State of California
Office of Administrative Law

In re:
Air Resources Board

Regulatory Action:
Title 13 and Title 17, California Code of Regulations

Adopt sections:
Title 13: 1900.0.1, 1956.8.1, 1961.2.1, 1961.3.1, 1962.2.1, 1962.3.1, 1965.0.1, 1968.2.1, 1968.5.1, 1969.0.1, 1971.1.1, 1971.5.1, 1976.0.1, 1978.0.1, 2035.0.1, 2036.0.1, 2037.0.1, 2038.0.1, 2040.0.1, 2111.0.1, 2112.0.1, 2113.0.1, 2114.0.1, 2115.0.1, 2116.0.1, 2117.0.1, 2118.0.1, 2119.0.1, 2121.0.1, 2123.0.1, 2125.0.1, 2126.0.1, 2127.0.1, 2128.0.1, 2129.0.1, 2130.0.1, 2131.0.1, 2133.0.1, 2137.0.1, 2139.0.1, 2140.0.1, 2141.0.1, 2142.0.1, 2143.0.1, 2144.0.1, 2145.0.1, 2146.0.1, 2147.0.1, 2148.0.1, 2149.0.1, 2317.0.1, 2423.0.1, 2485.0.1, 2903.0.1

Title 17: 95300.0.1, 95301.0.1, 95302.0.1, 95303.0.1, 95304.0.1, 95305.0.1, 95306.0.1, 95307.0.1, 95308.0.1, 95309.0.1, 95310.0.1, 95311.0.1, 95312.0.1, 95660.0.1, 95661.0.1, 95662.0.1, 95663.0.1, 95664.0.1

Amend sections:
Title 13: 1900, 1956.8, 1961.2, 1961.3, 1962.2, 1962.3, 1965, 1968.2, 1968.5, 1969, 1971.1, 1971.5,1976, 1978, 2035, 2036, 2037, 2038, 2040, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2121, 2123, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2133, 2137, 2139, 2139.5, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2166, 2166.1, 2167, 2168, 2169, 2169.1, 2169.2, 2169.3, 2169.4, 2169.5, 2169.6, 2169.7, 2169.8, 2170, 2317, 2423, 2485, 2903

Title 17: 95300, 95301, 95302, 95303, 95304, 95305, 95306, 95307, 95308, 95309, 95310, 95311, 95312, 95660, 95661, 95662, 95663, 95664

NOTICE OF APPROVAL OF EMERGENCY REGULATORY ACTION

Government Code Sections 11346.1 and 11349.6

OAL Matter Number: 2026-0316-04EE

OAL Matter Type: Emergency Readopt (EE)

This emergency readoption action pursuant to Government Code section 11236.1(h) submitted by the California Air Resources Board (CARB) seeks to readopt OAL File No. 2025-0922-01E, which adopted alternative criteria pollutant standards and associated on-board diagnostic requirements.

OAL approves this emergency regulatory action pursuant to sections 11346.1 and 11349.6 of the Government Code.

This emergency regulatory action is effective on 4/1/2026 and will expire on 7/1/2026. The Certificate of Compliance for this action is due no later than 6/30/2026.

Date: March 26, 2026

Lindsey McNeill

Lindsey S. McNeill
Senior Attorney

For: Kenneth J. Pogue
Director

Original: Steven S. Cliff, Ph.D.,
Executive Officer
Copy: Lindsay Garcia

Appendix A-1

Proposed Amendments to Title 13 Regulation Order

Emergency Vehicle Emissions Regulation

[Note: This version of the Proposed Amendments to Title 13 Regulation Order also complies with Government Code section 11346.2 subdivision (a)(3), and 11346.8, subdivision (c). It is provided to also improve the accessibility and readability of the regulatory text. The existing, original regulatory language currently adopted into the California Code of Regulations is shown as plain, clean text, while the final amendments are shown in tracked changes. To review this document in a clean format (no underline or strikeout to show changes), please select "Simple Markup" or "No Markup" in Microsoft Word's Review menu, or accept all changes. You can also change the view to the original (originally proposed regulatory text prior to proposed modifications) by selecting "Original" or rejecting all tracked changes. Additionally, "Advanced Track Changes Options" will allow for further options regarding color and other markings. Instructions on using/viewing Track Changes can be found here.

Subsections for which no changes are made in this rulemaking are indicated with "* * * * *."

The Chapters and Sections of title 13, California Code of Regulations that are being proposed for amendments per this regulatory proposal are as follows.

