UPDATED INFORMATIVE DIGEST

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

Sections Affected: Amendments to California Code of Regulations (CCR), title 13, sections 1900, 1956.8, 1968.2, 1968.5, 1971.1, 1971.5, and 2485, and title 17, sections 95302 and 95662, and these documents incorporated by reference.

1. "Emissions-Related Parts List," June 1, 1990, section 1900(b)(6);

2. "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);

3. "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);

4. International Organization for Standardization (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);

5. 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);

6. ISO 26262-5 "Road vehicles – Functional Safety – Part 5: Product development at the hardware level," November 2011, section 1968.2(g)(1.13);

7. SAE International (SAE) J1699-3 – "Vehicle OBD II Compliance Test Cases," July 2015, section 1968.2(g)(1.11);

8. SAE J1850 "Class B Data Communications Network Interface," June 2006, section 1968.2(g)(1.5);

9. SAE J1930-DA "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms Web Tool Spreadsheet," March 2014, section 1968.2(g)(1.1.1);

10. SAE J1962 "Diagnostic Connector," September 2015, section 1968.2(g)(1.2);

11. SAE J1979 "E/E Diagnostic Test Modes," August 2014, section 1968.2(g)(1.4);

12. SAE J1979-DA “Digital Annex of E/E Diagnostic Test Modes,” June 2014, section 1968.2(g)(1.4.1);

13. SAE J2012 “Diagnostic Trouble Code Definitions,” March 2013, section 1968.2(g)(1.6);

14. SAE J2012-DA “Digital Annex of Diagnostic Trouble Code Definitions and Failure Type Byte Definitions,” January 2013, section 1968.2(g)(1.6.1);

15. SAE J1939 “Serial Control and Communications Heavy Duty Vehicle Network – Top Level Document,” August 2013, section 1968.2(g)(1.10.1);

16. SAE J1939-01 “On-Highway Equipment Control and Communication Network,” November 2012, section 1968.2(g)(1.10.2);

17. SAE J1939-11 “Physical Layer, 250 Kbps, Twisted Shielded Pair,” September 2012, section 1968.2(g)(1.10.3);

18. SAE J1939-13 “Off-Board Diagnostic Connector,” October 2011, section 1968.2(g)(1.10.4);

19. SAE J1939-15 “Physical Layer, 250 Kbps, Un-Shielded Twisted Pair (UTP),” May 2014, section 1968.2(g)(1.10.5);

20. SAE J1939-21 “Data Link Layer,” December 2010, section 1968.2(g)(1.10.6);

21. SAE J1939-31 “Network Layer,” April 2014, section 1968.2(g)(1.10.7);

22. SAE J1939-71 “Vehicle Application Layer,” April 2014, section 1968.2(g)(1.10.8);

23. SAE J1939-73 “Application Layer – Diagnostics,” July 2013, section 1968.2(g)(1.10.9);

24. SAE J1939-81 “Network Management,” June 2011, section 1968.2(g)(1.10.10);

25. SAE J1939-84 “OBD Communications Compliance Test Cases For Heavy Duty Components and Vehicles,” February 2015, section 1968.2(g)(1.10.11); and

26. SAE J2534-1 – “Recommended Practice for Pass-Thru Vehicle Programming”, October 2015, section 1968.2(g)(1.12).

Background and Effect of the Proposed Rulemaking:

On-board diagnostic II (OBD II) systems serve an important role in helping to ensure that engines and vehicles maintain low emissions throughout their full lives. OBD II systems monitor virtually all emission controls on gasoline and diesel engines, including catalysts, particulate matter (PM) filters, exhaust gas recirculation systems, oxygen sensors, evaporative systems, fuel systems, and electronic powertrain components, and other components and systems that can affect emissions when malfunctioning. The systems also provide specific diagnostic information in a standardized format through a standardized serial data link on-board the vehicles. The use and operation of OBD II systems ensure reductions of in-use motor vehicle and motor vehicle engine emissions through improvements in emission system durability and performance.

