 1,” February 2013, section 1968.2(g)(1.9.1);
- ISO 26262-5 “Road vehicles – Functional Safety – Part 5: Product development at the hardware level,” November 2011, section 1968.2(g)(1.13);
- SAE J1699-3 – “Vehicle OBD II Compliance Test Cases,” July 2015, section 1968.2(g)(1.11);
- SAE 1850 “Class B Data Communications Network Interface,” June 2006, section 1968.2(g)(1.5);
- SAE J1930-DA “Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms Web Tool Spreadsheet,” March 2014, section 1968.2(g)(1.1.1);
- SAE J1962 “Diagnostic Connector,” September 2015, section 1968.2(g)(1.2);

- SAE J1979 "E/E Diagnostic Test Modes," August 2014, section 1968.2(g)(1.4);
- SAE J1979-DA "Digital Annex of E/E Diagnostic Test Modes," June 2014, section 1968.2(g)(1.4.1);
- SAE J2012 "Diagnostic Trouble Code Definitions," March 2013, section 1968.2(g)(1.6);
- SAE J2012-DA "Digital Annex of Diagnostic Trouble Code Definitions and Failure Type Byte Definitions," January 2013, section 1968.2(g)(1.6.1);
- SAE J1939 "Serial Control and Communications Heavy Duty Vehicle Network – Top Level Document," August 2013, section 1968.2(g)(1.10.1);
- SAE J1939-01 "On-Highway Equipment Control and Communication Network," November 2012, section 1968.2(g)(1.10.2);
- SAE J1939-11 "Physical Layer, 250 Kbps, Twisted Shielded Pair," September 2012, section 1968.2(g)(1.10.3);
- SAE J1939-13 "Off-Board Diagnostic Connector," October 2011, section 1968.2(g)(1.10.4);
- SAE J1939-15 "Physical Layer, 250 Kbps, Un-Shielded Twisted Pair (UTP)," May 2014, section 1968.2(g)(1.10.5);
- SAE J1939-21 "Data Link Layer," December 2010, section 1968.2(g)(1.10.6);
- SAE J1939-31 "Network Layer," April 2014, section 1968.2(g)(1.10.7);
- SAE J1939-71 "Vehicle Application Layer," April 2014, section 1968.2(g)(1.10.8);
- SAE J1939-73 "Application Layer – Diagnostics," July 2013, section 1968.2(g)(1.10.9);
- SAE J1939-81 "Network Management," June 2011, section 1968.2(g)(1.10.10);
- SAE J1939-84 "OBD Communications Compliance Test Cases For Heavy Duty Components and Vehicles," February 2015, section 1968.2(g)(1.10.11); and
- SAE J2534-1 – "Recommended Practice for Pass-Thru Vehicle Programming", October 2015, section 1968.2(g)(1.12).



These documents were incorporated by reference because it would be cumbersome, unduly expensive, and otherwise impractical to publish them in the California Code of Regulations. In addition, some of the documents are copyrighted, and cannot be reprinted or distributed without violating the licensing agreements. The documents are lengthy and highly technical test methods and engineering documents that would add unnecessary additional volume to the regulation. Distribution to all recipients of the California Code of Regulations is not needed because the interested audience for these documents is limited to the technical staff at a portion of reporting facilities, most of whom are already familiar with these methods and documents. Also, the incorporated documents were made available by ARB upon request during the rulemaking action and will continue to be available in the future. The documents from SAE and ISO are copyrighted and are available only for purchase on the organizations' websites.<sup>2</sup>

#### **IV. SUMMARY OF COMMENTS AND AGENCY RESPONSE**

Written comments were received during the 45-day comment period in response to the September 24-25, 2015 public hearing notice, and written and oral comments were presented at the Board Hearing. Comments were also received during the 15-day comment period in response to the March 21, 2016 public notice.

Listed below are the organizations and individuals that provided comments during the 45-day public comment period:

---

<sup>2</sup> Copies of SAE documents are available through the SAE at <http://www.sae.org> . Copies of ISO documents are available through ISO at <http://www.iso.org/iso/home.htm> .

<b>Commenter</b>	<b>Affiliation</b>
Douglas, Steven and Rege, Julia (September 18, 2015)	Alliance of Automobile Manufacturers and Association of Global Automakers (Alliance, Global)
Baumann, Monica (September 21, 2015)	California New Car Dealers Association (CNCDA)
Stegink, Lisa A. (September 21, 2015)	Truck and Engine Manufacturers Association (EMA)
Land, Klaus and Rogg, Daniel (September 18, 2015)	Daimler AG (Daimler)
Strand, Muriel (September 5, 2015)	Citizen (Strand)
Solomon, Matt (September 21, 2015)	The Northeast States for Coordinated Air Use Management (NESCAUM)
Kubsh, Joseph (September 21, 2015)	Manufacturers of Emission Control Association (MECA)
Holmes-Gen, Bonnie; Anair, Don; Shears, John; Magavern, Bill; and Phillips, Kathryn (September 21, 2015)	American Lung Association in California, Union of Concerned Scientists, The Center for Energy Efficiency and Renewable Technologies, Coalition for Clean Air, and Sierra Club California (NGO)
Baltusis, Paul (September 1, 2015)	SAE J1979 Committee (SAE)
Hogo, Henry (Oral, September 25, 2015)	South Coast Air Quality Management District (SCAQMD)
Douglas, Steven (Oral, September 25, 2015)	Alliance of Automobile Manufacturers (Alliance)
Rege, Julia (Oral, September 25, 2015)	Global Automakers (Global)
Barrett, Will (Oral, September 25, 2015)	American Lung Association in California (ALA)
Magavern, Bill (Oral, September 25, 2015)	Coalition for Clean Air (CCA)
Shears, John (Oral, September 25, 2015)	The Center for Energy Efficiency and Renewable Technologies (CEERT)

Listed below are the organizations and individuals that provided comments during the 15-day comment period:

<b>Commenter</b>	<b>Affiliation</b>
Douglas, Steven and Rege, Julia (April 6, 2016)	Alliance of Automobile Manufacturers and Association of Global Automakers (Alliance, Global)
Istenes, Jr., Raymond R. (April 6, 2016)	Volvo Group (Volvo)

Below is a summary of each objection or recommendation made regarding the specific regulatory actions proposed, together with an explanation of how the proposed action was changed to accommodate each objection or recommendation, or the reasons for making no change. The comments have been grouped by topic wherever possible. Comments not involving objections or recommendations specifically towards the rulemaking or to the procedures followed by ARB in this rulemaking are not summarized below.

## 45-DAY AND 15-DAY COMMENTS

### COMMENTS IN SUPPORT

1. Comment: We support the proposal to ensure ARB is able to monitor and confirm air quality and consumer benefits of new vehicle technologies employed to meet health protective standards. We support the adoption of the proposed 2015 amendments to the OBD II regulation in general. We support the proposal for voluntary participation in tracking and reporting various OBD data parameters as a means of conducting a check on vehicle emissions and fuel consumption. This will give ARB the ability to identify potential problems early upon release of new vehicles, assuring both consumer and health benefits are realized, and to develop more effective and improved carbon dioxide (CO<sub>2</sub>) standards, plug-in hybrid electric vehicles requirements, and greenhouse gas (GHG) inventory models. We strongly support the proposal requiring manufacturers to provide PM data with all LEV III OBD demonstration data. (NGO)
2. Comment: Meeting the proposed thresholds for LEV III gasoline and diesel vehicles is technically feasible in the required timeframes. MECA also supports phasing in PM thresholds for gasoline vehicles, requiring the collection of CO emission data with the gasoline catalyst monitor demonstration data, and revising the test-out criteria for diesel NMHC catalyst feedgas generation monitoring. (MECA)
3. Comment: Collecting vehicle data that will be used to characterize a vehicle's CO<sub>2</sub> emissions is important to ensure specific engine and vehicle technologies designed to reduce CO<sub>2</sub> are actually delivering expected GHG emission benefits and consumer fuel savings in-use. In the absence of a commercially available sensor that can directly measure CO<sub>2</sub> in a vehicle's exhaust stream, collection of this data is a reasonable way to help characterize a vehicle's CO<sub>2</sub> emissions, provided that safeguards are incorporated to mask sensitive driver behavior characteristics and prevent misuse of this information beyond the intent of this regulation. (MECA)
4. Comment: We support the proposed changes to section 1968.2 and the collection of CO<sub>2</sub> emission performance data by the OBD system. These data would result in verifying actual emissions and fuel economy performance to accurately estimate the GHG emission reduction benefits. We believe that the staff's proposal adequately protects consumer privacy. We also note that a recent report by the National Academies of Science recommends the use of OBD

systems to collect real-world fuel economy data from light-duty vehicles.  
(NESCAUM)

5. Comment: We support staff's proposal. OBD II is a good tool in the future to look at real world emissions, and we're finding that every year the emissions from the emissions inventory we use for attainment demonstration are not what we think they are in the real world. So the vehicle tracking performance requirements help. (SCAQMD)
6. Comment: The proposal helps to ensure that policies like LEV III are really delivering as promised. The vehicle performance data are an important step to ensure that the emission and consumer benefits are actually delivered and public health is actually being improved and protected. We take strong issue with the on-line ad campaigns the Auto Alliance is running against this proposal. We also urge staff to continue to review and tighten OBD criteria failure thresholds as quickly as feasible, specifically the PM threshold. The proposal reinforces ARB's certification and testing expertise and the need to catch potential emission and fuel economy problems early. (ALA)
7. Comment: We are in support of the proposal. There is a problem where we see this gap between emissions under a testing situation and what we're actually seeing on the road. ARB is on the right track to using these diagnostics to try to reduce emissions in a real-world situation. (CCA)
8. Comment: We support the proposal. We would like the in-use monitoring thresholds to eventually get tighter as technology evolves, avoiding what John Storey at Oak Ridge National Lab refers to as the PM paradox, where we're reducing our PM emissions. But with more and more gasoline direct injection (GDI) engines being introduced in the market, we may be in fact increasing our PM inventory on that side of the ledge with some different and more problematic issues there if we don't use appropriate control technologies, with PM filters being the most simple and robust. Adopting the proposal will not only help ARB more effectively do its work and but also help industry regain public trust and assure the public that the vehicles are performing as advertised. (CEERT)

Agency Response to Comments 1-8: We appreciate the comments. Concerning the PM thresholds, please see the agency response to comment 22.

#### GENERAL COMMENTS ABOUT COST, LEADTIME, AND STABILITY

9. Comment: Automakers still have concerns with the implementation of the requirements and believe that some requirements do not provide a benefit commensurate with the cost. In fact, no system can detect every possible malfunction or deliberate attempt to circumvent the OBD system for the purpose of inappropriately passing a Smog Check. We are concerned that this is the standard being set. (Alliance, Global)

Agency Response: Staff understands that neither every emission-related malfunction nor every attempt to cheat Smog Check can be detected by the OBD system. The OBD regulations even have language exempting manufacturers from detecting malfunctions where it is technically infeasible to do so. But for those malfunctions and cheating attempts that staff is aware of and that staff believes can be detected, the regulations should ensure that the OBD system detects such malfunctions to the best of the manufacturer's abilities. Staff believes every requirement proposed is important for reasons already stated in the staff report, and thus provide a benefit commensurate to the cost of meeting the requirements.

10. Comment: In the current proposal, we do not believe the costs analysis reflects the appropriate level of due diligence needed for an honest and thorough evaluation of the costs associated with the changes. The only costs thoroughly analyzed in the staff report were those associated with changes to positive crankcase ventilation (PCV) system monitoring. For PCV system monitoring, though at least one manufacturer has implemented the proposed changes and could provide the actual costs, ARB staff did not contact that manufacturer for the cost assessment, and that manufacturer reports that the actual cost to implement the PCV monitor was almost three times those reported in the staff report. Furthermore, in considering the cost of the OBD regulations, there are additional metrics that have real and important impacts on the overall cost and effectiveness of the OBD system such as the cost to the consumer, which includes the cost to repair a vehicle relative to a vehicle's age and worth, and the ability to repair a vehicle. Thus, we recommend that going forward ARB consider additional costs that would affect the overall costs-benefit analysis of the regulation. (Alliance, Global)

Agency Response: The PCV monitor was not the only cost that was considered in the total cost of the proposed changes to the OBD II regulations. In conducting the cost analysis, staff considered all of the proposed changes to the OBD II regulations and their implications on costs. Most of the proposed changes were not projected to affect costs or had a minimum impact on costs increasing and decreasing. As a result of this initial analysis, it was determined that the proposed changes that would likely affect costs were the PCV monitoring proposal, evaporative purge system proposal, tracking and reporting in-use monitoring performance ratio proposal, the proposal for new parameter IDs (PIDs), and changes to the data demonstration vehicle testing requirements for gasoline vehicles. Costs for all of these proposals were separately analyzed and summed to determine the incremental cost to the consumer of a new vehicle with these proposed changes. Staff's process for estimating these costs was described in detail in the staff report.

Regarding contacting manufacturers for the estimated costs to comply with the PCV monitor proposal, staff did have individual meetings with various manufacturers on the costs of the pressure sensor that staff projects most manufacturers will need for the PCV monitoring proposal. None of the manufacturers that were contacted provided any information on the costs. Staff

is not aware of any manufacturer that currently meets the originally proposed PCV requirements. Manufacturers have provided comments stating that the PCV requirements as currently proposed are not technologically feasible. As such, staff modified the proposal to address industry's concerns. Please see the agency response to comment 28 for more information on the proposed changes staff made as part of the 15-day notice.

As already mentioned, the cost analysis done by ARB estimated the initial incremental cost to consumers for the purchase of a new vehicle affected by the proposed regulatory changes. However, an analysis was done to estimate the repair costs outside of warranty for components added specifically to comply with the proposal. Those costs were described in the staff report and estimated to be 34 cents per vehicle and is not expected to be needed until a vehicle is over 10 years old and near the end of its useful life (e.g., 235,000 miles). If there are other costs that industry believes ARB should consider in future cost analyses, ARB staff invites industry to provide details about these costs.

11. Comment: ARB must provide sufficient leadtime and stability for implementation of new requirements. Based on the California H & S Code, section 43013, ARB is obliged to adopt OBD within reasonable time frames. Also, according to section 202(a) of the federal Clean Air Act (CAA) related to new vehicles over 6,000 lbs. gross vehicle weight rating, ARB must provide at least 4 model years' lead-time before application of new standards and 3 years period of stability between each new change or step-down in standards. ARB's OBD requirements must be consistent with section 202(a) in order for the U.S. EPA to waive federal preemption and allow California to enforce its own emission standards. (EMA)

Agency Response: The commenter submitted the same comments regarding lead time and stability during the engine manufacturer diagnostic (EMD) rulemaking in 2004, the heavy-duty OBD (HD OBD) rulemaking in 2005, the OBD II rulemaking update in 2006, and the HD OBD rulemaking updates in 2009 and 2012. 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, HD OBD, and OBD II regulations). Since the commenter has given the same comments again for this rulemaking, 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 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.