Chapter 1. Motor Vehicle Pollution Control Devices

Section 1900.	Definitions.
Section 1956.8.	Exhaust Emissions Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles, 2021 and Subsequent Zero-Emission Powertrains, and 2022 and Subsequent Model Heavy-Duty Hybrid Powertrains.
Section 1961.2.	Exhaust Emission Standards and Test Procedures--2015 through 2025 Model Year Passenger Cars and Light-Duty Trucks, and 2015 through 2028 Model Year Medium-Duty Vehicles.
Section 1961.3.	Greenhouse Gas Exhaust Emission Standards and Test Procedures--2017 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.
Section 1962.2.	Zero-Emission Vehicle Standards for 2018 through 2025 Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.
Section 1962.3.	Electric Vehicle Charging Requirements.
Section 1965.	Emission Control, Smog Index, and Environmental Performance Labels - 1979 and Subsequent Model-Year Motor Vehicles.
Section 1968.2.	Malfunction and Diagnostic System Requirements--2004 and Subsequent Model Year Passenger Cars, Light Duty Trucks, and Medium Duty Vehicles and Engines.
Section 1968.5.	Enforcement of Malfunction and Diagnostic System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines.
Section 1969.	Motor Vehicle Service Information--1994 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Engines and Vehicles, and 2007 and Subsequent Model Heavy-Duty Engines.
Section 1971.1.	On-Board Diagnostic System Requirements--2010 and Subsequent Model-Year Heavy-Duty Engines.

Section 1971.5.	Enforcement of Malfunction and Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines.
Section 1976.	Standards and Test Procedures for Motor Vehicle Fuel Evaporative Emissions.
Section 1978.	Standards and Test Procedures for Vehicle Refueling Emissions.
Section 2035.	Purpose, Applicability, and Definitions.
Section 2036.	Defects Warranty Requirements for 1979 Through 1989 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles; 1979 and Subsequent Model Motorcycles and Heavy-Duty Vehicles; and Motor Vehicle Engines Used in Such Vehicles; and 2020 and Subsequent Model Year Trailers.
Section 2037.	Defects Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles.
Section 2038.	Performance Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles.
Section 2040.	Vehicle Owner Obligations.

Chapter 2. Enforcement of Vehicle Emission Standards and Surveillance Testing

Section 2111.	Applicability.
Section 2112.	Definitions.
Section 2113.	Initiation and Approval of Voluntary and Influenced Emission-Related Recalls.
Section 2114.	Voluntary and Influenced Recall Plans.
Section 2115.	Eligibility for Repair.
Section 2116.	Repair Label.
Section 2117.	Proof of Correction Certificate.

Section 2118.	Notification.
Section 2119.	Recordkeeping and Reporting Requirements.
Section 2121.	Penalties.
Section 2123.	Initiation and Notification of Ordered Emission-Related Recalls.
Section 2125.	Ordered Recall Plan.
Section 2126.	Approval and Implementation of Recall Plan.
Section 2127.	Notification of Owners.
Section 2128.	Repair Label.
Section 2129.	Proof of Correction Certificate.
Section 2130.	Capture Rates and Alternative Measures.
Section 2131.	Preliminary Tests.
Section 2133.	Recordkeeping and Reporting Requirements.
Section 2137.	Vehicle, Engine, and Trailer Selection.
Section 2139.	Testing.
Section 2139.5.	CARB Authority to Test for Heavy-Duty In-Use Compliance.
Section 2140.	Notification and Use of Test Results.
Section 2141.	General Provisions.
Section 2142.	Alternative Procedures.
Section 2143.	Failure Levels Triggering Recall and Corrective Action.
Section 2144.	Emission Warranty Information Report.
Section 2145.	Field Information Report.
Section 2146.	Emissions Information Report.
Section 2147.	Demonstration of Compliance with Emission Standards.
Section 2148.	Evaluation of Need for Recall.
Section 2149.	Notification and Subsequent Action.

Section 2166.	General Provisions.
Section 2166.1.	Definitions.
Section 2167.	Required Recall and Corrective Action for Failures of Exhaust After-Treatment Devices, on-Board Computers or Systems, Urea Dosers, Hydrocarbon Injectors, Exhaust Gas Recirculation Valves, Exhaust Gas Recirculation Coolers, Turbochargers, Fuel Injectors.
Section 2168.	Required Corrective Action and Recall for Emission-Related Component Failures.
Section 2169.	Required Recall or Corrective Action Plan.
Section 2169.1.	Approval and Implementation of Corrective Action Plan.
Section 2169.2.	Notification of Owners.
Section 2169.3.	Repair Label.
Section 2169.4.	Proof of Correction Certificate.
Section 2169.5.	Preliminary Tests.
Section 2169.6.	Communication with Repair Personnel.
Section 2169.7.	Recordkeeping and Reporting Requirements.
Section 2169.8.	Extension of Time.
Section 2170.	Penalties.

Chapter 8. Clean Fuels Program.

Section 2317.	Satisfaction of Designated Clean Fuel Requirements with a Substitute Fuel.

Chapter 9. Off-Road Vehicles and Engines Pollution Control Devices

Section 2423.	Exhaust Emission Standards and Test Procedures — Off-Road Compression-Ignition Engines.