The Board originally adopted comprehensive OBD regulations in 1990, requiring all 1996 and newer model year passenger cars, light-duty trucks, and medium-duty vehicles and engines to have OBD II systems. The Board subsequently updated the OBD requirements in 2002 with the adoption of CCR, title 13, sections 1968.2 and 1968.5, which established OBD II requirements and enforcement requirements for 2004 and subsequent model year vehicles. The Board has modified the OBD II regulation in several updates since initial adoption to address manufacturers' implementation concerns and, where needed, to strengthen specific monitoring requirements. The Board last adopted updates to the OBD II requirements in 2012 and 2013 to address several concerns and issues regarding the regulation (CCR, title 13, section 1968.2) and enforcement requirements (CCR, title 13, section 1968.5).

Description of Regulatory Action:

The OBD II regulation reduces motor vehicle and motor vehicle engine emissions by establishing emission standards and other requirements for OBD II systems installed on passenger cars, light-duty trucks, and medium-duty vehicles and engines certified for sale in California. The OBD II systems, through an onboard computer(s), monitor emission systems in-use for the actual life of the vehicle or engine, detect malfunctions of monitored emission systems, illuminate a malfunction indicator light (MIL) to notify the vehicle operator of detected malfunctions, and store fault codes identifying the detected malfunctions. The use and operation of OBD II systems ensure reductions of in-use motor vehicle and motor vehicle engine emissions through improvements in emission system durability and performance.

In adopting the OBD II regulation, the Board directed the staff to monitor manufacturers' progress towards meeting the regulation's requirements and to report back should modifications to the requirements be deemed appropriate. Since then, staff has met with stakeholders in several teleconferences and face-to-face meetings, including a public workshop in October 2014, where staff and manufacturers identified areas in which modifications to the OBD II regulation would be beneficial.

ARB released a 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)” on August 4, 2015, and accepted public comments on the proposal beginning August 7, 2015. The substantive amendments to the OBD II regulation include:

- Adding definitions for “emissions neutral diagnostic,” “emissions neutral default action,” “safety-only component or system,” and “smart device,” and revising the monitoring requirements
- Revising the requirements for default modes of operation to clarify the conditions under which manufacturers are exempt from illuminating the MIL
- Proposing more stringent in-use monitoring performance requirements for the PM filter monitor on light-duty diesel vehicles
- Proposing emission malfunction thresholds for Low Emission Vehicle III (LEV III) applications, including revisions to the direct ozone reduction system requirements and proposed PM thresholds for gasoline vehicles
- Specifying more detailed monitoring requirements for hybrid vehicles
- Revising the gasoline misfire monitoring requirements for plug-in electric hybrid vehicles to no longer require emission threshold-based malfunction criteria
- Relaxing the interim malfunction thresholds for gasoline air-fuel ratio cylinder imbalance monitoring
- Revising the gasoline evaporative system purge flow monitoring requirements for purging on the high-load purge lines and proposing relaxed in-use monitoring performance requirements for the monitor
- Revising the gasoline and diesel crankcase ventilation system monitoring requirements
- Revising the requirements for light-duty and medium-duty chassis-certified diesel vehicles, including revising the diesel misfire monitoring requirements to no longer require emission threshold-based malfunction criteria and to require expanded monitoring conditions
- Revising the gasoline and diesel cooling system monitoring requirements to clarify when monitor enablement can occur
- Revising the criteria that manufacturers must meet to be exempt from monitoring certain comprehensive components
- Updating the SAE and ISO document references
- Revising the readiness status requirements to clarify which monitors are to be included in determining readiness
- Adding data stream parameters required to be reported
- Clarifying the calibration verification number requirements
- Revising the certification demonstration testing requirements to clarify how to perform the testing for gasoline air-fuel ratio cylinder imbalance monitoring and exhaust gas sensor monitoring, to add testing requirements for the evaporative system monitor, to specify additional data required to be collected during testing, and to clarify the test requirements for catalyst faults and other faults where default actions are taken

- Adding items required to be submitted as part of the certification application

The Board also amended the OBD II enforcement regulation (CCR, title 13, section 1968.5) to align with the above described changes to the OBD II regulation, including revisions to the mandatory recall provisions for the air-fuel ratio cylinder imbalance monitor for gasoline vehicles, the misfire monitor for plug-in hybrid electric vehicles, and the misfire and PM filter monitors for light-duty diesel vehicles.