## DEFINITIONS

12. Comment: Regarding the definition of "emissions neutral default action," industry is concerned that 10 seconds (from engine start or the first effect of the monitored system or component in the driving cycle) is an insufficient time to detect a malfunction and trigger the emissions neutral default action with regards to latching the action across driving cycles. We recommend extending the time to 30 seconds. Further, if a vehicle loses propulsion, it should be considered in an emissions neutral default action regardless of whether or not the loss of propulsion is caused by a non-transmission diagnostic. Also, "specifically



named” is not defined or its meaning is not clear. We recommend deleting the phrase “it is not activated by a non-transmission diagnostic for a component or system that is specifically named in section (e)(15) or (f)(15).” (Alliance, Global)

Agency Response: Regarding the 10-second criterion, staff proposed 10 seconds to minimize the time it takes for the vehicle to activate the emissions neutral default action, but agrees that a longer time is needed. Thus, staff proposed to increase the time to 30 seconds as part of the 15-day notice. Further, while staff disagrees that any default mode of operation that prevents propulsion should be included, staff agrees that the wording of “specifically named” is unclear. The intent of the language is to ensure that manufacturers do not use a no-propulsion state to avoid a MIL-on condition, and by extension emission warranty coverage of high-priced components. As such, staff proposed to revise the language as part of the 15-day notice to specifically prohibit the use of no propulsion/no start as an emissions neutral default action for components/systems determined to be “high price warranted parts” per section 2037(c) of title 13, CCR.

13. Comment: Regarding the definition of “safety-only component or system,” the term “hybrid high voltage containment systems” is not clear. We recommend providing examples of such systems (e.g. high voltage interlock loop or high voltage isolation detection). (Alliance, Global)

Agency Response: Staff agrees and proposed the same examples in the regulatory language as part of the 15-day notice.

14. Comment: We recommend deleting the phrase “Devices that control transmissions or battery packs are excluded from this definition” from the “smart device” definition, since this phrase could mean every sensor in the powertrain control system (e.g., engine sensors that have direct effect on transmission/battery packs) and could therefore exclude devices used by the engine control module. (Alliance, Global)

Agency Response: Staff did not intend to exclude such sensors/devices from the definition of smart devices, and thus proposed changes that would limit this exclusion to devices that “provide high level control” of transmissions or battery packs as part of the 15-day notice.

## GENERAL REQUIREMENTS

15. Comment: Section 1968.2(d)(2.2.3) does not need to include language stating the OBD II system is required to illuminate the MIL in the event of a malfunction of a “smart device” since these are covered in other sections of the regulation. (Alliance, Global)

Agency Response: Staff agrees and deleted the phrase “smart device” from this section as part of the 15-day notice.

16. Comment: The new language in section 1968.2(d)(2.5.2)(F) should allow manufacturers to use the criteria in either section 1968.2(d)(2.5.2)(A) or (B) to erase the permanent fault code for engine cooling system monitors, since all other monitors are allowed the option to use the criteria in (B). (Alliance, Global)

Agency Response: Staff agrees and made the changes allowing the option to use either criterion for engine cooling system monitors as part of the 15-day notice.

17. Comment: The intent of section 1968.2(d)(2.6) is not clear. The criterion regarding default strategies that “causes an overt indication... such that the driver is certain to respond and have the problem corrected” seems to address “emissions neutral default action.” The criterion regarding default strategies “not caused by a component required to be monitored by the OBD II system under sections (e) through (f)” seems circular with the comprehensive component requirements in sections 1968.2(e)(15) and (f)(15). It is unclear if the criterion regarding default strategies that are “not invoked to protect a component required to be monitored by the OBD II system under sections (e) through (f)” is related to comprehensive components or to systems that cannot protect electronic components. The language regarding default strategies that are “an AECD that is properly activated due to the occurrence of conditions that have been approved by the Executive Officer” is unclear, since “default strategy” and “auxiliary emission control devices (AECDs)” are mutually exclusive, and the phrase “properly activated” is unclear. ARB staff should work with the industry to clarify this section. (Alliance, Global)

Agency Response: Section 1968.2(d)(2.2.3) requires the OBD II system to illuminate the MIL and store a fault code when the powertrain “enters a default or ‘limp home’ mode of operation that can affect emissions or the performance of the OBD II system.” The intent of section 1968.2(d)(2.6) is to allow the OBD II system to be exempt from this requirement (i.e., exempt from illuminating the MIL and storing a fault code when a default mode of operation is activated) in certain cases. Since this section is related to default modes of operation that affect emission or the performance of the OBD II system, they do not involve emissions neutral default actions, which by definition do not affect emissions or the OBD II system performance. Further, this section involves cases where a fault of a component does not affect emissions or the OBD II system performance but activates a default mode of operation that does. Therefore, it does not include comprehensive components required to be monitored under sections 1968.2(e)(15) and (f)(15), which involve components with failures that affect emissions or the OBD II system performance when no default action is activated. To make this clearer, staff modified the language in criterion 1968.2(d)(2.6.1)(A)(2) (now section 1968.2(d)(2.6.1)(B)) as part of the 15-day notice to indicate that the default action is “not otherwise caused by a component required to be monitored by the OBD II system under sections (e) through (f).”

Additionally, section 1968.2(d)(2.6) was written with the purpose that “default mode of operation” includes default actions that are both activated due to faults

and activated in the absence of faults (e.g., due to the vehicle encountering extreme ambient conditions). Thus, staff's proposal was not an attempt to direct manufacturers to illuminate the MIL for the latter case (e.g., an AECD used for component protection under extreme conditions) since there is no fault present and included language in this section exempting the OBD II system from illuminating the MIL when an AECD is properly activated, with "properly activated" defined as activated under conditions in which the AECD is allowed to be activated (i.e., conditions under which manufacturers indicate the AECD is activated as part of the certification application and are approved by the Executive Officer). However, to address manufacturers' concerns, staff proposed to move the reference to AECDs to a separate section (new section 1968.2(d)(2.6.3)).

18. Comment: The denominator incrementing criteria in section 1968.2(d)(4.3.2)(L) should not include the purge flow monitor on plug-in hybrid electric vehicles, since this section does not require fueled engine operation to occur. (Alliance, Global)

Agency Response: Staff agrees and made changes requiring the purge flow monitor denominator on plug-in hybrid electric vehicles to increment based on the criteria under sections 1968.2(d)(4.3.2)(K)(i) through (iv) (which include the fueled engine operation condition) in addition to the criteria under sections (d)(4.3.2)(L) as part of the 15-day notice.

19. Comment: The proposed denominator incrementing criteria in section 1968.2(d)(4.3.2)(M) for the evaporative system high-load purge monitor should be revised to address the following issues. The second purge line monitor requires a certain purge flow through the purge valve for a reliable detection of disconnected or blocked purge line, which can only be achieved with a pressure difference between ambient and boost pressure of greater than 200 hectopascals (hPa), and also requires stable driving conditions. These conditions need to be maintained during the entire monitoring period. The criteria should be revised to increase the time under which the "high-load purging conditions" occurs from 2 seconds to 10 seconds, and from a minimum cumulative time of 50 seconds instead of 10 seconds. Further, "high-load purging conditions" should be defined as the time during boosted engine operation when boost pressure is 200 hPa above ambient pressure. (Alliance, Global)

Agency Response: Staff would like to reiterate that the denominator is a measure of vehicle activity, not a measure of "monitoring opportunities." Thus, the denominator should not be incremented based on criteria that would ensure that a specific manufacturers' monitor runs and completes. Nonetheless, while staff did not change the proposed criteria in the regulation to the specific time and pressure criteria the commenters mentioned above, staff did clarify the high-load purging conditions under which the denominator should increment. Specifically, staff proposed as part of the 15-day notice that, among other conditions, "high-load purging conditions" occur when the engine manifold pressure is greater than or equal to 7 kilopascals (kPa) above atmospheric pressure. This would help to

exclude lower load conditions where small amounts of purging may briefly occur through the high-load line, but include most conditions in which purging occurs through these lines during high-load conditions.

20. Comment: While we agree on the intent of proposed section 1968.2(d)(7.2), the language does not accomplish the intent. It's unclear if it excludes the obvious differences between sections (e) and (f) (e.g., air-fuel ratio cylinder imbalance monitoring only required for gasoline, not diesel; charge air cooler monitoring only required for diesel, not gasoline). Section 1968.2(d)(7.2) should be deleted and the language in proposed sections 1968.2(e)(16.4) and (f)(16.4) should be revised to apply to "emission control systems" instead of "emission control strategies" and include this requirement. (Alliance, Global)

Agency Response: As part of the 45-day notice, staff proposed new language (section 1968.2(d)(7.2)) clarifying that manufacturers of vehicles that "are equipped with components/systems defined by any of the monitoring requirements in section (e) and components/systems defined by any of the monitoring requirements in section (f)" are required to submit a plan for meeting the OBD II requirements, since they may not cleanly fit under just the gasoline requirements or just the diesel requirements. The language was intended to give manufacturers more details on what is required for technologies that are used on a certain vehicle but not detailed under the requirements for such vehicles (e.g., a gasoline vehicle using a selective catalytic reduction (SCR) system that is traditionally used on diesel vehicles and that has specific detailed requirements in the diesel monitoring requirements). Without the proposed language, such monitoring requirements would need to be proposed by the manufacturer under the gasoline "other emission control or source system" monitoring requirements without any guidelines as to what kind of plan is acceptable. This similar issue would also apply to the requirements under section 1968.2(d) related to tracking of the in-use monitor performance data for monitors of specific components/systems. Further, the vehicle may neglect to output the necessary standardized parameters needed to troubleshoot failures of the technology since they are not required for such vehicles in the regulation (e.g., section 1968.2(g)(4.2) requires data stream parameters related specifically to diesel technologies such as SCR systems and PM filters to be made available only on diesel vehicles, not gasoline vehicles). Since the requirements under sections 1968.2(d), (e), (f), and (g) are involved, staff believes that section 1968.2(d) is the best section to include this language (as opposed to the sections 1968.2(e)(16) and (f)(16) proposed by the commenter). Nonetheless, due to manufacturers' confusion, staff proposed as part of the 15-day notice to modify the language clarifying which requirements should be considered for gasoline and diesel vehicles respectively. Staff would also like to note that while the intent was not to necessarily impose new monitoring requirements on current gasoline and diesel vehicles, the expectation is that section 1968.2(d)(7.2) will provide guidance to manufacturers as to the elements required in the monitoring plan if current technology becomes OBD relevant in the future because the technology has become an important part of the emission control solution. For example,

components or systems that exceed the thresholds for other required monitors would clearly be OBD relevant and need to be included in a monitoring plan.

## MONITORING REQUIREMENTS

21. Comment: The proposed OBD II regulation provides relief to chassis dynamometer-certified light-duty vehicles and MDPVs with regards to specific timelines for phase in of compliance or applicability dates of certain diesel provisions, including full range diesel misfire monitoring, revised diesel fuel system malfunction criteria determination requirements, revised in-use monitor performance ratio requirements for certain diesel monitors, and catalyzed PM filter feedgas generation monitoring. However, they did not provide similar relief for engine-dynamometer-certified medium-duty vehicles. These differences in applicability dates provide unfair relief to some sections of the industry which may result in financial and competitive inequity. EMA recommends that the same timeline and applicability dates being proposed for light-duty vehicles and MDPVs be applied to medium-duty vehicles as well. (EMA)

Agency Response: Contrary to the commenter's assertion, ARB did not provide "relief" to the light-duty and MDPVs with regard to these requirements, since these requirements did not apply to these vehicles in the first place. Instead, staff proposed "more stringent" requirements that happened to be already applied to medium-duty vehicles. The reason these requirements were already applied to medium-duty vehicles is due to a request from the commenter in a May 2009 meeting. When the HD OBD regulations were first adopted in 2005, staff had intended that rulemaking updates to the HD OBD regulations occur separately from updates to the OBD II regulations due to the differences between the heavy-duty industry and light- and medium-duty industry and the different participants involved with each industry. However, during the preparation for the 2009 rulemaking update to the HD OBD regulations, manufacturers of engines used in both medium-duty and heavy-duty vehicles requested that the requirements that applied to medium-duty engines/vehicles be analogous to and updated at the same time as those of the heavy-duty engines vehicles. Specifically, these manufacturers did not want to design two different sets of OBD systems to meet two different requirements for the same engine, since this would result in additional workload and complexity. Staff agreed to this request, and thus concurrently updated the medium-duty vehicle requirements in the OBD II regulations every time staff updated the HD OBD regulations from 2009 on. When staff proposed new requirements for these vehicles, staff proposed implementation dates that provided appropriate leadtime given the timeframe the new requirements were first adopted. Then when staff subsequently updated the OBD II requirements and proposed similar requirements for diesel light-duty vehicles and MDPVs, staff proposed a similar amount of leadtime as that given to heavy-duty and medium-duty vehicles, which considering the later date of the OBD II rulemaking update would understandably result in a later start date for light-duty vehicles and MDPVs. Staff believes it would be inappropriate and unnecessary to additionally delay the requirements for medium-duty vehicles to line up with the start date for light-duty vehicles, especially since the majority of

the requirements the commenter is concerned about have implementation start dates for medium-duty vehicles that have already passed (i.e., current medium-duty vehicles should already be meeting the requirements of concern). Staff also believes these differences in applicability dates are not unfair and would not result in financial and competitive inequity, since light-duty diesels and medium-duty diesels are different markets.

22. Comment: ARB should review whether and when the PM threshold of 17.5 mg/mile can be revised downward as soon as is practical and review what are appropriate strategies for addressing PM emissions in general. The number of GDI vehicles is rapidly increasing. PM emissions from these vehicles, which are smaller and thus more harmful to the health than PM emissions from diesels, can be very high. Though gasoline particulate filters are used on vehicles in Europe, we understand that manufacturers are hoping to avoid using gasoline particulate filters in California and the U.S. by improving the performance of GDI engines. In the interim, ARB should be cautious of GDI development to ensure California doesn't end up with a large legacy fleet of GDI-equipped vehicles that contribute significantly to the PM inventory (U.S. market share projected to be more than 50 percent GDI engines by 2017). Reports by the Consumers Union issue caution about the reliability of GDI engines and ARB's research indicate higher emissions on malfunctioning GDI vehicles due to certain downsizing strategies. The 17.5 mg/mile PM threshold is high relative to the 3 mg/mile standard (which is approximately the same as the Euro 5 standard that started in 2009 and the Euro 6 standard in effect this year) and leaves significant room for higher emission levels to go undetected. The PM threshold should be tightened especially considering California's PM standard will tighten to 1 mg/mile and the evolving technology developed in response to the tighter standards. (NGO)

Agency Response: Staff proposed the threshold of 17.5 mg/mile based on manufacturer input, which they indicated was based on current monitoring strategy capability and available sensor technology. As mentioned in the staff report, ARB currently does not have enough data showing the PM emissions impact of a malfunction on gasoline vehicles, but does believe PM emissions will become an issue, especially with GDI engines, which may be even more susceptible to a large increase in PM emissions when a fault occurs. Thus, staff had proposed as part of the 45-day notice that manufacturers of gasoline vehicles provide PM emission data as part of the OBD II demonstration data on LEV III vehicles. Staff will use these data to evaluate and review the 17.5 mg/mi PM threshold and continue to work with industry to propose future changes to the threshold if necessary. Staff will also continue to monitor the status of available sensor technology to determine if a lower PM threshold is technologically feasible in the future.