Chapter 10. Mobile Source Operational Controls

Section 2485 Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling.

Chapter 16. Certification Fees for Mobile Sources

Section 2903. Definitions.

Proposed Regulation Order

Amendments to Title 13, California Code of Regulations

Amend Sections 1900, 1956.8, 1961.2, 1961.3, 1962.2, 1962.3, 1965, 1968.2, 1968.5, 1969, 1971.1, 1971.5, 1976, 1978, 2035, 2036, 2037, 2038, 2040, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2121, 2123, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2133, 2137, 2139, 2139.5, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2166, 2166.1, 2167, 2168, 2169, 2169.1, 2169.2, 2169.3, 2169.4, 2169.5, 2169.6, 2169.7, 2169.8, 2170, 2317, 2423, 2485, and 2903.

§ 1900. Definitions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1900 or section 1900.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1900 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39010, 39600, 39601, 43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 39002, 39003, 39010, 39500, 40000, 43000, 43013, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43106 and 43204, Health and Safety Code; and Section 27156, Vehicle Code.

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§ 1956.8. Exhaust Emissions Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles, 2021 and Subsequent Zero-Emission Powertrains, and 2022 and Subsequent Model Heavy-Duty Hybrid Powertrains.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1956.8 or section 1956.8.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1956.8 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 38580, 39500, 39600, 39601, 40000, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39010, 39017, 39033, 39500, 39600, 39601, 39610, 39650, 39657, 39667, 39701, 40000, 43000, 43000.5, 43009, 43009.5, 43013, 43017, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43202, 43204, 43205, 43205.5, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

§ 1961.2. Exhaust Emission Standards and Test Procedures--2015 through 2025 Model Year Passenger Cars and Light-Duty Trucks, and 2015 through 2028 Model Year Medium-Duty Vehicles.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1961.2 or section 1961.2.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1961.2 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43101, 43104, 43105 and 43106 Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204 and 43205, Health and Safety Code.

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§ 1961.3. Greenhouse Gas Exhaust Emission Standards and Test Procedures--2017 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1961.3 or section 1961.3.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1961.3 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38550, 38566, 39500, 39600, 39601, 43013, 43018, 43018.5, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106 and 43211, Health and Safety Code.

§ 1962.2. Zero-Emission Vehicle Standards for 2018 through 2025 Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1962.2 or section 1962.2.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1962.2 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 38562, 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43205 and 43205.5, Health and Safety Code.

§ 1962.3. Electric Vehicle Charging Requirements.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1962.3 or section 1962.3.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1900 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 38562, 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43205 and 43205.5, Health and Safety Code.

§ 1965. Emission Control, Smog Index, and Environmental Performance Labels - 1979 and Subsequent Model-Year Motor Vehicles.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1965 or section 1965.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1965 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018, 43101, 43104, 43105, 43200 and 43200.1, Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43013, 43018.5, 43100, 43101, 43102, 43104, 43107, 43200 and 43200.1, Health and Safety Code.

§ 1968.2 Malfunction and Diagnostic System Requirements--2004 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1968.2 or section 1968.2.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1968.2 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 38501, 38510, 39010, 39600, 39601, 39602.5, 43000.5, 43013, 43018, 43100, 43101, 43104, 43105, 43105.5 and 43106, Health and Safety Code; and *Engine Manufacturers Association v. California Air Resources Board* (2014) 231 Cal.App.4th 1022. Reference: Sections 38501, 38505, 38510, 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600, 39601, 39602.5, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150, 43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211 and 43212, Health and Safety Code.

§ 1968.5. Enforcement of Malfunction and Diagnostic System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1968.5 or section 1968.5.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1968.5 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 38501, 38510, 39010, 39600, 39601, 39602.5, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, 43106, 43154, 43211, and 43212, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600, 39601, 39602.5, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150, 43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211 and 43212, Health and Safety Code; and *Engine Manufacturers Association v. California Air Resources Board* (2014) 231 Cal.App.4th 1022.

§ 1969. Motor Vehicle Service Information--1994 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Engines and Vehicles, and 2007 and Subsequent Model Heavy-Duty Engines.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1969 or section 1969.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1969 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 43000.5, 43018, 43105.5 and 43700, Health and Safety Code. Reference: Sections 39027.3, 43104 and 43105.5, Health and Safety Code; and Sections 1633.7 and 1633.8, Civil Code.

§ 1971.1. On-Board Diagnostic System Requirements--2010 and Subsequent Model-Year Heavy-Duty Engines.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1971.1 or section 1971.1.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1971.1 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 38501, 38510, 39010, 39600, 39601, 39602.5, 43000.5, 43013, 43018, 43100, 43101, 43104, 43105, 43105.5, and 43106, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600, 39601, 39602.5, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150, 43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211, and 43212, Health and Safety Code.