The Board also amended CCR, title 13, section 1900, specifically the definition of "emissions-related part." CCR, title 13, section 1900(b)(6) defines "emissions-related part" as "any automotive part, which affects any regulated emissions from a motor vehicle which is subject to California or federal emission standards." This includes, at a minimum, those parts specified in the 'Emissions-Related Parts List,' adopted by the State Board on November 4, 1977, as last amended May 19, 1981." Although the "Emissions-Related Parts List" was updated on June 1, 1990, section 1900(b)(6) was never revised to incorporate the updated version of the "Emissions-Related Parts List." The Board modified the definition of "Emissions-related part" in section 1900(b)(6) to incorporate the version of the "Emissions-Related Parts List" as last amended June 1, 1990. The definition of "emissions-related part" refers to motor vehicles subject to California or federal emissions standards. The definition of the term "emission standard" that applies to all on-road motor vehicles and motor vehicle engines is set forth in CCR, title 13, section 1900(b)(3), and CCR, title 13, sections 1900(b)(4) and (b)(5) define the terms "evaporative emission standards" and "exhaust emission standards" as subcategories of emission standards.

The terms "emission standard", "evaporative emission standard" and "exhaust emission standard" are also set forth in provisions that are specifically applicable to heavy-duty motor vehicle engines and heavy-duty vehicles in CCR, title 13, sections 1956.8(i)(2)-(4), 2485(h)(7)-(9), and CCR, title 17, sections 95302(a)(19.1)-(19.3). CCR, title 13, sections 1968.2(c) and 1971.1(c) define "emission standard", "evaporative emission standard" and "exhaust emission standard" in the OBD II regulation and the heavy-duty OBD (HD OBD) regulation, respectively.

The OBD II amendments will provide manufacturers with greater compliance flexibility, and strengthen and clarify the performance requirements they are expected to meet in designing and developing robust OBD II systems. This will encourage manufacturers to design and build more durable engines and emission-related components, all of which will help ensure that forecasted emission reduction benefits from adopted light-and medium-duty vehicle emission control programs are achieved in-use. Ultimately, the action will further the goal of ARB, which is to promote and protect public health, welfare and ecological resources through the effective and efficient reduction of air pollutants, and provide safe, clean air to Californians.

At the Board's September 25, 2015 public hearing, the Board approved for adoption amendments to the CCR, title 13, sections 1900, 1968.2, and 1968.5, as modified by staff's suggested modifications presented to the Board at the September 25, 2015

hearing. The staff suggested modifications were developed in response to comments received since the staff report was released to the public on August 4, 2015. These modifications include changes to the monitoring requirements for gasoline positive crankcase ventilation systems, diesel crankcase ventilation systems, and diesel non-methane hydrocarbon converting catalysts, as well as changes to the vehicle performance tracking requirements. At the hearing, the Board adopted Resolution 15-44 which, among other things, directed the Executive Officer to make the modified regulatory language, and any additional conforming modifications, available for public comment, with any additional supporting documents and information, for a period of at least 15 days as required by Government Code section 11346.8. The Board further directed the Executive Officer to consider written comments submitted during the public review period and to make any further modifications that are appropriate available for public comment for at least 15 days, and to present the regulation to the Board for further consideration if warranted, or to take further action to adopt the regulation after addressing all appropriate modifications.

Subsequent to the hearing, staff identified additional conforming modifications in response to comments received during the hearing and the 45-day period prior to it and other modifications needed to correct errors in the original proposal. Staff also added three additional SAE technical standards to the rulemaking record because those technical standards were recently updated, and the references in the OBD II regulation have been updated to refer to these newer versions, as is common practice. Further, staff identified other modifications needed to correct grammar, punctuation, and spelling, and modifications to clarify requirements to the OBD II regulations which are considered non-substantive.

Finally, staff also deleted the definition of “emission standard” from the OBD II regulation and the OBD II enforcement regulation (sections 1968.2 and 1968.5 of title 13, CCR), and from 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 Code section 39027.

These post-hearing modifications were made available for a 15-day public comment period in the staff’s Notice of Public Availability of Modified Text and Availability of Additional Documents, released March 21, 2016.