23. Comment: The OBD II regulation does not contain thresholds for vehicles certified to EPA Tier 3 BIN 85 and BIN 110 standards, which will be sold in California under the Federally Certified Vehicle provisions of section 1961.2. We recommend that the OBD II regulation treat BIN 85 as equivalent to ULEV 70. For the BIN 110, we recommend a 1.5 multiplier for CO, and a PM threshold of

17.5 g/mi. Further the non-methane organic gases (NMOG)+NO<sub>x</sub> multiplier should be 2.0 for the catalyst monitor and 1.85 for all other monitors, which is derived based on the Tier 2/LEV II OBD threshold for Bin 4 (2.5xNO<sub>x</sub> and 1.5xNMOG) weighted by the Bin 4 standard contribution to the interim Tier 3 Bin 110 (NMOG=70/100 and NO<sub>x</sub>=40/110). (Alliance, Global)

Agency Response: When updating the regulation, staff mistakenly did not address vehicles certified to the Tier 3 Federal Bin 85 and Bin 110 tailpipe emission standards. Thus, staff proposed malfunction criteria for the transitional bins for both gasoline and diesel vehicles as part of the 15-day notice, though they are not the same as those recommended by the commenter. For the CO and PM thresholds, staff proposed that the transitional Tier 3 bins use the same multipliers as those currently proposed for the corresponding LEV III ULEV125 standards. The NMOG+NO<sub>x</sub> threshold was calculated based on the weighted Bin 3 and 4 standard contribution to the Tier 2 OBD threshold in effect for Bins 3 and 4, which is 2.5 times NO<sub>x</sub> and 1.5 times NMOG. This calculation resulted in a 1.85 NMOG+NO<sub>x</sub> multiplier for all monitors (including the PM filter filtering performance monitor) except the gasoline catalyst monitor and diesel aftertreatment monitors, which would have a 2.0 NMOG+NO<sub>x</sub> multiplier instead.

24. Comment: The proposed evaporative system high-load purge flow monitoring requirements include language allowing manufacturers to be exempt from monitoring purge flow through the high-load purge line if the purge mass flow through this line is 0 percent of the total purge mass flow to the engine on the Unified cycle and less than 1 percent of the total purge mass flow to the engine on the US06 cycle. "0" percent cannot be demonstrated since it would require an infinite number of tests and should be some percentage greater than zero. Also, total purge masses are not typically measured on the Unified cycle, therefore the Federal Test Procedure (FTP) is more appropriate. Finally, 1 percent is too low on the US06 and should be some percentage greater than 1. (Alliance, Global)

Agency Response: When manufacturers first brought up this issue during the regulatory development prior to the publishing of the 45-day notice, staff asked manufacturers to propose new percentage criteria and provide data supporting the proposal, but manufacturers have not provided such a proposal or data. In any case, considering high-load purging will more likely occur during conditions encountered on the US06 cycle instead of the FTP or Unified cycles, staff believes that only the criterion tied to the US06 cycle is necessary. Thus, staff is proposing to delete the criterion tied to the Unified cycle and to allow exemption from monitoring if the purge mass flow through the high-load line is less than 1 percent of the total purge mass flow to the engine on the US06 cycle.

25. Comment: Section 1968.2(e)(6.2.5), which allows manufacturers to modify the fail criteria for the gasoline fuel system due to certain operating conditions, was removed but is still needed by manufacturers. Section (e)(6.3.5) only deals with enable conditions. We recommend reinstating this paragraph. If this is a policy change, we recommend a 25/50/75/100 percent phase in starting in 2019MY with alternative phase in. (Alliance, Global)

Agency Response: Staff deleted section 1968.2(e)(6.2.5), which allowed manufacturers to adjust the malfunction criteria or limits during conditions that will not provide for robust detection of faults, since staff believed it was not necessary anymore considering staff also adopted new language in section 1968.2(e)(6.3.5) allowing for disablement of the fuel system monitor during conditions such as those described in section 1968.2(e)(6.2.5). However, due to the commenter's concerns, staff proposed to reinstate the language in section 1968.2(e)(6.2.5) and allow this provision indefinitely as part of the 15-day notice.

26. Comment: Revisions should be made to the gasoline engine cooling system monitoring requirements (section 1968.2(e)(10)) and the gasoline fuel system monitoring requirements (section 1968.2(e)(6)) for requirements related to closed-loop operation. For the engine coolant temperature (ECT) sensor time-to-closed-loop monitor, "closed-loop operation" should refer to "the start of stoichiometric or non-stoichiometric operation, whichever occurs first." Non-stoichiometric operation requires very short times, and waiting for stoichiometric operation involves coolant temperatures closer those required by the thermostat monitor, and it will be difficult to meet required minimum times in the regulation. Further, the ECT required for closed-loop operation is not a single value but a function of engine speed and load. So these required times should be tied to only idle conditions, since this will have the coldest ECT values and therefore give the worst case situations. Also, manufacturers should be exempt from this monitoring requirement if the manufacturers have other monitors meeting the comprehensive component monitoring requirements of section 1968.2(e)(15) or (f)(15) that are as timely and effective in detecting faults that prevent closed-loop operation. This will result in setting a fault code that identifies the faulty component and helps the repair technician, which the current requirement for ECT sensor time-to-closed monitor requirement does not do. Further, due to the difficulty in calibrating the monitor at very cold temperatures (e.g., -40 degrees Fahrenheit), the ECT sensor time-to-closed loop monitor should not be required if the engine start temperature is below 20 degrees Fahrenheit. Also note that the advantage of the comprehensive component monitor is that it works even at very cold temperatures. Similar changes should also be made to the gasoline fuel system monitoring requirements related to closed-loop operation. (Alliance, Global)

Agency Response: Staff agrees that changes need to be made to these sections to address the increased complexity of closed-loop fueling strategies on current and future engines. Concerning the gasoline fuel system monitoring requirements in section 1968.2(e)(6.2.4), staff agrees that the language should be modified to reflect the current certification allowances, specifically the ability to demonstrate compliance using a component-level monitoring strategy that is as timely in detecting faults as an overall system-level monitor, and thus modified the language in this section to clarify this as part of the 15-day notice. However, while the commenter believes the requirements should be re-written to allow manufacturers to monitor the time to stoichiometric or non-stoichiometric closed-loop operation, whichever occurs first, staff believes the focus should be on the



time to reach stoichiometric closed-loop operation because in most cases this is still the target for optimum combustion and emission control. Thus, as part of the 15-day notice, staff proposed to clarify that this section is related to failure of the fuel system to enter “stoichiometric” closed-loop operation within a certain time, and is proposing this requirement to be phased-in during the 2019 through 2021 model years.

Concerning the gasoline engine cooling system time-to-closed-loop monitoring requirements in section 1968.2(e)(10.2.2)(B), staff also proposed changes as part of the 15-day notice to clarify that the monitor would be based on time to reach “stoichiometric” closed-loop operation, and that manufacturers would be required to phase-in this requirement during the 2019 through 2021 model years. Due to this change, the maximum time thresholds required in section 1968.2(e)(10.2.2)(B)(ii) may not be appropriate anymore. However, staff is currently not able to propose new time thresholds considering the lack of time and data to determine the appropriate thresholds. Nonetheless, staff believes this should not be an issue for manufacturers, since section 1968.2(e)(10.2.2)(B)(iii) allows manufacturers to propose more appropriate time thresholds for these monitors in lieu of the time thresholds stated in the regulation. Further, staff is also clarifying that the time thresholds shall be based on achieving stoichiometric closed-loop operation “across the range of engine loads observed on the FTP cycle.” As the commenter noted, the ECT required for closed-loop operation is not a single value but a function of engine speed and load. Given that the FTP is the standard test cycle for calibrating OBD monitors, staff believes it is appropriate that the time thresholds for stoichiometric closed-loop operation be based on the same cycle.

27. Comment: Manufacturers should be exempt from EGR high flow functional monitor when the EGR open failure causes the vehicle to stall (similar to the exemption proposed for PCV monitoring. (Alliance, Global)

Agency Response: Staff agrees that in cases where the EGR failure or deterioration cannot be detected because the vehicle has immediately stalled during idle conditions, monitoring is not required since the monitor itself is prevented from running. However, manufacturers must demonstrate that the failure or deterioration would be detected under all other driving conditions, or provide data indicating why the failure or deterioration can only be detected under idle conditions. As such, staff proposed 15-day language to allow for Executive Officer approval to not detect these EGR faults because the vehicle stalls at idle.

28. Comment: In the proposed changes to the PCV and CV monitoring requirements, it is unclear what “transports” means when referring to hoses/tubing transporting vapors. The language implies that fresh air lines on naturally aspirated engines need to be monitored since they contain crankcase air under high engine air flows and manifold pressures (wide open throttle or WOT), when ARB previously stated monitoring was not required since WOT conditions occur infrequently. Additionally, monitoring for leaks in this line is not

feasible using the current monitor approach with a pressure sensor for a hose that does not have high air flow through it (e.g., boosted engine under boost); the sensor does not see a leak, but sees a pressure drop due to airflow. Further, the use of the word “leak” is inappropriate since a leak can only occur in a sealed system and crankcase is not a sealed system. “Disconnection” or “break” are appropriate terms.

Additionally, several other changes should be made to the PCV and CV monitor language for clarity. The definition of “PCV system” in section 1968.2(e)(9.2.1) should be moved up to section 1968.2(e)(9.1.1), modified to indicate that PCV system is any form of crankcase ventilation system “that is intended to contain or transport crankcase vapors,” modified to include hoses/tubing that provide a ventilation path “between the engine and the intake air system, and modified to delete the examples listed, which included tubing/hoses between the crankcase and valve cover and between the crankcase and the fresh air intake system on normally aspirated engines with dry sump lubrication systems. The PCV system monitoring requirements for current vehicles should also be modified to exempt detecting disconnections that result in overt indication to the driver (e.g., rapid loss of oil) such that the driver would respond and have the vehicle repaired, and should include similar language for turbocharged/supercharged engines as well. Additionally, the new requirements in section 1968.2(e)(9.2.3)(C) should be changed from applying to “engines with dry sump lubrication systems that cannot meet the requirements of sections (e)(9.2.3)(A) and (e)(9.2.3)(B)” to “engine that utilize hoses, tubes, or lines that is intended to contain but do not transport vapors (e.g., a hose that equalizes crankcase pressure between engine banks).” Further, several of the monitoring exemptions that were previously allowed in the current requirements should also be added to the new PCV and CV monitoring requirements. These include exemptions related to PCV valves that are significantly harder to remove from the crankcase than disconnecting the line between the valve and intake manifold, connections that are resistant to deterioration or accidental disconnections, and unlikelihood of disconnection based on manufacturers’ repair procedures for non-PCV and non-CV system repair. Finally, PCV and CV monitoring exemption should also be allowed if the manufacturer submits data showing that crankcase emissions are contained within the crankcase on the US06 cycle when there is a disconnection. (Alliance, Global)

Agency Response: Staff understands the commenters’ concerns regarding fresh air lines on naturally aspirated engines, and proposed as part of the 15-day notice to delete language related to monitoring of “hoses, tubes, or lines that do not transport crankcase vapors” in the PCV monitoring language. Staff also made additional changes to clarify that PCV and CV system hoses/tubes/lines that transport crankcase vapors are required to be monitored up to where it connects to the air intake air system. Regarding the word “leak” to describe PCV system malfunctions, staff believes it is moot but has proposed to change the word “leak” to “disconnection” and “break” from the PCV and CV monitoring language as part of the 15-day notice.

Concerning the commenters' question about what "transports" means with regards to hoses/tubing transporting vapors, the transport of crankcase vapors refers to any PCV and CV system hoses/tubes/lines that are primarily used to contain crankcase vapors, equalize crankcase pressure, or provide a ventilation path for crankcase vapors between various areas of the engine. Manufacturers had previously claimed that PCV and CV system hoses/tubes/lines that are primarily used to provide a ventilation path for fresh air (i.e., fresh air lines for normally aspirated engines) do not contain crankcase vapors, equalize crankcase pressure, or provide a ventilation path for crankcase vapors even under extreme operating conditions such as WOT. Based on these claims and manufacturer data, the fresh air lines for naturally aspirated engines are not considered to "transport" crankcase vapors, so no monitoring is required under the proposal.

Concerning the other changes suggested by the commenters, staff did not make these changes. Regarding the commenters' suggested modifications to improve clarity by adding language and reorganizing the language, including changes to the current monitoring requirement language, staff agrees with some of the suggestions provided but did not want to modify the existing structure of the regulation (e.g., remove existing language or move portions of the existing language in the current requirements) to avoid confusing manufacturers into thinking new requirements were implemented. Additionally, since the PCV and CV monitoring requirements for current vehicles have not been significantly changed in 10 years, manufacturers should all know these requirements well. Staff will continue to reevaluate the language and may consider including some of manufacturer's suggestions to improve clarity during the next update of the regulation.

Staff also did not implement the commenters' suggested modifications to add the current PCV/CV monitoring exemption language to the new requirements because this is not in line with the intent of the new language proposed by staff. Specifically, the exemption language requires more of a subjective review and thus would not help streamline the OBD II system certification review process. The exemption criteria generally requires staff to evaluate large amounts of technical information and design mock-ups, which often leads to prolonged discussions with manufacturers during the design reviews and consequently delayed certification approvals. Additionally, the suggestion to apply the monitoring exemptions that are provided for engines with dry sump lubrication systems to all engines that utilize hoses, tubes, or lines that contain but do not transport vapors was not implemented for the same streamlining reasons as described above.

Finally, staff did not implement the commenters' suggestion to exempt monitoring of hoses, tubes, or lines if the manufacturer submits data showing that crankcase emissions are contained within the crankcase on the US06 cycle when there is a disconnection. The issue was not discussed with manufacturers in time for the language to be considered for implementation. Staff would like to keep the

dialogue open on this topic with possible consideration of the suggested language during the next update of the regulation.