§ 1971.5. Enforcement of Malfunction and Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1971.5 or section 1971.5.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1971.5 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 38501, 38510, 39010, 39600, 39601, 39602.5, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, 43106, 43154, 43211 and 43212, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600, 39601, 39602.5, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150, 43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211 and 43212, Health and Safety Code.

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§ 1976. Standards and Test Procedures for Motor Vehicle Fuel Evaporative Emissions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1976 or section 1976.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1976 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 39667, 43013, 43018, 43101, 43104, 43105, 43106 and 43107, Health and Safety Code. Reference: Sections 39002, 39003, 39500, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204 and 43205, Health and Safety Code.

§ 1978. Standards and Test Procedures for Vehicle Refueling Emissions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 1978 or section 1978.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 1978 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 39667, 43013, 43018, 43101, 43104, 43105 and 43106, Health and Safety Code. Reference: Sections 39002, 39003, 39500, 39667, 43000, 43009.5, 43013, 43018, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204 and 43205 Health and Safety Code.

§ 2035. Purpose, Applicability, and Definitions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2035 or section 2035.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2035 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43205 and 43205.5, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43106, 43204, 43205 and 43205.5, Health and Safety Code.

§ 2036. Defects Warranty Requirements for 1979 Through 1989 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles; 1979 and Subsequent Model Motorcycles and Heavy-Duty Vehicles; and Motor Vehicle Engines Used in Such Vehicles; and 2020 and Subsequent Model Year Trailers.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2036 or section 2036.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2036 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600 and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43106, 43204, 43205.5, 44004, 44010, 44011, 44012, 44015 and 44017, Health and Safety Code.

§ 2037. Defects Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2037 or section 2037.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2037 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600 and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43106, 43204, 43205, 44004, 44010, 44011, 44012, 44015 and 44017, Health and Safety Code.

§ 2038. Performance Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2038 or section 2038.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2038 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 43106, 43204, 43205, 44004, 44010, 44011, 44012, 44014 and 44015, Health and Safety Code.

§ 2040. Vehicle Owner Obligations.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2040 or section 2040.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2040 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 43106, 43204, 43205 and 43205.5, Health and Safety Code.

§ 2111. Applicability.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2111 or section 2111.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2111 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2112. Definitions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2112 or section 2112.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2112 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections ~~32~~ 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, 43105 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 38501, 38505, 38510, 38560, 39002, 39003, 39010, 39500, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43202, 43204-43205.5, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

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§ 2113. Initiation and Approval of Voluntary and Influenced Emission-Related Recalls.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2113 or section 2113.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2113 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2114. Voluntary and Influenced Recall Plans.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2114 or section 2114.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2114 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2115. Eligibility for Repair.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2115 or section 2115.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2115 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2116. Repair Label.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2116 or section 2116.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2116 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2117. Proof of Correction Certificate.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2117 or section 2117.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2117 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

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§ 2118. Notification.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2118 or section 2118.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2118 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2119. Recordkeeping and Reporting Requirements.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2119 or section 2119.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2119 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2121. Penalties.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2121 or section 2121.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2121 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2123. Initiation and Notification of Ordered Emission-Related Recalls.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2123 or section 2123.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2123 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2125. Ordered Recall Plan.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2125 or section 2125.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2125 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections HSC 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2126. Approval and Implementation of Recall Plan.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2126 or section 2126.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2126 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2127. Notification of Owners.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2127 or section 2127.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2127 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2128. Repair Label.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2128 or section 2128.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2128 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2129. Proof of Correction Certificate.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2129 or section 2129.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2129 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2130. Capture Rates and Alternative Measures.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2130 or section 2130.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2130 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2131. Preliminary Tests.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2131 or section 2131.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2131 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2133. Recordkeeping and Reporting Requirements.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2133 or section 2133.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2133 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2137. Vehicle, Engine, and Trailer Selection.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2137 or section 2137.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2137 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2139. Testing.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2139 or section 2139.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2139 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 39002, 39003, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213, Health and Safety Code.

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§ 2139.5. CARB Authority to Test for Heavy-Duty In-Use Compliance.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2139.5.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2139.5 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 39002, 39003, 43000, 43009.5, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213, Health and Safety Code.

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§ 2140. Notification and Use of Test Results.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2140 or section 2140.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2140 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213, Health and Safety Code.

§ 2141. General Provisions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2141 or section 2141.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2141 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2142. Alternative Procedures.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2142 or section 2142.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2142 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43018, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2143. Failure Levels Triggering Recall and Corrective Action.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2143 or section 2143.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2143 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2144. Emission Warranty Information Report.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2144 or section 2144.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2144 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43018, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2145. Field Information Report.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2145 or section 2145.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2145 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43018 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2146. Emissions Information Report.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2146 or section 2146.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2146 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43018, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2147. Demonstration of Compliance with Emission Standards.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2147 or section 2147.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2147 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43018, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2148. Evaluation of Need for Recall.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2148 or section 2148.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2148 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43018, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2149. Notification and Subsequent Action.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2149 or section 2149.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2149 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39500, 39600, 39601, 43000.5, 43013, 43018, 43105, 43204, 43205.5 and 43214 Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107, 43204-43205.5, 43211-43213 and 43107, Health and Safety Code.