COMPARABLE FEDERAL REGULATIONS

In February 1993, the U.S. EPA promulgated OBD requirements for federally certified light-duty vehicles and trucks. (40 CFR Part 86, §§ 86.094-2, 86.094-17, 86.094-18(a), 86.094-21(h), 86.094-25(d), 86.094-30(f), 86.094-35(l), 86.095-30(f), 86.095-35(l); see 58 Fed.Reg. 9468-9488 (February 19, 1993).) These requirements were later amended to require OBD systems on medium-duty vehicles by the 2008 model year. The final rule with the latest modifications of the requirements was published on February 24, 2009. A

central part of the federal regulation is that, for federal certification of vehicles, U.S. EPA will deem California-certified OBD II systems to comply with the federal regulations. In Health and Safety Code sections 43013, 43018, and 43101, the Legislature directed ARB to adopt emission standards for new motor vehicles that are necessary and technologically feasible and to endeavor to achieve the maximum emission reduction possible from vehicular and other mobile sources to accomplish the attainment of the State standards at the earliest practicable date. ARB initially adopted the OBD II regulations to meet those legislative directives. The OBD II regulation was first adopted in 1990. On October 3, 1996, the U.S. EPA granted California's request for a waiver regarding the OBD II regulation, as last amended in December 1994,[1] recognizing that the OBD II regulation is at least as stringent in protecting public health and welfare as the federal regulation, and that unique circumstances exist in California necessitating the need for the State's own motor vehicle regulations program.

In 2014, the U.S. EPA adopted regulations that establish more stringent emission standards for 2017 and subsequent model year light duty vehicles, light-duty trucks, medium-duty passenger vehicles, and complete heavy-duty vehicles between 8,501 and 14,000 pounds gross vehicle weight rating (GVWR), and that additionally limit the sulfur content in gasoline: "Control of Air Pollution From Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards; Final Rule" (EPA Tier 3 regulation), 79 Federal Register 23414 (April 28, 2014). The EPA Tier 3 regulation largely harmonizes federal emission standards for the regulated categories of vehicles with the corresponding California emission standards in California's LEV III program.[2]

The EPA Tier 3 regulation also includes provisions that generally align federal OBD requirements for 2017 and subsequent model year light duty vehicles, light-duty trucks, medium-duty passenger vehicles, and complete heavy-duty vehicles between 8,501 and 14,000 pounds GVWR with ARB's California OBD II regulation, as last amended in 2013.[3] The amended federal OBD requirements differ from corresponding California OBD requirements in several minor respects, but notably retain the provision that allows the U.S. EPA to deem California-certified OBD II systems to comply with the federal OBD regulation.

Although the amended federal OBD regulation generally harmonizes federal and California OBD requirements, the OBD II regulation still establishes more comprehensive and stringent requirements than the amended federal regulation. For instance, the OBD II regulation requires earlier compliance with monitoring requirements compared to the amended federal regulation. The OBD II regulation requires OBD systems in medium-duty diesel vehicles and engines to detect PM filter performance faults before emissions exceed 0.03 g/bhp-hr beginning in the 2013 model

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[1] *California State Motor Vehicle Pollution Control Standards; Waiver of Federal Preemption; Decision*, dated October 3, 1996, 61 Fed.Reg. 53371 (October 11, 1996).
[2] EPA issued California a waiver for the LEV III emission standards in 2013. 78 Fed. Reg. 2112 (Jan. 9, 2013).
[3] ARB most recently adopted amendments to the OBD II regulation on June 26, 2013, and those amendments became operative under state law on July 31, 2013.

year, but allow specific failure modes to be excluded until the 2015 model year.[4] The amended federal OBD regulation requires federal OBD systems to detect PM filter performance faults at these same levels beginning in the 2019 model year, so California OBD systems must detect PM filter monitoring faults (without excluding specific failure modes) at least three model years earlier than federal OBD systems.

The 2015 amendments to the OBD II requirements will further establish the stringency of the California OBD II requirements to federal requirements. The 2015 amendments continue California's efforts to require more comprehensive and robust monitoring of emission-related components and systems than required by federal OBD regulation. The amendments also incorporate some new requirements adopted in the U.S. EPA Tier 3 regulation, including requiring demonstration testing of the evaporative system 0.020-inch leak monitor and storing a data stream parameter related to the distance traveled since the last successful completion of that monitor. More details about the comparison between the California OBD II requirements and the federal OBD requirements can be found in the staff report.

Historically, virtually every vehicle sold in the U.S. is designed and certified to California's OBD II requirements in lieu of the federal OBD requirements.

[4] CCR, title 13, section 1968.2(f)(9.2.1)