29. Comment: The proposed engine cooling system requirements in sections 1968.2(e)(10.1.4) and (f)(11.1.4) need to be clarified with regards to whether or not vehicles with systems that use other temperature sensors “in addition to” the ECT sensor are required to meet the requirements. If so, leadtime and a phase-in (25/50/75/100 percent phase in starting in 2019MY with alternative phase in) are needed. Additionally, the new proposed thermostat monitor requirement (section 1968.2(e)(10.2.1)(B)) needs to be allowed to use alternate malfunction criteria and/or monitoring conditions that are a function of engine start temperature on vehicles that do not reach the thermostat monitor threshold temperatures even when the thermostat is functioning properly (similar to section 1968.2(e)(10.2.1)(D) which applies to the thermostat monitor in section 1968.2(e)(10.2.1)(A)). (Alliance, Global)

Agency Response: Staff intended the language to include systems that use other temperature sensors in addition to the ECT sensor to indicate engine operating temperatures for emission control purposes. Thus, staff proposed revisions to the language as part of the 15-day notice in these sections to make clear that manufacturers of vehicles that use sensors/systems “in addition to” or “in lieu of” the cooling system and ECT sensor are required to propose a monitoring plan for Executive Officer approval. Further, for vehicles that use sensors/systems “in addition to” the cooling system and ECT sensor, staff proposed that manufacturers phase in these monitors during the 2019 through 2021 model years. Staff also modified the language to make clear that this only involves engine and/or engine component temperature sensors so that temperature sensors such as ambient air temperature sensors are not included. Concerning the comment about the new proposed thermostat monitor requirement (section 1968.2(e)(10.2.1)(B)), staff mistakenly forgot to modify sections 1968.2(e)(10.2.1)(D) and (f)(11.2.1)(D) to allow these monitors to use alternate malfunction criteria and/or monitoring conditions that are a function of engine start temperature on vehicles that do not reach the thermostat monitor threshold temperatures even when the thermostat is functioning properly. Thus, staff proposed modifications to these sections to address this as part of the 15-day notice.

30. Comment: There is no need for the proposed language requiring detection of malfunctions of components that provide input to or receive commands from a “smart device” in sections 1968.2(e)(15.1.1) and (f)(15.1.1), since smart devices are spelled out in subsequent sections. Additionally, the proposed language in sections 1968.2(e)(15.1.1), (e)(15.1.2), (f)(15.1.1), and (f)(15.1.2) concerning vehicles that compensate or adjust for deterioration of malfunction of the component/system is not clear, specifically what “compensate” means and whether or not sections 1968.2(d)(2.2.3) and (e)(15.4.4) still apply if the vehicle does not “compensate.” (Alliance, Global)

Agency Response: Regarding the inclusion of “smart device” in sections 1968.2(e)(15.1.1) and (f)(15.1.1), staff disagrees with the commenter and kept the language because it is intended to ensure that outputs controlled by a smart device are monitored. These requirements are not included in subsequent sections as suggested by the commenter. Regarding the new language concerning vehicles compensating or adjusting for deterioration or malfunction of the component/system, staff intended for the language to clarify that if the vehicle control system takes a direct action to compensate or adjust in response to detecting a deteriorated or malfunctioning component/system, then this type of response would be considered a default action subject to the requirements of either section 1968.2(d)(2.2.3) or (e)(15.4.4) or (f)(15.4.5) as applicable. Because direct action is being taken in response to the detection of deterioration or malfunction of a component/system, the emission impact of such a component or system cannot be determined using the “test-out” criteria in section 1968.2(e)(15.1.2) or (f)(15.1.2). Thus, staff proposed modifications as part of the 15-day notice to indicate that such vehicles are not allowed to use the test-out criteria specified under sections 1968.2(e)(15.1.2) and (f)(15.1.2).

31. Comment: It is still not clear if hybrid components need to be monitored unconditionally in accordance with sections 1968.2(e)(15.2.3) and (f)(15.2.3) or if they can test out of monitoring in case of no emission influence. Manufacturers in the past have not been able to test out of monitoring active battery cooling or regenerative braking even with data showing no emissions impact. Manufacturers should be exempt from monitoring hybrid components that do not affect emissions and are not used as part of another monitor. (Alliance, Global)

Agency Response: Staff intended for manufacturers to be able to use the emissions “test-out” provisions in sections 1968.2(e)(15.1.2) and (f)(15.1.2) on hybrid vehicles except for plug-in hybrid electric vehicles, which are subject to the criteria under sections 1968.2(e)(15.2.3)(I) and (f)(15.2.3)(I). To make this clearer, staff proposed new language in sections 1968.2(e)(15.2.3)(H) and (f)(15.2.3)(H) clarifying this as part of the 15-day notice.

32. Comment: We recommend deleting the requirement for separate fault codes for shorted high and shorted low in sections 1968.2(e)(15.2.1)(B) and (f)(15.2.1)(B). This new requirement does not improve diagnostics (ARB has allowed circuit fault and out-of-range faults to use the same codes for many years), it adds more complexity with no benefit to the air quality or repair effectiveness/efficiency, requires manufacturers to add hundreds of new tests to their software and SAE to retroactively assign hundreds of new fault codes, and is not supported by the existing SAE J2012, which does not distinguish between circuit and out-of-range codes and will need to add fault codes though it is running out of fault codes. (Alliance, Global)(SAE)
33. Comment: Industry will develop SAE J2012 usage notes with examples, and automakers who want to add shorted high and low can use manufacturer-specific fault codes. (Alliance, Global)

Agency Response to Comments 32-33: Staff did not intend to require manufacturers to store separate fault codes distinguishing these faults, and only added these examples to account for manufacturers that do choose to store separate fault codes. Thus, to avoid further confusion, staff proposed to delete “shorted high” and “shorted low” from the examples cited in sections 1968.2(e)(15.2.1)(B)(ii) and (f)(15.2.1)(B)(ii) as part of the 15-day notice. However, although these examples were deleted, the requirement to separately pinpoint faults to the extent feasible still applies, such that consolidation of fault codes is only allowed when it is not possible to distinguish between open circuit and out-of-range faults using existing hardware.

34. Comment: The proposed language requiring monitoring of input and output comprehensive components used for “emission control strategies” is unclear, specifically concerning how an “emission control strategy” is defined. This type of broad and unclear requirement should not be used; ARB should develop specific requirements instead. If ARB goes ahead with the requirement, ARB should clearly define the terms and use examples to further clarify the intent. Also, we recommend deleting “fuel rail pressure sensor” from the examples as it doesn’t seem to apply. (Alliance, Global)

Agency Response: ARB staff disagrees and did not delete these requirements. First, it is important to note that these sections (sections 1968.2(e)(15.2.1)(D) and (e)(15.2.2)(C)) are primarily used to address new emission controls that emerge and are implemented by manufacturers. Once a technology is identified and understood well enough, specific regulatory language targeting that emission control and the minimum monitoring requirements are added to provide additional direction to manufacturers. The sections clearly identify that it only includes emission control strategies not otherwise addressed in the regulation. It does not and cannot apply to strategies that are not emission control strategies or force the manufacturers to monitor a component simply because “ARB believes” it should be monitored. As the stated purpose of the OBD regulation is to ‘monitor emission systems,’ it would be inappropriate for systems to be certified with emission controls that are not monitored. As already stated in the staff report, staff recently had concerns with manufacturers designing the OBD II system without monitoring certain aspects of the emission control system solely because those emission controls or aspects were not “specifically” identified in the regulation. Further, some manufacturers were not readily disclosing to ARB the presence of these controls or even considering OBD monitors for these emission controls or strategies. Without this new monitoring language, manufacturers might be more likely to avoid sharing information with ARB about emerging emission control technologies so that they can implement them prior to ARB staff having the time to add explicit language in the regulation or use other tactics to avoid monitoring key emission control components. Nonetheless, to avoid confusion among manufacturers concerning the fuel rail pressure sensor example used for gasoline input components, staff proposed as part of the 15-day notice to delete this example and to instead include a hypothetical example of an exhaust gas temperature sensor used for a control strategy that regulates catalyst inlet temperature within a target window.

35. Comment: A hybrid energy storage system (ESS) condition resulting in performance deterioration may be recoverable. So for ESS state of health monitoring, condition (3) of sections 1968.2(e)(15.2.3)(A)(i) and (f)(15.2.3)(A)(i), which requires detection of ESS faults that prevent movement of the vehicle, should only apply if the condition is not recoverable. (Alliance, Global)

Agency Response: Staff does not believe any changes need to be made to the language. Recoverable ESS state of health conditions resulting in the inability of the vehicle to move can be addressed with enable conditions and two trip logic (e.g., a manufacturer may choose to see that a charging event has occurred before maturing this fault in a manner similar to how a fuel level sensor rationality requires a refill event).

36. Comment: Hybrid ESS cell balancing circuitry is not always used, and some manufacturers balance state of charge between cells rather than balancing cell voltages. Hybrid ESS cell balance monitoring should only be required “if equipped,” and regulation language should be changed to require monitoring of the ESS cell balancing system for “proper functional response” instead of “proper functional response to computer commands.” Further, the regulation language should be changed to require detection of faults when the balancing system can no longer maintain the “desired balance,” not “individual cell voltages desired.” (Alliance, Global)

Agency Response: Staff does not believe any changes need to be made to the language. Consistent with how the rest of the monitoring requirements are written in the OBD II regulation, the phrase “if equipped” is not needed concerning monitoring of the ESS cell balancing system. It is already inherent that if the vehicle does not have the technology, the manufacturer does not need to meet the monitoring requirements for that specific technology. Similarly, staff has chosen to align the regulation language in this section with that of output components in section 1968.2(e)(15.2.2), and as such no change will be made to the “proper functional response to computer commands” language. Further, the regulatory language already allows manufacturers to propose a monitoring plan for OBD II systems that do not determine cell balancing using individual cell voltages, so staff believes that it is not necessary to modify the language to require detection of faults when the balancing system can no longer maintain the “desired balance” instead of “individual cell voltages desired.”

37. Comment: In the emissions impact criteria sections for plug-in hybrid electric vehicles, the phrase “a fully-charged vehicle’s engine” should be revised to “an engine in a vehicle with a fully charged ESS.” (Alliance, Global)

Agency Response: Staff agrees and made these changes as part of the 15-day notice.

38. Comment: The monitoring conditions in sections 1968.2(e)(15.4.1) and (f)(15.4.1) should reference (15.2.3)(A)(v), not (15.2.3)(A)(iv). (Alliance, Global)

Agency Response: Staff agrees and made these changes as part of the 15-day notice.

39. Comment: The proposed changes to the OBD II regulation would specify different criteria for LEV II and LEV III vehicles with regards to the test out criteria for comprehensive components. We recommend harmonizing the LEV II and LEV III requirements, particularly given the very extensive testing that must be performed to meet the test out criteria (for either the old LEV II test out criteria or the new LEV III test out criteria). We recommend that for LEV II vehicles that have previously received an exception to monitoring, manufacturers should be allowed to carry over this exception since the manufacturer has already done the testing and engineering evaluation necessary to obtain ARB approval. We also recommend allowing manufacturers to optionally use the new test out criteria in sections 1968.2(e)(15.1.2)(A) and (B) for new LEV II test groups. (Alliance, Global)

Agency Response: Staff agrees and proposed language as part of the 15-day notice to include the allowances the commenter requested. When staff modified the language in sections 1968.2(e)(15.4.2) and (f)(15.4.2), which describe the emission impact-based criteria under which a comprehensive component monitor is exempt from illuminating the MIL, staff did not intend that all LEV II vehicles be required to use these criteria and prohibited from using the new test-out criteria under sections 1968.2(e)(15.1.2) and (f)(15.1.2). Nonetheless, to make the language clearer, staff modified the language in sections 1968.2(e)(15.4.2) and (f)(15.4.2) to apply these sections to vehicles that are not using the criteria of sections 1968.2(e)(15.1.2)(A) through (E) and (f)(15.1.2)(A) through (E) to determine if a component/system can affect emissions. Further, considering the timing of the rulemaking update, staff proposed language in sections 1968.2(e)(15.1.2) and (f)(15.1.2) allowing manufacturers of vehicles certified in the 2017 or earlier model year and carried over to the 2018 through 2019 model year to carry over any emission test-out determinations from the 2017 and earlier model years.

40. Comment: Vehicles meeting the combined NMOG+NO<sub>x</sub> standard should be exempt from meeting the NMHC converting catalyst feedgas generation monitoring requirements. This requirement is obsolete for these LEV III vehicles because any impact the loss of diesel oxidation catalyst (DOC) efficiency has on tailpipe NO<sub>x</sub> via nitrogen dioxide (NO<sub>2</sub>) is accounted for by the combined threshold, unlike for LEV II vehicles. (Alliance, Global)
41. Comment: Regarding the monitoring of the DOC for deterioration of nitrogen monoxide (NO)-to-NO<sub>2</sub> conversion, we understand that NO<sub>2</sub> conversion will deteriorate faster than light-off and therefore the thermal exotherm may not be sensitive enough to detect deterioration in feedgas generation. Based on discussions with manufacturers, there currently seems to be no definitive long-term solution for DOC feedgas monitoring. In the future, hydrocarbon (HC) sensors may become available that could be used to distinguish HC and NO oxidation across the catalyst. (MECA)



Agency Response to Comments 40-41: While staff understands the difficulties in monitoring NMHC catalyst feedgas generation monitoring, staff disagrees with deleting the monitoring requirements in the regulation. Staff is concerned that deleting this requirement could allow full loss of feedgas generation capability and an increase in emissions close to the emission threshold without any detection of a fault. However, staff does acknowledge that the current criteria for monitoring exemption is difficult to achieve at the lower ULEV and SULEV emission levels to which manufacturers will be certifying. Thus, staff proposed amendments to the monitoring exemption language as part of the 15-day notice to allow manufacturers to more easily be exempt from monitoring the feedgas generation function of these catalysts. Specifically, staff proposed to increase the maximum emissions increase criteria for monitoring exemption from 15 percent to the following values: 25 percent for SULEV30 and SULEV20 vehicles, 20 percent for ULEV70 and ULEV50 vehicles, and 15 percent for all other vehicles, where the percentage is based on the applicable full useful life NMHC, NOx (or NMOG+NOx, if applicable), CO, or PM standard as measured from an applicable emission test cycle.

42. Comment: The gasoline misfire monitoring requirements allow manufacturers to disable the monitor below 20 degrees Fahrenheit and to continue disablement until the ECT exceeds 70 degrees Fahrenheit. We recommend adding this exemption to diesel misfire monitoring requirements, since engine roughness at cold temperatures might be significantly higher than on a warm engine, which can result in false misfire detections. False detections can also occur when ECT is above 20 degrees Fahrenheit since the engine oil temperature increases slowly. (Alliance, Global)

Agency Response: Staff agrees and proposed revisions to allow such a disablement for diesel misfire monitors as part of the 15-day notice.

43. Comment: Section 1968.2(f)(9.2.4)(A) incorrectly states “NMHC emissions” and should be just be “emissions” for LEV III applications. (Alliance, Global)

Agency Response: Staff agrees and made changes to correct this as part of the 15-day notice.

## STANDARDIZATION REQUIREMENTS

44. Comment: References to SAE J1939 are not applicable to light-duty vehicles since SAE J1939 is not an allowed OBD protocol. Remove all references to SAE J1939 documents from OBD II regulations. (SAE)

Agency Response: SAE J1939 was specifically referenced in the OBD II regulation when section 1968.2 was first adopted in 2002, with language allowing early model year (2004 through 2005 model year) medium-duty vehicles to use the SAE J1939 protocol. This language was subsequently modified after the adoption of the HD OBD regulation in 2005, but considering the definition of “calculated load value” referenced SAE J1939, staff believed it appropriate to

continue referencing the related SAE J1939 documents. However, because this definition only references one SAE J1939 document and considering the commenter's statement above, staff will look into this issue and consider deleting SAE J1939 references in the regulation if determined to be unnecessary at a future OBD II rulemaking update.