§ 2166. General Provisions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2166.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2166 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections, 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

§ 2166.1. Definitions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2166.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2166.1 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2167. Required Recall and Corrective Action for Failures of Exhaust After-Treatment Devices, On-Board Computers or Systems, Urea Dosers, Hydrocarbon Injectors, Exhaust Gas Recirculation Valves, Exhaust Gas Recirculation Coolers, Turbochargers, Fuel Injectors.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2167.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2167 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2168. Required Corrective Action and Recall for Emission-Related Component Failures.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2168.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2168 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169. Required Recall or Corrective Action Plan.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.1. Approval and Implementation of Corrective Action Plan.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.1 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.2. Notification of Owners.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.2.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.2 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.3. Repair Label.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.3.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.3 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. Engine Mfrs Assn v. California Air Resources Board, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.4. Proof of Correction Certificate.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.4.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.4 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. Engine Mfrs Assn. v. California Air Resources Board, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.5. Preliminary Tests.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.5.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.5 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. Engine Mfrs. Assn. v. California Air Resources Board, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.6. Communication with Repair Personnel.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.6.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.6 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. Engine Mfrs Assn v. California Air Resources Board, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.7. Recordkeeping and Reporting Requirements.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.7.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.7 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. Engine Mfrs Assn v. California Air Resources Board, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2169.8. Extension of Time.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2169.8.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2169.8 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2170. Penalties.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow this section 2170.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2170 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39500, 39600, 39601, 43000.5, 43013, 43018, 43204, 43205.5 and 43214, Health and Safety Code. *Engine Mfrs Assn v. California Air Resources Board*, (2014) 231 Cal. App.4th 1022. Reference: Sections 43000, 43100, 43101, 43102, 43106, 43107 and 43806, Health and Safety Code.

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§ 2317. Satisfaction of Designated Clean Fuel Requirements with a Substitute Fuel.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2317 or section 2317.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2317 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 39667, 43013, 43018 and 43101, Health and Safety Code; and *Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District,* 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: Sections 39000, 39001, 39002, 39003, 39500, 39515, 39516, 39667, 43000, 43013, 43018 and 43101, Health and Safety Code; and *Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District*, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

§ 2423. Exhaust Emission Standards and Test Procedures — Off-Road Compression-Ignition Engines.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2423 or section 2423.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2423 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 43013, 43017, 43018, 43101, 43104 and 43211-43212, Health and Safety Code.

§ 2485. Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2485 or section 2485.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2485 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 39614(b)(6)(A), 39658, 39667, 43000.5(d), 43013(b), 43013(h), 43018(b) and 43018(c), Health and Safety Code; and *Western Oil & Gas Assn. v. Orange County Air Pollution Control Dist.* (1975), 14 Cal.3d.411. Reference: Sections 39002, 39003, 39027, 39500, 39600, 39650, 39655, 39656, 39657, 39658, 39659, 39662, 39665, 39674, 39675, 42400, 42400.1, 42400.2, 42400.3, 42402, 42402.1, 42402.2, 42402.3, 42402.4, 42403.5, 42410, 43013, 43018 and 43704, Health and Safety Code; Sections 305, 336, 350, 440, 445, 545, 546, 642, 680, 21400, 22452, 22515, 27153, 40001 and 40001(b)(5), California Vehicle Code; ~~and Sections 1201, 1900, 1962 and 2480, Title 13, California Code of Regulations.~~

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§ 2903. Definitions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 2903 or section 2903.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 2903 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 43019, 43019.1 and 43202.6, Health and Safety Code. Reference: Sections 43000, 43000.5, 43013, 43018, 43019 and 43019.1, Health and Safety Code.

Appendix A-2-1

Proposed Regulation Order:

Emergency Vehicle Emissions Regulations

Part I

[Note: The entire text of sections below is new language in "normal type" proposed to be added to title 13, California Code of Regulations]

The Chapters and Sections of title 13, California Code of Regulations that are being proposed for adoption per this regulatory proposal are as follows.