45. Comment: Replace reference to the May 2012 version of SAE J1699-3 – “Vehicle OBD II Compliance Test Cases” with the July 2015 version. (SAE)

Agency Response: Staff made the change and added to the rulemaking record the July 2015 version of SAE J1699-3 as part of the 15-day notice.

46. Comment: Whereas the proposed regulation prohibits any data link connector (DLC) covers with a 2019-2021 model year phase-in, it requires the DLC to comply with the most current version of the SAE J1962 from the 2019 model year without any phase-in. While we support ARB efforts to update the requirements for the DLC in future vehicles that are currently in development (and able to incorporate hardware changes), the SAE J1962 changes require a lead time of minimum 3 years due to complex hardware changes. These major changes include stricter definitions for DLC location and orientation and an increase in the defined “Technician Access Area” in front of the DLC. Complying by 2019 would cause a disproportionately high burden (cost, resources, loss of profitability, time) on phase-out models with low sales numbers because of extensive hardware changes. The location of the DLC exacerbates the situation due to complex interactions with several subsystems (e.g., hood lever, brake pedal, lights, other electric switches/systems). Therefore, we request an alignment of both DLC requirements with the suggested phase-in (or the approved alternate phase-in) of 30 percent of 2019, 60 percent of 2020, 100 percent of 2021 and subsequent model year vehicles. (Daimler)

Agency Response: Staff agrees and made changes to allow a 2019-2021 phase-in to meet the specifications of the most current version of SAE J1962 document as part of the 15-day changes. Further, staff also made additional changes to this section updating the SAE J1962 referenced to the latest version, the September 2015 version.

47. Comment: Many new data stream parameters are being introduced. The regulatory structure is complicated and difficult to interpret. We recommend the SAE J1979 committee assist ARB in cleaning up the regulatory structure and adding PID numbers to the regulation. (Alliance, Global)(SAE)

48. Comment: PIDs used to be grouped into distinct categories that made it easy for manufactures to identify what PIDs were required gasoline and diesel applications. New PIDs are being added in general categories making it difficult for manufacturers and ARB staff to determine what PIDs are required for a given application. For example, turbochargers are part of the diesel major monitors but part of the gasoline comprehensive component monitors. Traditionally, turbo PIDs were utilized on diesels, not gasoline vehicles. (SAE)

Agency Response to Comments 47-48: Staff understands that there is confusion regarding the data stream parameters, and proposed changes as part of the 15-day notice to make clearer which vehicles were required to support which parameters. However, manufacturers should look at the language carefully to determine what parameters a vehicle is required to support and not assume that a certain parameter is only required on diesel vehicles since the technology is generally only found on those vehicles as opposed to gasoline vehicles and vice versa. Regarding the commenter's example, though the turbocharger is a diesel major monitor and not a gasoline major monitor, the OBD II regulation still requires gasoline vehicles to monitor turbochargers if the vehicles are equipped with them and they affect emissions or the OBD II system. Thus, the regulation language requires that "vehicles so equipped" (which include gasoline vehicles equipped with turbochargers) support the "variable geometry turbo control status" parameter.

49. Comment: Many of the new data stream parameters are required to be implemented 100 percent by 2019MY. To implement these by 2019MY, manufacturers must start implementing in 2017MY. This will be impossible as some (e.g., diesel exhaust fluid (DEF) PIDs) are not currently supported by SAE J1979. "Odometer" is not defined in SAE J1979 yet. We recommend a 25/50/75/100 percent phase in starting in 2019MY, with alternative phase in. (Alliance, Global)

Agency Response: Staff disagrees and did not make the changes. The "odometer" parameter already has a 2019-2021 phase-in schedule proposed as part of the 45-day notice. The proposed new data stream parameters applicable to hybrid vehicles and gasoline vehicles "so equipped" (i.e., hybrid/EV charging state, hybrid/EV battery system voltage, hybrid/EV battery system current, NOx sensor output, NOx sensor corrected) are already defined/supported in SAE J1979 and affect only a small segment of a manufacturers' vehicle line-up. Thus, staff believes 100 percent implementation of these data stream parameters by the 2019 model year is appropriate. Similarly, the proposed DEF-related data stream parameters required for diesel vehicles would affect only a small segment of most manufacturers' light- and medium-duty vehicle line-up and have recently been defined in SAE J1979, so staff believes the 100 percent 2019 model year implementation requirement is achievable. Further, staff believes it is important to make available these parameters as soon as possible not only for in-use emission control system performance screening of diesel vehicles but also to assist repair technicians in diagnosing DEF-related malfunctions. Most manufacturers already support DEF dosing-related parameters, but they currently can only be accessed by dealer enhanced scan tools. Thus, requiring these parameters to be accessible to generic scan tools would not only aid independent repair technicians in fixing malfunctions but also facilitate testing of diesel vehicles.

50. Comment: Portable emission measurement system (PEMS) testing requires \$61 Driver's Demand Engine Percent Torque, \$62 Actual Engine Percent Torque,

\$63 Engine Reference Torque, \$8E Engine Friction Percent Torque, \$9D Engine/Vehicle Fuel Rate, \$9E Engine Exhaust Flow Rate, but not \$A2 Cylinder Fuel Rate. We recommend ARB clarify that “cylinder fuel rate” is a diesel only requirement. (Alliance, Global)(SAE)

Agency Response: Staff agrees that the cylinder fuel rate should be limited to diesel vehicles and made this change, requiring 2019 and subsequent model year diesel vehicles to support this data stream parameter, as part of the 15-day notice.

51. Comment: The proposed language requiring manufacturers to report the “most accurate values” for certain data stream parameters is not quantifiable. This language should be deleted and the SAE J1979 definitions, which were developed by the vehicle/engine manufacturers and PEMS equipment manufacturers, should be used. (SAE)

Agency Response: Staff included the proposed language to address issues with vehicles that keep track of more than one value of the same parameter but output to a scan tool the least accurate of the values for that parameter. Thus, staff is keeping the language. Nonetheless, staff is proposing to delete the specific sentence that defined the “most accurate value” to avoid confusion.

52. Comment: We recommend allowing a default value for the calibration verification number (CVN). They are needed if there is a lack of communication between a remote module and the module providing the CVN. SAE J1979 contains requirements allowing for default data if data are not available. Default CVN values will alert the technician to a problem and is more valid than a stored CVN, which could have been generated some time ago. (Alliance, Global)

53. Comment: Prohibiting default values is inconsistent with SAE J1979 and previous ARB direction for J1979 PIDs with faulted data. SAE J1979 provides clear direction on how an engine control unit (ECU) should respond when data are not available from a hardwired sensor and from an OBD device that communicates over a network. Reporting a value that is out of range or not normal (i.e., a value least likely to be expected under normal conditions), indicates to a service technician that the device failed. Specific default values for the calibration identification number (CAL ID), CVN, and vehicle identification number (VIN) were specified after discussions with vehicle/engine, scan tool manufacturers, and inspection and maintenance (I/M) test equipment manufacturers. A CVN of 000000 and CAL ID of ????????? would not be mistaken for valid values. An ECU that is not communicating but reporting valid values is more confusing for a technician. (SAE)

Agency Response to Comments 52-53: While staff understands the manufacturers’ concern, staff wants to limit the output of default CVN values. Thus, staff proposed as part of the 15-day notice to allow a default CVN value to be reported to a scan tool in cases where a communication malfunction occurs that prevents access to the stored CVN value provided that (1) a pending fault

code is stored or a confirmed fault code is stored with the MIL commanded on for the communication failure of the module, and (2) the default CVN value reported to the scan tool cannot be mistaken for a valid CVN value.

54. Comment: We recommend deleting the new language requiring manufacturers to erase all emission-related diagnostic information in all control modules that reported supported readiness for a readiness bit other than the comprehensive component readiness bit when the VIN is reprogrammed. The current requirement, where the information is cleared in the engine control module, covers the vast majority of cases. Requiring aftertreatment modules that support readiness to meet this requirement requires a complicated handshake between modules. Though the new requirement seems to be an attempt to prevent I/M cheating, there are means to easily bypass this requirement. The requirement also conflicts with other proposed requirements to clear all emission data from all modules. (Alliance, Global)

Agency Response: Staff disagrees and did not make this change. First, as already discussed in the staff report, the commenter misinterpreted the current requirement regarding VIN reprogramming. Staff believes that the regulation is clear that resetting “all” emission-related diagnostic information, not just the information in the control module containing the VIN, is required in conjunction with reprogramming the VIN. This does not allow to manufacturer to erase the emission-related diagnostic information in only the engine control module if information is also located in other modules. The proposed amendment limiting the erasure of information to “control modules that reported supported readiness for a readiness bit other than the comprehensive components readiness bit” starting in the 2019 model year is thus considered a “relaxation” of the current requirements. Second, the proposed amendment related to VIN reprogramming would not conflict with the other proposed requirement to clear all emission data from all modules, since the other requirement relates to scan tool commands to erase information while this requirement relates to reprogramming the VIN. Third, as already stated in the staff report, staff’s intent with this requirement is to reduce the opportunity for selective reprogramming events to be used to evade detection during inspections or avoid necessary repairs. The commenter is correct that individuals with sophisticated knowledge of how OBD systems work may be successful in bypassing on some vehicle designs the readiness protections required by the regulation. However, the staff does not believe that it should consequently remove from the regulation protections that are and will continue to be effective in deterring OBD system tampering in the vast majority of cases.

55. Comment: Section 1968.2(g)(4.10.1), which lists the emission-related diagnostic information, duplicates SAE J1979, which has the same list and is more accurate. Many people interpret “all” to mean “only the data listed below”. We recommend removing duplicate section from the regulation or replace “all” with “at least”. (Alliance, Global)(SAE)

Agency Response: Staff agrees that clarifications need to be made, and added language indicating that the emission-related diagnostic information is required to include “at least” the information listed in the OBD II regulation. This change was made as part of the 15-day notice.

56. Comment: Physical code clears are routinely used during assembly plant testing and technician service procedures. Technicians usually repair one module at a time and use physical code clear to determine if the issue is fixed before moving on to the next module. The new proposed requirement requiring erasure of emission-related diagnostic information from “all” control units would prohibit proper servicing of vehicles. This requirement appears to be an attempt to prevent I/M cheating, but there are methods to bypass this requirement. Permanent codes are the real solution to prevent I/M cheating, since they cannot be erased even when these cheating methods are attempted. The new requirement will require manufacturers to change the software in every OBD module and change repair procedures. (Alliance, Global)(SAE)
57. Comment: No leadtime or phase-in is provided for this new requirement prohibiting physical code clears. Either delete this new requirement or require a phase-in of 25/50/75/100 percent starting in the 2019 model with allowance for alternate phase-ins. (Alliance, Global)
58. Comment: For heavy-duty vehicles, it is normal to service the transmission in one shop and the engine in another. The new requirement will make it impossible for a vehicle owner to get his vehicle serviced within a reasonable time when faults in both the engine and transmission exist, since one shop will not be able to repair the vehicle if the first shop erases all the emission-related fault information. The vehicle would need to be re-driven to fix the fault, which takes a long time for some diesel monitors. The requirement will inconvenience customers at I/M, specifically diesel vehicles where some monitors like the PM filter monitor can take 500 miles to complete. If a vehicle is repaired and the information cleared, the vehicle may have to be driven 500 miles to reset all I/M readiness bits. The term “all” from “all control units” should be deleted. (SAE)

Agency Response to Comments 56-58: While permanent fault codes are intended to facilitate vehicle inspections under certain scenarios and prevent I/M cheating, there are currently too many issues with improper implementation of permanent fault codes in vehicles to rely on them as the primary basis for fraud prevention in I/M testing today. However, staff understands manufacturers’ concerns about servicing vehicles. Thus, staff proposed as part of the 15-day notice to limit the information erasure to control units that reported supported readiness for a readiness bit other than the comprehensive component readiness bit. This is consistent with what was proposed for permanent fault code erasure in section 1968.2(g)(4.4.6)(D) and VIN reprogramming in section 1968.2(g)(4.8.2), allowing manufacturers to erase information only in secondary control units that only support monitors for comprehensive components. Further, contrary to the commenter’s statement, staff did provide leadtime as part of the 45-day notice, requiring manufacturers to meet the requirement by the 2019

model year. However, to alleviate manufacturers' concerns about implementation of this requirement, staff proposed to change the implementation date from a 2019 model year start date to a 2019-2021 model year phase-in as part of the 15-day notice.

59. Comment: The proposed language in section 1968.2(g)(4.10.3) appears to require manufacturers to request Executive Officer approval to clear codes while the engine is running in addition to the engine-off requirement. This appears to be a misinterpretation of an original equipment manufacturer (OEM) requirement that only allows codes to be cleared at the end of a driving cycle rather than at the time the clear codes request was made. An ignition key cycle is required to complete the code clear in order to reset the failure mode/default actions taken in the presence of some faults. We recommend revising the wording in this section to allow manufacturers to request Executive Officer approval to erase all emission-related diagnostic information from all control units during "alternate conditions (e.g., engine off conditions requiring an ignition key cycle) for the purpose of safety or component protection." (SAE)

Agency Response: While staff does not agree with the specific wording the commenter proposed, staff agrees that the language needs to be modified to be clearer. Specifically, section 1968.2(g)(4.10.2) allows for the OBD II system to erase the information (in response to a scan tool command) during any driving conditions as long as the information can be erased while the vehicle is in the key on, engine-off position, while section 1968.2(g)(4.10.3) allows manufacturers to forgo erasing the information during key on, engine-off conditions for safety or component protection reasons. Thus, staff proposed changes in section 1968.2(g)(4.10.3) to clarify that manufacturers may request to be exempt from erasing the information while in the key on, engine off position for purposes of safety or component protection, and that manufacturers are allowed to propose "alternate conditions (i.e., conditions other than or in addition to the key on, engine off position)" to erase the information.

60. Comment: Requiring the in-use performance numerators and denominators to be stored in non-volatile random access memory (NVRAM) does not make sense, since these values exported in Service \$09 are calculated based on many individual diagnostics (typically 5-10) and would require all individual numerators and denominators to also be stored in NVRAM. This will consume considerable NVRAM resources. This requirement should either be deleted or have additional lead time and a phase-in (25/50/75/100 percent starting in 2019MY with alternative phase in). (Alliance, Global)

Agency Response: Staff agrees and proposed to delete this requirement as part of the 15-day notice.

## OTHER OBD II REQUIREMENTS

61. Comment: The meaning of section 1968.2(h)(5.2.3) prohibiting "preconditioning cycles" prior to running the exhaust emission test is not clear, specifically how it

fits with the requirements in sections 1968.2(h)(5.1.1) and (5.2.2) or the order of the demonstration test sequence. This section should be clarified. (Alliance, Global)

Agency Response: This language was intended to prevent manufacturers from carrying over “preconditioning cycles” that were approved for showing compliance with the tailpipe emissions standards and using those cycles to detect the implanted malfunction, not the “preconditioning cycle” referenced in section 1968.2(h)(5.1). Thus, staff proposed modifications to section 1968.2(h)(5.2.3) to clear up the confusion.

62. Comment: The proposed certification documentation requirement requiring manufacturers to include a list of components that are not OBD II monitored due to meeting the criteria under sections 1968.2(e)(17.8), (17.9), (f)(17.7), and (17.8) is burdensome and ignores the intent of these sections, which was to put some components outside of the OBD requirements. We recommend deleting this requirement. (Alliance, Global)

Agency Response: Staff disagrees with the commenter and thus did not delete the requirement. This section deals with components that only have an effect on emissions or the OBD II system performance when either the ambient temperature is below 20 degrees Fahrenheit or the vehicle speed is above 82 miles-per-hour. Considering the extreme range of driving conditions under which the exemption applies, not many components should fall under these exemption clauses and thus, manufacturers should already be aware of these components. Further, staff believes this requirement is important in cases where a manufacturer may have incorrectly determined a component does not affect emissions or other monitors during normal driving conditions. Without a list, staff will not know which component(s) a manufacturer chose not to monitor based on the exemption criteria, and thus staff will not have the opportunity to challenge a manufacturer’s exemption determination if staff believes the component does in fact affect emissions or other monitors during normal driving conditions.

## VEHICLE OPERATION TRACKING REQUIREMENTS

63. Comment: We do not support the proposed vehicle operation tracking requirements. These requirements are flawed and should be deleted from the regulations. (Alliance, Global)

Agency Response: Subsequent to the Board Hearing, staff met with several manufacturers as well as representatives of the trade associations and members of the SAE J1979 committee. As a result of these discussions, ARB staff made changes to the original proposed regulation language as part of the 15-day notice. A flaw was found in one of the proposed parameters (cumulative output torque) and has been addressed (modified and clarified to represent total engine output energy). Other minor changes have also been made to clarify the requirements. The details of many of the other changes can be found in the Agency Response to Comments 69-70 and 72-74 below.



64. Comment: The proposal is beyond the scope of OBD - it doesn't fit the purpose of the OBD II requirements (e.g., doesn't monitor for emission-related malfunctions) - and lacks reasonable justification or need. There is no need for ARB to add more requirements for the purpose of turning every vehicle into a potential research platform. The proposal is also beyond ARB's authority. None of the statutory provisions relied upon by ARB for authority to promulgate the OBD regulations, including the California H & S Code (e.g., section 43018(c)), gives ARB to authority to collect these data. (Alliance, Global)

Agency Response: ARB disagrees with the commenter's assertions. As explained below, the vehicle operation tracking requirements of the OBD II regulation set forth in sections 1968.2(g)(6.3) through (g)(6.6) fall within the broad scope of authority that Legislature has conferred on ARB to monitor sources of GHG emissions and are not inconsistent with the intended purpose of OBD systems.

### **Consistent With Statutory Authority**

In 2006, California's Legislature enacted the California Global Warming Solutions Act of 2006 (Assembly Bill 32 (AB 32); Stats 2006, ch. 488, H & S Code section 38500 et seq.), which declares that global warming<sup>3</sup> poses a serious threat to the economic well-being, public health, natural resources, and the environment of California. H & S Code section 38510 designates ARB as the state agency charged with monitoring and regulating sources of GHG emissions.<sup>4</sup>

H & S Code section 38501 expresses the Legislature's intent that the Board coordinate with State agencies and consult with the environmental justice community, industry sectors, business groups, academic institutions, environmental organizations, and other stakeholders in implementing AB 32, and that the Board design emission reduction measures to meet the statewide emission limits for GHGs in a manner that minimizes costs and maximizes benefits for California's economy, and maximizes additional environmental and economic co-benefits for California, and complements the State's efforts to improve air quality.

H & S Code sections 39600 and 39601 authorize the Board to adopt standards, rules and regulations, and to perform such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by [Division 26 of the H & S Code] and by any other provision of law.

These statutory provisions grant ARB broad authority to adopt regulations needed to properly execute the powers and duties granted to ARB by AB 32, including ARB's duty to monitor and regulate sources of GHG emissions. Motor vehicles are a recognized source of GHG emissions, and ARB has adopted

---

<sup>3</sup> H & S Code section 38505 defines greenhouse gases as including CO<sub>2</sub>, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride.

<sup>4</sup> H & S Code section 38510 provides that "[t]he State Air Resources Board is the state agency charged with monitoring and regulating sources of emissions of greenhouse gases that cause global warming in order to reduce emissions of greenhouse gases."

regulations that establish GHG emission standards applicable to new passenger cars, light-duty trucks, and medium-duty vehicles.<sup>5</sup>

As explained in the staff report, staff established the vehicle operation tracking requirements to ensure that it will have data enabling it to both assess the CO<sub>2</sub> emissions generated from actual in-use vehicles and verify that the advanced vehicle and powertrain technologies being utilized to comply with California's stringent GHG emission standards actually deliver the expected GHG benefits and consumer fuel savings in the real world. Vehicle manufacturers are utilizing a number of new engine and vehicle technologies to comply with applicable CO<sub>2</sub> emission standards, but the CO<sub>2</sub> emission reductions associated with these technologies are based on a limited set of certification test cycles that likely differ from the emission reductions observed in actual, real world usage. The data will therefore assist ARB staff in evaluating whether specific technologies have real world benefits that are disproportionately less than represented by the results obtained during certification, which fulfills staff's objective of monitoring emissions of a specific GHG pollutant, namely CO<sub>2</sub>, from in-use motor vehicles.

Staff further explained in the staff report that it anticipates using data obtained from the vehicle operation tracking requirements to more accurately assign credits for vehicles equipped with "active technologies" that are currently assigned additional off-cycle credits towards meeting the GHG vehicle standards (e.g., haptic-feedback pedals, driver coaching, active aerodynamics), to propose future CO<sub>2</sub> emission standards to better ensure that real world reductions are achieved, to develop future plug-in hybrid electric vehicle requirements that more accurately represent the emission reductions these vehicles achieve, and to improve GHG inventory models to more accurately project benefits from current and future regulatory measures being considered when planning for compliance with the State's GHG goals.

Because these requirements will provide ARB staff with information to help them evaluate the performance of existing CO<sub>2</sub> emission control technologies and develop future regulations to regulate GHG emissions, the requirements unquestionably fall within the scope of ARB's statutory authority to monitor and regulate sources of GHG emissions that cause global warming. Furthermore, should ARB engage in future rulemaking actions to establish new CO<sub>2</sub> emission standards and/or future plug-in hybrid vehicle requirements, those rulemakings would also be fully consistent with H & S Code section 38501's directive that ARB design emission reduction measures to meet the statewide emission limits for GHGs, with H & S Code section's 38510's directive that ARB regulate sources of emissions of GHGs, and with H & S Code sections 39600 and 39601's directive that ARB perform such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon the Board by Division 26 of the H & S Code and by any other provision of law.

---

<sup>5</sup> Title 13, CCR sections 1961.1 and 1961.3.

## Consistent with purpose of OBD regulation

ARB also disagrees with the commenter's statements that the vehicle operation tracking requirements are not consistent with the purpose of the OBD regulation and are also "not necessary for the OBD system to carry out its duly authorized functions."

As explained above, ARB established the vehicle operation tracking requirements pursuant to its statutory authority to monitor and regulate sources of GHG emissions and to perform such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon it by any provision of law.<sup>6</sup>

ARB previously established the OBD II regulation to ensure reductions of in-use motor vehicle and motor vehicle engine emissions through improvements of emission system durability and performance. As the commenter notes, OBD II systems fulfill such objectives by requiring onboard computers to monitor vehicle emission control systems for malfunctions over the actual life of the vehicle, and to timely notify the vehicle operator of detected malfunctions. ARB adopted the current version of the OBD II regulation pursuant to statutory provisions and other provisions of law<sup>7</sup> that broadly authorize ARB to perform such acts as may be necessary for the proper execution of the powers and duties granted to and imposed upon it by any provision of law, including adopting regulations which will result in the most cost-effective combination of control measures on all classes of motor vehicles and motor vehicle fuel, including reductions of in-use emissions from motor vehicles through improvements in emission system durability and performance.<sup>8</sup>

No conflict or inconsistency exists between the provisions of law authorizing the vehicle operation tracking requirements and the provisions of law authorizing the most recent version of the OBD II regulation. Neither the OBD II regulation nor the provisions of law authorizing ARB to adopt and amend the regulation prohibit or restrict OBD systems from recording the data specified by the vehicle operation tracking requirements. Rather, ARB staff, based on its extensive knowledge of OBD systems and experience in implementing the OBD II regulation, determined that OBD systems are uniquely suited to acquire and record the data specified by the vehicle operation tracking requirements.

The commenter's concern is premised on its assumption that OBD systems may only be subject to requirements that are directly related to currently existing requirements in the OBD regulation. That premise is incorrect and is fully inconsistent with ARB's broad authority to adopt regulations and to take such acts that are needed for ARB to properly execute the powers and duties granted

---

<sup>6</sup> H & S Code sections 38501, 38505, 38510, 39600, and 39600.

<sup>7</sup> H & S Code sections 39010, 39602.5, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, and 43106; and *Engine Manufacturers Association v. California Air Resources Board* (2014) 231 Cal.App.4th 1022.

<sup>8</sup> H & S Code section 43018(c).

to and imposed upon it by any other provision of law. Furthermore, the commenter's premise would also improperly restrict ARB from amending the OBD regulation to reflect new advances in emission control technology or to monitor new categories of air pollutants.

The information provided by the vehicle operation tracking requirements will, among other things, inform ARB of the need to amend the OBD regulation to specifically apply to GHG pollutants. Although the OBD II regulation does not currently require OBD systems to monitor for malfunctions that cause exceedances of GHG emissions (i.e., section 1968.2 presently does not specify malfunction emission threshold requirements for GHG pollutants), ARB clearly is authorized to amend the OBD regulation to require that OBD systems do so, and such amendments would be fully consistent with the goal of the OBD II regulation. In other words, the OBD II regulation is intended to reduce motor vehicle and motor vehicle engine emissions, not just motor vehicle and motor vehicle engine criteria pollutant emissions. The tracking requirements will also assist ARB in evaluating the need to further amend the OBD regulation to ensure that OBD systems are capable of timely malfunction detection of emission control systems and to maintain continued reductions of in-use motor vehicle and motor vehicle engine emissions through improvements of emission system durability and performance.

As explained above, ARB is authorized to require that 2019 and subsequent model year OBD II systems track and report specified vehicle data pursuant to its statutory authority in H & S Code section 38510 to monitor and regulate sources of GHG emissions, and H & S Code section 38501 further authorizes ARB to design emission reduction measures to meet the statewide emission limits for GHGs. Neither these provisions nor the provisions authorizing the amendments to the OBD regulation<sup>9</sup> prohibit or restrict ARB from obtaining that data from OBD II systems. Furthermore, no inconsistencies exist between the statutory provisions of H & S Code sections 38501, 38505, and 38510 and the statutory provisions authorizing the remaining elements of the amendments to the OBD II regulation.<sup>10</sup> Indeed, ARB staff determined that OBD II systems are uniquely suited to fulfill such tracking and reporting requirements and accordingly proposed that OBD II systems be required to meet the vehicle data requirements. Accordingly, ARB disagrees with the commenter and instead maintains that because the OBD II regulation already includes a standardized method to access vehicle information and specifies exactly what vehicle information must be made available, it is uniquely suited to contain the specifications for data needed to monitor sources of GHG emissions, and specifically the CO<sub>2</sub> emissions generated from actual in-use vehicles.

---

<sup>9</sup> H & S Code, sections 39010, 39600, 39601, 39602.5, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, and 43106; and *Engine Manufacturers Association v. California Air Resources Board* (2014) 231 Cal.App.4th 1022.

<sup>10</sup> See fn 5.

Further, ARB believes that these comments from the automotive manufacturer associations regarding the inappropriateness of these new data in the OBD regulations are disingenuous. In the past, individual manufacturers and their respective associations have specifically requested that ARB keep all requirements for required vehicle data in a single regulation to facilitate compliance on their part. Manufacturers have previously expressed concerns that specifying required data elements across different regulations would increase their risk of noncompliance, and ARB has therefore placed the new data requirements in the OBD regulation. Examples include past additions of data necessary for biennial emission inspections, enforcement of the OBD requirements themselves, verification of the limited usage of auxiliary emission control devices relative to manufacturer claims at the time of vehicle certification, identification of tampered or modified emission control software, or diagnosis and repair of new emission control technologies. In all cases, these data have been included in the existing framework of the OBD regulations, which gives precise information to manufacturers as to how the data are to be implemented and provides a single regulation for them to refer to for all data required. Furthermore, during public workshop proceedings leading up to this rulemaking action, staff proposed the concept of establishing a separate regulation to contain these data requirements, rather than placing the data requirements in the OBD regulation as had been past practice. While manufacturers continued to voice their objections to requiring these data at all, they largely agreed that placing the requirements in a stand-alone regulation separate from OBD would not be a preferred alternative to placing the requirements in the OBD regulations.

65. Comment: The proposal does not adequately address personal privacy. This information, which includes driver behavior data, is highly confidential, so generation of such data should be minimized to the extent possible and collection of the data should only be when necessary with the consumer's consent. The proposed vehicle performance tracking data will be recorded and stored without most consumers' knowledge, consent, or ability to opt-in to the data recording. ARB has not adequately addressed the extent to which the data collected is considered personally "identifiable information" (defined as information linked to the vehicle from which the information is retrieved, the owner of the vehicle, or the registered user<sup>11</sup>) when combined with the VIN. Information stored with the VIN is not restricted nor prevented from occurring. Though ARB states the data are collected in an aggregate manner rather than a trip-by-trip format, the data could still be used to generate an overall picture of the consumer's driving behavior when combined with other data, which may become more prevalent with the internet. (Alliance, Global)

---

<sup>11</sup> "Identifiable information" is defined in the "Consumer Privacy Protection Principles for Vehicle Technologies and Services," which was attached to a letter from the Alliance of Automobile Manufacturers and Association of Global Automakers to Federal Trade Commission Chairwoman Edith Ramirez, dated November 12, 2014

66. Comment: We support using the OBD system to track emission-related failures and the revisions to the regulation as written, as long as access to the vehicle information is intended only to ensure the OBD system integrity and the regulation won't be expanded to track specific driver behaviors and habits (e.g., how fast the driver drives, how hard the driver brakes, how many miles the driver drives, how frequently the driver visits specific locations). California Vehicle Code Section 9951 already requires disclosure and protects consumers against unauthorized distribution of this information unless a consumer consents. Automakers have also strictly limited access to vehicle data to protect the public's safety and the security of personal information. We believe that driver's privacy should be respected and protected. (CNCDA)

Agency Response to Comments 65-66: First, relative to the original staff proposal, the required data parameters have been significantly pared down and modified to eliminate data that could be used to identify individual driver habits. As an example, the original parameters discussed the possibility of collecting data in various vehicle acceleration ranges to help normalize the fuel consumption data. However, such a proposal was eliminated and replaced with one that aggregates a kinetic energy term that can similarly normalize the data to account for how much kinetic energy was generated by the vehicle but in a manner that prevents any identification of acceleration rates. For these data, an acceleration from one vehicle speed to another reflects the exact same kinetic energy regardless of whether the event happened as a single rapid acceleration, a single extremely slow acceleration, or multiple cumulative accelerations between intermediate vehicle speeds.