Chapter 1. Motor Vehicle Pollution Control Devices

Section 1956.8.1.	Exhaust Emissions Standards and Test Procedures -- 1985 and Subsequent Model Heavy-Duty Engines and Vehicles. (Alternative)
Section 1968.2.1.	Malfunction and Diagnostic System Requirements 2004 and Subsequent Model Year Passenger Cars, Light Duty Trucks, and Medium Duty Vehicles and Engines. (Alternative)
Section 1968.5.1.	Enforcement of Malfunction and Diagnostic System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines. (Alternative)
Section 1971.1.1.	On-Board Diagnostic System Requirements--2010 and Subsequent Model-Year Heavy-Duty Engines. (Alternative)
Section 1971.5.1.	Enforcement of Malfunction and Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines. (Alternative)
Section 2035.0.1.	Purpose, Applicability, and Definitions (Alternative)
Section 2036.0.1.	Defects Warranty Requirements for 1979 Through 1989 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles; 1979 and Subsequent Model Motorcycles and Heavy-Duty Vehicles; and Motor Vehicle Engines Used in Such Vehicles. (Alternative)
Section 2040.0.1.	Vehicle Owner Obligations. (Alternative)

Chapter 2. Enforcement of Vehicle Emission Standards and Surveillance Testing

Section 2111.0.1.	Applicability. (Alternative)
Section 2113.0.1.	Initiation and Approval of Voluntary and Influenced Emission-Related Recalls. (Alternative)
Section 2114.0.1.	Voluntary and Influenced Recall Plans. (Alternative)
Section 2115.0.1	Eligibility for Repair. (Alternative)
Section 2116.0.1.	Repair Label. (Alternative)

Section 2117.0.1.	Proof of Correction Certificate. (Alternative)
Section 2118.0.1.	Notification. (Alternative)
Section 2119.0.1.	Recordkeeping and Reporting Requirements. (Alternative)
Section 2121.0.1.	Penalties. (Alternative)
Section 2123.0.1.	Initiation and Notification of Ordered Emission-Related Recalls. (Alternative)
Section 2125.0.1.	Ordered Recall Plan. (Alternative)
Section 2126.0.1.	Approval and Implementation of Recall Plan. (Alternative)
Section 2127.0.1.	Notification of Owners. (Alternative)
Section 2128.0.1.	Repair Label. (Alternative)
Section 2129.0.1.	Proof of Correction Certificate. (Alternative)
Section 2130.0.1.	Capture Rates and Alternative Measures. (Alternative)
Section 2131.0.1.	Preliminary Tests. (Alternative)
Section 2133.0.1.	Recordkeeping and Reporting Requirements. (Alternative)
Section 2137.0.1.	Vehicle and Engine Selection. (Alternative)
Section 2141.0.1.	General Provisions. (Alternative)
Section 2142.0.1.	Alternative Procedures. (Alternative)
Section 2143.0.1.	Failure Levels Triggering Recall. (Alternative)
Section 2144.0.1.	Emission Warranty Information Report. (Alternative)
Section 2145.0.1.	Field Information Report. (Alternative)
Section 2146.0.1.	Emissions Information Report. (Alternative)
Section 2148.0.1.	Evaluation of Need for Recall. (Alternative)
Section 2149.0.1.	Notification and Subsequent Action. (Alternative)

Chapter 9. Off-Road Vehicles and Engines Pollution Control Devices

Section 2423.0.1.	Exhaust Emission Standards and Test Procedures — Off-Road Compression-Ignition Engines. (Alternative)

Chapter 10. Mobile Source Operational Controls

Section 2485.0.1.	Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. (Alternative)

Proposed Regulation Order

Title 13, California Code of Regulations

Adopt New Sections 1956.8.1, 1968.2.1, 1968.5.1, 1971.1.1, 1971.5.1, 2035.0.1, 2036.0.1, 2040.0.1, 2111.0.1, 2113.0.1, 2114.0.1, 2115.0.1, 2116.0.1, 2117.0.1, 2118.0.1, 2119.0.1, 2121.0.1, 2123.0.1, 2125.0.1, 2126.0.1, 2127.0.1, 2128.0.1, 2129.0.1, 2130.0.1, 2131.0.1, 2133.0.1, 2137.0.1, 2141.0.1, 2142.0.1, 2143.0.1, 2144.0.1, 2145.0.1, 2146.0.1, 2148.0.1, 2149.0.1, 2423.0.1, and 2485.0.1.

§ 1956.8.1. Exhaust Emissions Standards and Test Procedures -- 1985 and Subsequent Model Heavy-Duty Engines and Vehicles. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a)(1) The exhaust emissions (i) from new 1985 through 2003 model heavy-duty diesel engines (except methanol-fueled engines), and heavy-duty natural-gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and (ii) from all new 1993 through 2003 model heavy-duty methanol-fueled, diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed:

Exhaust Emission Standards
For 1985-2003 Model Heavy-Duty Engines Other than Urban Bus Engines
(grams per brake horsepower-hour [g/bhp-hr])