Second, the new data do not (nor did ARB staff ever propose to) include any data regarding the driver or registered owner of the vehicle, the location of the vehicle, or any driver habits that could be used to infer compliance with traffic or safety laws (e.g., speeding, failure to stop at red lights, rapid braking events).

Third, the regulation only specifies that these data be stored in the vehicle in a standardized format. There is no requirement that the data be remotely accessible or communicated wirelessly from the vehicle in any form. Access to the data requires a physical connection to a connector, located inside the vehicle passenger compartment, while the ignition is on. By definition, this effectively precludes access to the data without the permission and awareness of the vehicle driver. That said, staff also worked with the Global Automakers association to develop additional new language, section 1968.2(g)(6.9), to further address concerns about data security and privacy related to the new parameters. The language, which was proposed as part of the 15-day notice, would make clear that any time these data would be collected by ARB, it would be obtained by voluntary and informed consent of the vehicle operator. Additionally, the language ensures any such data will be collected and stored in a manner that would prevent tying the data to a specific vehicle or registered vehicle owner. For example, any records of these data maintained by ARB could be stored without the full VIN, license plate, or registered owner, eliminating any ability to associate the data to the individual vehicle that it was procured from.

67. Comment: The proposal does not adequately address data security, specifically how consumers' personally identifiable information such as the VIN and driving behavior data will be protected not only by ARB, but also by other parties that access this information through the OBD data connection port. There is no effective way to prevent unauthorized data collection by third parties. A broad range of people and businesses from repair shops to car washes can access the data and possibly sell the data to someone else. The data can easily be accessed with an inexpensive tool. Wireless devices connected to the OBD system are increasing in number. The OBD II regulations are the de facto national standards since the federal regulations allows for vehicles to be certified to California's OBD regulations. So the data will be available to anyone in all 50 states, increasing the chance for unauthorized and improper data collection. Other state I/M programs may choose to collect these data with the VIN, and California's I/M program may follow suit, possibly without informing the consumer of the download and with no plan on how they will protect the data. (Alliance, Global)

68. Comment: Any generic scan tool will be able to access the data. Many devices that can plug into the OBD DLC have access to all J1979 data and can wirelessly broadcast the data to its servers. Some of these devices are installed by customers with a corresponding app on their phone (e.g., Dash Labs), and these apps often download the OBD data to their servers for data mining purposes. Third parties like insurance companies can install devices to gather and transmission vehicle tracking information to a server (e.g., for insurance rate adjustments). The data are vehicle specific since the VIN is part of the data. (SAE)

Agency Response to Comments 67-68: It is true that the new data will be stored in the vehicle in a manner that permits access through a standardized scan tool. However, that does not mean that the data is available to anyone or for any car. Access still requires a physical wired connection from the tool to the connector inside the car, while the ignition is on. As noted in the Agency Response to Comments 65-66, this effectively precludes any access without the permission of the vehicle driver (e.g., the driver has to allow someone to physically plug a tool into the connector located in the driver's footwell region and to provide them the keys to the car to turn the ignition on). Additionally, while the connector and communication to the car for these data are standardized within the automotive industry, it still requires the use of a specialized automotive scan tool to access the information. While part of the purpose of OBD systems was to enable easier access by private citizens and repair technicians to the information necessary to repair cars, such scan tools are far from a commonly used or owned item for the average vehicle owner.

Further, to the extent a vehicle owner has already purchased (or may in the future purchase) a device or tool that they plug into or leave installed in their car to enable 'wireless' access to information through the OBD connector, it reflects a personal choice made by the driver to do so. Nothing in the OBD regulation prohibits (or requires) a vehicle owner from doing so today or in the future. This

already happens on vehicles today, well before any of these new data will be available on cars. In fact, many of the devices available today already calculate parameters similar to those that will be required in the future such as estimated fuel consumption. While the new data will make it easier for devices to perform such calculations and improve the accuracy of such calculations, it does not alter the fact that the driver must knowingly decide to purchase and install such a device to enable access to the data. And, if the device the vehicle owner chooses to install is collecting, storing, or transmitting information to a third party without the owner's knowledge, the presence or absence of these new data does not change the situation. That situation must be remedied with proper disclosure by the device manufacturer to the purchaser as to what data it may collect and what it will do with the data---not by preventing one mechanism for such data to be available within a car.

Regarding the concern that the data could be accessed without the owner's knowledge or consent by other people that are provided access to a car (e.g., repair technicians working on the car, car wash attendants, valets), the concern seems to overlook some obvious issues. Even setting aside the vast amounts of data available in a car that may be of more value than fuel economy data to such an unscrupulous person (e.g., recent global positioning system location data from the navigation system, cellphone records from a Bluetooth connected system, or registered vehicle owner information in the glove compartment), there are cheaper and easier ways to access even the fuel economy data. For instance, nearly all vehicles today already contain dashboard displays with information on the recent fuel economy of the car including fuel consumed, distance and time traveled, and often, average vehicle speed. No specialized tools are required to access or even record this information (e.g., a person can use a cell phone camera to take a picture of the display). Even accessing the VIN of the vehicle, which is not connected to these new data but is available electronically, is more readily done by reading the physical identification tag located in the corner of the windshield; this can be done without access to the interior of the car, without the ignition on, and without the use of any specialized tools.

69. Comment: Even if there's regulatory language concerning data collection by third parties, this doesn't provide regulatory assurance – the only assurance is that ARB will work hard to put in place good measures to protect consumer privacy and implement best practices for data collection and storage. (Global)

70. Comment: Staff report statements do not provide regulatory certainty. While the language in the staff report intends to reassure the public that the data will not be collected without their consent, it is not legally binding. Federal and California courts instead have viewed statements in preambles (or staff report) as interpretive guidance or general statements of policy. (Alliance, Global)

Agency Response to Comments 69-70: As noted in Agency Response to Comments 65-66, staff proposed new language as part of the 15-day notice, section 1968.2(g)(6.9), to address concerns about data security and privacy related to the new parameters. The proposed language, in the regulation itself



and not just in the staff report, would make it clear that any data collected by ARB would be obtained by voluntary and informed consent of the vehicle operator and that the data will be collected and stored in a manner that would prevent linking of the data to a specific vehicle, driver, or registered vehicle owner.

71. Comment: I have concerns regarding on-board processor and computer security and the chance of the OBD system (at least) being hacked. What measures are being taken to prevent this? (Strand)

Agency Response: No change was made in response to this comment. While concerns regarding automotive computer security and hacking are valid concerns, they are not relevant to any changes being proposed in this rulemaking. The OBD system is a diagnostic system comprised primarily of software in various vehicle control units and does not have an impact on the security measures vehicle manufacturers do or do not implement to prevent unauthorized access or modification of their vehicles. In general, vehicle manufacturers have become increasingly aware of the security risks and have been accelerating implementation of increasingly protective security measures. Further, the National Highway Traffic Safety Administration has established an internal agency working group and has begun research in the area of cyber security.

72. Comment: There's a concern of how the data will be used. ARB should clarify that vehicle tracking data will not be used for compliance purposes – the regulation language does not state how the data will be used. They should not be used by vehicle manufacturers to verify compliance given the fact that “your mileage will vary” depending on the various driving and ambient conditions. The data thus will not be correlated to laboratory test results. It would be unreasonable to upend a system ARB and U.S. EPA established and mandated, consisting of highly controlled testing, with an entirely new, untested system uncorrelated to the current testing, reporting and compliance regime. The data at most should only be used as a research tool to inform updates to future rulemakings and transportation models (how vehicles perform on-road, driving conditions and scenarios, and vehicle miles traveled). (Alliance, Global)

Agency Response: Staff worked directly with both Global and the Alliance to address this concern. As a result, language was added as part of the 15-day notice (section 1968.2(g)(6.11)) to confirm that the requirement for these data did not alter the test procedures or standards used to determine compliance with ARB's light-duty GHG emission standards (title 13, CCR section 1961.3). Language was also added to indicate that these data would reflect vehicle operation in “various real world conditions including different driving, environmental, and vehicle weight conditions that may not correspond to regulated test procedures.”

73. Comment: The regulation requires 4 byte PIDs with specific units. Manufacturers have concerns about their ability to resolve distances to that fine a resolution, and others have concerns about the feasibility of accurately determining grid energy delivered to the vehicle for propulsion. Defining units, resolution, and accuracy is best handled by the cross-function team of experts at the SAE J1979 committee along with ARB input. (SAE)

Agency Response: Historically, detailed specifications like those identified in the comment have indeed been contained in the SAE J1979 specification rather than in the OBD regulation. This has generally been the preferred solution by both ARB and vehicle manufacturers, which takes advantage of their expertise in developing very complex technical specifications that satisfy the needs of ARB. On occasion, however, the regulation has had to provide such a level of detail in advance of the SAE committee developing equivalent draft specifications for the regulation to cite or rely on. Since the original staff proposal, work with SAE committee members has been ongoing and as a result, draft SAE J1979 specifications have now largely been developed for these new data. The final specifications for these data are expected to be officially approved and published in SAE J1979 well ahead of the 2019 model year implementation start date for these data. Accordingly, ARB proposed several changes to the regulation in the 15-day notice. Specifically, staff proposed to delete additional descriptive text for several parameters in sections 1968.2(g)(6.3) and (6.4) and delete most of the detailed numerical specifications for each counter in section 1968.2(g)(6.6.2). These deletions are possible because of the continued work by members of the committee to develop detailed specifications for each of these parameters (including the units and software implementation details), eliminating the need for a similar or redundant level of specification developed by staff in the regulation.

74. Comment: If ARB moves forward with their proposal, the regulations should include the following changes:

- Change the implementation date to a 3 year phase-in of 30/60/100 percent, beginning with the 2020MY, and allow the alternative phase-in specified in the regulation. SAE has not defined any of the new PIDs yet, and can probably define all the new PIDs within a year of when the final regulations are issued if the process is expedited by SAE. The regulations are estimated to be finalized by mid-2016, so the earliest SAE can define the PIDs is mid-2017 when most 2018 model year vehicles are already certified and the OBD software on most 2019 model year vehicles finalized. The phase-in will allow manufacturers to implement the PIDs on a subset of vehicles and get real world feedback before implementing on the rest of the vehicles.
- Include language in the regulation and the FSOR to codify ARB's intent, protect the data and consumer, making aware to consumers that any third party can obtain the data, and set a strong regulatory precedence for how others might consider collecting these data once it is readily available on all vehicles. This includes language stating the data will be obtained only with consumer consent, will be stored in an aggregated form that does not identify specific driver behavior or location or any other personal data like the VIN, and will be collected only through secured wired connection by physically

plugging into the vehicle with a specialized tool while the vehicle is on. Language should also be added stating that compliance with this requirement will not create any statutory, regulatory, or common law liability upon the regulated entities for breach of cyber security , privacy, or any other laws, and that the regulated entity has no obligation to share the data with others. (Alliance, Global)

Agency Response: To address the concern in the first bullet regarding implementation, the 15-day notice included regulatory language to change the implementation dates in sections 1968.2(g)(6.3), (6.4), and (6.5) from a 2019 model year start date for all vehicles to a three year phase-in schedule for 2019 through 2021 model year vehicles to give manufacturers additional time to implement these new data. As noted in the Agency Response to Comment 73, staff has also had ongoing work with SAE committee members to finalize draft specifications for these new data to enable timely implementation by the manufacturers.

Regarding the concerns in the second bullet, staff worked with the Alliance and Global to develop the additional regulatory language contained in section 1968.2(g)(6.9). This language was proposed as part of the 15-day notice. As noted in Agency Response to Comments 69-70, the added language does clarify that ARB will only collect the data with the voluntary and informed consent of the driver and will not store it in a manner that would allow it to be connected to the individual vehicle, driver, or registered owner that it came from. ARB also already has defined data storage and security policies that govern the safe and secure handling of data. The language does not, however, define required procedures for any other entities that may collect the data in the future as ARB has no authority to establish or enforce such restrictions. Regarding the last concern about not creating any statutory liability, ARB technical and legal staff worked with the Alliance and Global and developed the language of section 1968.2(g)(6.10), which was proposed as part of the 15-day notice, to clarify that the requirement to make these data available in cars did not also create a requirement for manufacturers to collect and/or share these data with other entities.

## 15-DAY COMMENTS

75. Comment: Sections 1968.2(e)(10.2.2)(C) and (f)(11.2.2)(C) require ECT sensor monitors to detect faults where the ECT sensor inappropriately indicates a temperature below the highest minimum enable temperature. The monitor requires that the gasoline engine operate to increase temperature before detecting the fault. The in-use performance ratio requirements are designed to ensure that monitors operate sufficiently in use, with the ratio being the “number of times the monitor completes” divided by the “number of times the monitor has an opportunity to operate.” For an accurate ratio, the denominator must be specified such that the monitor has an opportunity to operate. In the case of the ECT sensor monitor on a plug-in hybrid electric vehicle, the denominator should only be incremented if the gasoline engine operates (i.e., “fueled engine

operation” occurs). Section 1968.2(d)(4.3.2)(L) does not require this fueled engine operation condition to be met to increment the denominator for these monitors. So these monitors may not have an opportunity to operate. Section 1968.2(d)(4.3.2)(L) should be modified to require the fueled engine operation condition (section 1968.2(d)(4.3.2)(K)(iv)) to be met to increment the denominator. (Alliance, Global)

Agency Response: To be clear, while the denominator-incrementing criteria for some monitors are designed around conditions where a monitor “may” more likely run, the denominator-incrementing criteria are not designed to guarantee that a monitor “can” run (if it were, the required minimum ratio would be closer to 1). The denominators are intended to be a reflection of in-use vehicle activity. Concerning the ECT sensor monitor, based on years of experience reviewing different OBD II systems, staff believes that the most robust rationality monitor for temperature sensors (including the ECT sensor) involves a cross-check of the temperature sensors’ outputs after a long soak period. Thus, staff had been approving denominator incrementing criteria for temperature sensor monitors that included cold starts to ensure conditions in which such monitors are more likely able to run. Considering plug-in hybrid electric vehicles can have driving cycles where the engine does not come on, the OBD II regulation dictated that for these vehicles, the denominator incrementing criteria require that the vehicle experience a long soak (with the criterion related to 6 hours of non-propulsion system active time). Staff had not taken into account other ECT sensor monitors that may need the engine to run in order to heat up the ECT. But staff is also apprehensive about requiring fueled engine operation for all ECT sensor rationality monitors since the ECT sensor cold start correlation monitors are also rationality monitors for other temperature sensors (e.g., intake air temperature sensor) that do not require the engine to run in order to operate. Staff will revisit this issue in the future and consider changes, if needed, to the denominator incrementing criteria for the ECT sensor rationality monitors at a future OBD II regulation update.

76. Comment: The regulation language (section 1968.2(e)(8.2.4)) in the 15-day notice is confusing, but appears to allow an exemption (with Executive Officer approval) to monitoring for high-flow EGR malfunctions when the vehicle immediately stalls, but requires the manufacturer to demonstrate that this failure is detected during all other driving conditions. A driver will repair a vehicle that stalls (i.e., engine dies) immediately during an idle condition, but if they don’t, a “check engine” light will certainly not persuade them to repair the vehicle. So monitoring during other driving conditions is unnecessary to ensure proper repair. Also, since this monitor requires two trips to illuminate the MIL, even if the monitor can detect the fault during off-idle conditions, the vehicle will not have an opportunity to run the monitor on subsequent driving cycles if the vehicle stalls. The regulation language should be modified to delete the requirement to detect the fault during off-idle conditions and delete the language requiring manufacturers to provide data demonstrating that the failure can only be detected during idle if that is the case. (Alliance, Global)

Agency Response: One of the important elements of the OBD II regulation is the requirement for OBD II systems to identify malfunctioning components with the storage of a specific fault code pinpointing the problem. This is intended to assist repair technicians in diagnosing and fixing the malfunction in a timely and efficient manner. There can be many different kinds of failure modes that would result in the vehicle stalling; a fault code pinpointing the EGR system as the source of the problem would help technicians quickly repair the fault. While staff understands that the vehicle stall may prevent the monitor from running and detecting this fault, if the OBD II system is able to run a monitor and detect this fault during other conditions, the manufacturer should implement such a monitor.

77. Comment: There is a typo in the definition of “diagnostic or emission critical” in section 1968.2(c). The phrase “criteria (1) through (3)” in the last sentence should be “criteria (2) and (3).” (Alliance, Global)

Agency Response: Staff agrees and corrected this typo in the Final Regulation Order for section 1968.2.

78. Comment: The latest published version of ISO 15031-3 is February 9, 2016, and SAE J1962 is currently being published. (Volvo)

Agency Response: Section 1968.2 does not reference the ISO 15031-3 document, only the SAE J1962 document. Further, since the latest version of SAE J1962 has not been officially published at this time, staff cannot update the regulation to include this version. Staff will consider updating the regulation to include the latest version of SAE J1962 during the next OBD II rulemaking update.

79. Comment: There is a typo in the freeze frame regulation language in section 1968.2(g)(4.3.2). The phrase “number of warm-up cycles since fault memory last cleared” is duplicated. (Alliance, Global)

Agency Response: This duplication error was made only in the regulation language attached to the 15-day notice. The current regulation language correctly only mentions this phrase once.

80. Comment: The proposed section 1968.2(g)(4.7.4)(B) requires the ECU to send a negative response code for a CVN request after a reprogramming event, volatile or non-volatile memory clear, or battery disconnect before the CVN has been calculated in the ECU. A more transparent and easier way to implement this feature is to use a default CVN of 0x0000 as specified in section 1968.2(g)(4.7.4)(C) for CVN communicated from other ECUs/smart devices. (Volvo)

Agency Response: First, this section does not “require” the ECU to send a negative response in such cases. Specifically, this section states “the on-board computer may respond with a negative response code directing the scan tool to wait or resend the request message after the delay.” The use of the word “may”

gives the ECU the option to respond with a negative response code. Second, if the commenter is suggesting that a default CVN be used after a reprogramming event or battery disconnect before the CVN is calculated, the staff disagrees with this suggestion. As explained in the agency response to comments 52-53 above, staff wants to limit the output of default CVN values and thus only allowed them in cases where a communication malfunction occurs that prevents access to the stored CVN value. In cases where a reprogramming event or battery disconnect has necessitated a recalculation of the CVN, there is no discernable advantage to allowing a default CVN to be outputted to a scan tool in lieu of a negative response code. If a default CVN was outputted, the scan tool would consider this to be a valid CVN and the technician would need to send another CVN request in order to get the correct CVN after it is recalculated. A negative response code would direct the scan tool to wait or resend the CVN request message after the delay in CVN recalculation, which the scan tool would do automatically without further actions from the technicians. Thus, staff believes it is better to allow a negative response code in such cases, not a default CVN value.

81. Comment: The proposal that prohibits erasing emissions-related diagnostic information from one ECU if it supports more than just comprehensive components should be reconsidered. Permanent fault codes were introduced more than 10 years ago to prevent I/M cheating. While ARB states there are too many issues with improper permanent fault code implementation, the proposal will be more difficult to implement and verify, yet easier to bypass. Though ARB characterizes this proposed change (to exempt ECUs that only support comprehensive components) as a relief, it is not truly a relief because there will be two different strategies and implementations, two verification methods, and two ways to handle OBD ECUs in the aftermarket. This will affect the OEM development, fault tracing methods in the aftermarket, service literature, and training of service technicians for minimal or no environmental gain.

Most ECU diagnostic communication software is built around OSI-layers, and there is one module getting the CAN frames and transmitting a diagnostic service message to the upper layer of the software. The diagnostic communication module (DCM) receives the message without knowing the sender or if it was sent physically or functionally. The DCM executes the service message and sends the response back to the lower layers which will truncate the message into CAN-frames and send to the tool. It will be a technical burden to “hack” the OSI-stack in order to let the service “Clear diagnostic trouble code (DTC)” know how it was addressed, for just one of the services. Many OEMs base their software implementations on functionality defined by Autosar. This change will cause an update of the Autosar platform or software workarounds done by the system supplier, and some of the standard documents (e.g., SAE J1979, ISO 14229, ISO 27415) may need to be updated. The risk for mistakes and misinterpretation is extremely high. There will be different DCMs between the OBD ECUs and the rest of the vehicle, which will double the verification for the vehicle manufacturer. Service methods will be affected for all ECUs (OBD and non-OBD) on the same network, so all faults in all ECUs must be fixed before sending the Clear DTC service. SAE J1699-3, which is the conformance test specification, focuses on

SAE J1979 communication which is by definition only sent functionally. This means that there is no conformance tool for the enhanced diagnostics and it may be very difficult to make a tool which supports all enhanced diagnostic protocols (many OEMS use ISO 14229-1 for enhanced diagnostics).

The proposal will introduce considerable risk for service technicians who may attempt to bypass these systems in the field through various methods. So the requirement will not prevent anyone from cheating I/M. It would be more prudent to improve the SAE J1699-3 standard and the tool to verify the implementation of permanent fault codes. Another improvement is to implement the readout for permanent fault codes in I/M stations. (Volvo)

Agency Response: Staff agrees with the commenter that, for vehicle designs that permit controller-specific clearing of fault codes, a software change would be required to meet this requirement. Accordingly, the amended regulation provides leadtime in the form of a phase-in plan to implement the change. Staff does not agree that the requirement forces manufacturers to implement two different strategies and implementations for fault code clearing. The implementation of a single strategy that simply clears all OBD information from all modules when a scan tool command is issued, regardless of readiness supported in each module, would be clearly acceptable under the regulation. The provision to handle fault code clearing differently for modules that only support comprehensive component monitor readiness was added to provide flexibility to the industry, and is not mandatory. The overall purpose of the amended language is to ensure that the integrity of data needed for I/M programs is preserved by preventing selective clearing of critical fault code parameters. As such, OBD information needed for the I/M program must be either saved in its entirety or cleared in its entirety.

For those manufacturers that choose to implement different fault clearing functions, (one for clearing OBD information from all modules, and one for clearing information from modules supporting more than comprehensive component readiness) staff agrees with the commenter that affected modules must be updated/reprogrammed to recognize these two different messages. Unique messages must be defined in the manufacturer's communication network such that the correct OBD clearing action is achieved. Diagnostic networks typically have thousands of different messages and each module on the network must have communication software to recognize and respond to applicable messages. The inclusion of an additional message to clear OBD information from a subset of modules is not a foreign or new concept in diagnostic messaging design. Existing examples of selective module response to a scan tool message, as is the case in staff's proposal, have to some extent always been present in diagnostic software. For example, all modules do not support test results, and those that don't would not be programmed to respond to test result request message. Hence, only the subset of modules for which the message is applicable would respond to the scan tool and output test results.

The commenter also states that staff's proposal is prone to mistakes during implementation and a conformance tool does not exist to verify the software. Staff does not agree because the regulation allows for a single code clearing method that will work the same for all models, and the conformance test specified by the regulation (SAE J1699) would test this function. Manufacturers that choose to implement an additional proprietary function for modules that only support comprehensive component monitoring would be introducing additional complexity, and would also be responsible for ensuring that the implementation is error free and that service information adequately explains how the function should be used in repairing vehicles. However, this is true for all manufacturer-specific OBD system content that is additive to what the regulation requires.

The commenter is correct that permanent fault codes are intended as another protection against circumventing I/M inspections through clearing of the OBD information; however, their use in California's I/M program as well as others around the country has not been implemented at the present time. Further verification of manufacturers' permanent fault code implementations and their effectiveness in maintaining I/M test integrity are still needed. Therefore, ensuring that I/M readiness has been established in vehicles that are undergoing an inspection and that active fault codes have not been selectively cleared continues to be necessary to ensure I/M program integrity. The commenter is also correct that individuals with sophisticated knowledge of how OBD systems work may be successful in bypassing on some vehicle designs the readiness and fault clearing protections required by the regulation. However, the staff does not believe that it should consequently remove from the regulation protections that are and will continue to be effective in deterring OBD system tampering in the vast majority of cases.

82. Comment: The proposed section 1968.2(g)(6.9) indicates that the additional data collected may be used by ARB or their subcontractors if consent is granted. Volvo is concerned that this data is thereby available to other parties since it is on an open protocol. Drivers may then end up in a dependency situation towards their employer and may not have the same possibility to "not consent." The consent becomes ineffective in terms of protecting data privacy. (Volvo)

Agency Response: No change was made in response to this comment. As explained in the 15-day notice, new sections 1968.2(g)(6.9) through (6.11) were established to specifically address manufacturers' data security and privacy concerns related to the new parameters. Section 1968.2(g)(6.9) explicitly states that the data parameters specified in sections 1968.2(g)(6.3) through (g)(6.5) that are directly collected from vehicles owned by a private individual by either ARB or by a third party contracted directly by ARB shall be obtained with the voluntary and informed consent of the vehicle operator<sup>12</sup> and collected and stored in a manner in accordance with required data security and record keeping policies applicable to ARB to protect the data from: (a) unauthorized access; or (b) being used to identify the individual vehicle (i.e., VIN or license plate number) or

---

<sup>12</sup> Title 13, CCR, section 1968.2(g)(6.9.1)



registered owner.<sup>13</sup> Therefore, the commenter’s concern that “this data is thereby available to other parties since it is on an open protocol” is unwarranted.

ARB is a California state agency and is therefore subject to the provisions of the Information Practices Act of 1977 (IPA) (Civ. Code § 1798 et seq.), which states that an individual’s right to privacy is a personal and fundamental right that is protected by both the California and the United States Constitutions, and that individuals have a right to privacy in information that pertains to them.<sup>14</sup> The IPA requires that state agencies comply with specific requirements in the collection, use, maintenance, and disclosure of information relating to individuals, and prohibits state agencies from disclosing personal information “in a manner that would link the information disclosed to the individual to whom it pertains” unless the disclosure meets specified conditions. Additionally, ARB employees are prohibited from engaging in any employment or activity that is clearly inconsistent, incompatible, in conflict with, or detrimental to their duties as state officers or employees. (Govt. Code § 19990). Incompatible activities include providing confidential information to persons to whom issuance of such confidential information has not been authorized. (Govt. Code § 19990(c)). These statutory provisions therefore establish safeguards to ensure that the subject data parameters in sections 1968.2(g)(3) through (g)(6.5) obtained by ARB will not be freely available to unauthorized parties.

To the extent that the commenter suggests that consent to collect the data specified in 1968.2(g)(6.9) should be extended to drivers employed to operate vehicles for employers (e.g., commercial drivers for vehicle fleets), ARB disagrees. Section 1968.2(g)(6.9) expressly only applies to vehicles owned by a private individual, and the comment therefore extends beyond the scope of that section as described in the notice of availability of modified text.

Furthermore, ARB notes that state law regarding event data recorders or sensing and diagnostic modules (devices installed by manufacturers in new motor vehicles that record specified data that can be retrieved after a vehicle accident)<sup>15</sup> specifies that the retrieval of information from such devices is prohibited unless, among other conditions, the *vehicle owner* consents to such information retrieval. (California Vehicle Code § 9951). The principle that vehicle owners, and not vehicle operators, are authorized to consent to the disclosure of the vehicle data parameters is consistent with the “Consumer Privacy Protection Principles for Vehicle Technologies and Services” (Principles) that commenters the Alliance of Automobile Manufacturers (Alliance) and the Association of Global Automakers (Global Automakers) submitted to the Honorable Edith Ramirez,

---

<sup>13</sup> Title 13, CCR, section 1968.2(g)(6.9.2)

<sup>14</sup> The IPA defines “personal information” as “any information that is maintained by an agency that identifies or describes an individual, including, but not limited to, his or her name, social security number, physical description, home address, home telephone number, education, financial matters, and medical or employment history. It includes statements made by, or attributed to, the individual.” (Cal. Civ. Code § 1798.3(a)).

<sup>15</sup> The specified data includes: vehicle speed and direction, a history of where a vehicle travels, steering performance, brake performance, driver seatbelt status, and information concerning an accident. VC § 9951(b)

Chairwoman of the U.S. Federal Trade Commission on November 12, 2014.<sup>16</sup> The Volvo Car Group is identified as a Participating Member of the Alliance and Global Automakers that has committed to “meeting or exceeding the commitments contained in the Principles for new vehicles manufactured no later than Model year 2017 ... and for Vehicle Technologies and Services subscriptions that are initiated or renewed on or after January 2, 2016.”<sup>17</sup>

## V. Peer Review

Health and Safety Code Section 57004 sets forth requirements for peer review of identified portions of rulemakings proposed by entities within the California Environmental Protection Agency, including ARB. Specifically, the scientific basis or scientific portion of a proposed rule may be subject to this peer review process. Here, ARB determined that the rulemaking at issue does not contain a scientific basis or scientific portion subject to peer review, and thus no peer review as set forth in Section 57004 was or needed to be performed.

---

<sup>16</sup> The Applicability section of the Principles explicitly state that “The Principles apply to the collection, use, and sharing of Covered Information in association with Vehicle Technologies and Services available on cars and light-duty trucks sold or leased to individual consumers *for personal use* in the United States.” (Emphasis supplied; p. 3).

<sup>17</sup> Page 2, Commitment of the Alliance of Automobile Manufacturers, Inc. and the Association of Global Automakers, Inc. to the Consumer Privacy Protection Principles for Vehicle Technologies and Services,” attached to letter submitted by the Alliance and the Global Automakers to the Honorable Edith Ramirez, Chairwoman of the U.S. Federal Trade Commission dated November 12, 2014 (Attachment to Comment 5).