Model Year	*Total Hydrocarbons or OMHCE*[A]	*Optional Non-methane Hydrocarbons*[A]	*Carbon Monoxide*	*Oxides of Nitrogen*	*Particulates*
1985-1986	1.3		15.5	5.1	—
1987[B]	1.3		15.5	5.1	—
1988-1989	1.3		15.5	6.0	0.60
1990	1.3	1.2	15.5	6.0	0.60
1991-1993[C]	1.3	1.2	15.5	5.0	0.25[D]
1994-1997	1.3	1.2	15.5	5.0	0.10[D]
1995-1997[E]	1.3	1.2	15.5	3.5 to 0.5	0.10
1998-2003[F]	1.3	1.2	15.5	4.0[G,H]	0.10[G]
1998-2003[E]	1.3	1.2	15.5	2.5 to 0.5[I]	0.10

[A] The total or optional non-methane hydrocarbon standards apply to petroleum-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled engines. The Organic Material Hydrocarbon Equivalent, or OMHCE, standards apply to methanol-fueled engines.

[B] As an option a manufacturer may elect to certify to the 1988 model-year emission standards one year early, for the 1987 model year.

[C] For methanol-fueled engines, these standards shall be applicable beginning with the 1993 model year.

[D] Emissions averaging may be used to meet this standard. Averaging is restricted to within each useful life subclass and is applicable only through the 1995 model year. Emissions from engines used in urban buses shall not be included in the averaging program.

[E] These are optional standards. A manufacturer may elect to certify to an optional NOx standard between the values, inclusive, by 0.5 grams per brake horsepower-hour increments. Engines certified to any of these optional NOx standards are not eligible for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated by reference in (b), below.

[F] These are mandatory standards.

[G] Engines of 1998 through 2003 model years may be eligible to generate banking credits based on these standards according to the requirements of the averaging, banking and trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated by reference in (b), below.

[H] May be used as the certification standard for the higher emitting fueling mode of an engine certified under the dual fueling mode certification process of (a)(3)(4), below.

[I] May be used as the certification standard for the lower emitting fueling mode of an engine certified under the dual fueling mode certification process of (a)(3)(4), below.

(2)(A) The exhaust emissions from new 2004 and subsequent model heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines, and the optional, reduced-emission standards for 2002 and subsequent model engines produced beginning October 1, 2002, except in all cases engines used in medium-duty vehicles, shall not exceed:

Exhaust Emission Standards for 2004 and Subsequent Model Heavy-Duty Engines, and Optional, Reduced Emission Standards for 2002 and Subsequent Model Heavy-Duty Engines Produced Beginning October 1, 2002, Other than Urban Bus Model-Year Engines Produced From October 1, 2002 Through 2006
(grams per brake horsepower-hour [g/bhp-hr])

Model Year	Oxides of Nitrogen Plus Non-methane Hydrocarbons	Optional Oxides of Nitrogen Plus Non-methane Hydrocarbons	Oxides of Nitrogen	Optional Oxides of Nitrogen	Non-methane Hydrocarbons	Carbon Monoxide	Particulates
2004-2006[H]	2.4[A,C,E,J]	2.5[B,C,E,J]	n/a		n/a	15.5	0.10[C]
October 1, 2002-2006	n/a	1. 8 to 0.3[A,D,F]	n/a		n/a	15.5	0.03 to 0.01[G]
2007 and subsequent[M]	n/a	n/a	0.20[I]		0.14	15.5	0.01[K]
2015 and Subsequent (Optional)[N,O]	n/a	n/a	n/a	0.10, 0.05, or 0.02	0.14	15.5	0.01

A This is the standard for the arithmetic sum of the oxides of nitrogen exhaust component certification value and the non-methane hydrocarbon exhaust component certification value, without individual restriction on the individual component values.

B This is the standard for the arithmetic sum of the oxides of nitrogen exhaust component certification value and the non-methane hydrocarbon exhaust component certification value, with the non-methane hydrocarbon individual component value not to exceed 0.5 g/bhp-hr.

C For 2004 through 2006 model years, emissions averaging may be used to meet this standard. Averaging must be based on the requirements of the averaging, banking and trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated by reference in section 1956.8(b), below.

D A manufacturer may elect to certify to an optional reduced-emission NOx+NMHC standard between the values, inclusive, by 0.3 grams per brake horsepower-hour increments. Engines certified to any of these optional reduced-emission NOx standards are not eligible for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated by reference in section 1956.8(b), below.

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[E] May be used as the certification standard for the higher emitting fueling mode of an engine certified under the dual fueling mode certification process of section 1956.8(a)(4), below.

[F] May be used as the certification standard for the lower emitting fueling mode of an engine certified under the dual fueling mode certification process of section 1956.8(a)(4), below.

[G] A manufacturer may elect to certify to an optional reduced-emission PM standard between the specified values, inclusive, by 0.01 grams per brake horsepower-hour increments. Engines certified to any of these optional reduced-emission PM standards are not eligible for participation in any averaging, banking or trading programs described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated by reference in section 1956.8(b), below.

[H] Engine manufacturers subject to the Heavy-Duty Diesel Engine Settlement Agreements (Settlement Agreements)[1] must produce engines in compliance with the requirements contained in their respective Settlement Agreement. Most engine manufacturers subject to the Settlement Agreements are required to manufacture engines meeting the exhaust emission standards for 2004 and subsequent model years engines beginning October 1, 2002.

[I] A manufacturer may elect to include any or all of its heavy-duty diesel engine families in any or all of the NOx emissions averaging, banking, or trading programs for heavy-duty diesel engines, within the restrictions described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in section 1956.8 (b), below. If the manufacturer elects to include engine families in any of these programs, the NOx family emission limit (FEL) may not exceed the following FEL caps: 2.00 grams per brake horsepower-hour (0.75 grams per megajoule) for model years before 2010; 0.50 grams per brake horsepower-hour (0.19 grams per megajoule) for model years 2010 and later. The FEL cap applies whether credits for the engine family are derived from averaging, banking, or trading programs.

[J] For 2007 through 2009 model years, a manufacturer may use these emission standards in accordance with section 1956.8 (a)(2)(B). A manufacturer may elect to include any or all of its heavy-duty diesel engine families in any or all of the NOx plus NMHC emissions averaging, banking, or trading programs for heavy-duty diesel engines, within the restrictions described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated in section 1956.8 (b), below. If the manufacturer elects to include engine families in any of these programs, the NOx family emission limit (FEL) may not exceed the following FEL caps: 2.00 grams per brake horsepower-hour (0.75 grams per megajoule) for model years. The FEL cap applies whether credits for the engine family are derived from averaging, banking, or trading programs.

[K] A manufacturer may elect to include any or all of its heavy-duty diesel engine families in any or all of the particulate averaging, banking, or trading programs for heavy-duty diesel engines, within the restrictions described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" incorporated by reference in section 1956.8 (b), below. The particulate FEL for each engine family a manufacturer elects to include in any of these programs may not exceed an FEL cap of 0.02 grams per brake horsepower-hour (0.0075 grams per megajoule). The FEL cap applies whether credits for the engine family are derived from averaging, banking, or trading programs.

[L] For 2007 and subsequent model-year urban bus engines, this section applies. For urban bus model-year engines produced from October 1, 2002 through 2006, refer to section 1956.1.

[M] For model years between 2007 and 2009, transit agencies purchasing urban buses and/or urban bus engines shall meet the requirements set forth in section 2023.1.

[N] Optional Low NOx emission standards. A manufacturer may choose to offer an engine that is 50%, 75%, or 90% below the current 0.20 g/bhp-hr NOx emission standards for heavy duty engines. A manufacturer may not include an engine family certified to the optional NOx emission standards in the ABT programs for NOx but may include it for particulates.

- On-Board Diagnostic (OBD) requirements are to be followed per Title 13, CCR, section 1971.1 with the exception of the NOx emission threshold malfunction criteria for all applicable monitors, in which case a malfunction criterion of 0.4 g/bhp-hr NOx shall be used (i.e., the OBD system is required to detect a malfunction before NOx emissions exceed 0.4 g/bhp-hr).

[1] Seven of the largest heavy-duty diesel engine manufacturers will be implementing measures to reduce emissions beginning October 1, 2002, to meet the requirements of the Heavy-Duty Diesel Engine Settlement Agreements reached with the ARB. The Heavy-Duty Diesel Engine Settlements were agreements reached in response to lawsuits brought by the United States Environmental Protection Agency and violations alleged by the ARB pertaining to excess in-use emissions caused by the use of defeat devices and unacceptable algorithms. Navistar signed its Settlement Agreement on October 22, 1998. Cummins, Detroit Diesel Corporation, Caterpillar, Volvo, Mack and Renault signed their Settlement Agreements on December 15, 1998.

(B) Phase-in Options.

1.Early NOx compliant engines. For model years 2007, 2008, and 2009, a manufacturer may, at their option, certify one or more of their engine families to the combined NOx plus NMHC standard or FEL applicable to model year 2006 engines under section 1956.8 (a)(2)(A), in lieu of the separate NOx and NMHC standards or FELs applicable to the 2007 and subsequent model years, specified in section 1956.8 (a)(2)(A). Each engine certified under this phase-in option must comply with all other emission requirements applicable to model year 2007 engines. To qualify for this option, a manufacturer must satisfy the U.S.-directed production requirement of certifying no more than 50 percent of engines to the NOx plus NMHC standards or FELs applicable to 2006 engines, as specified in 40 Code of Federal Regulations, part 86, section 86.007-11(g)(1), as adopted January 18, 2001. In addition, a manufacturer may reduce the quantity of engines that are required to be phased-in using the early certification credit program specified in 40 Code of Federal Regulations, part 86, section 86.007-11(g)(2), as adopted January 18, 2001, and the "Blue Sky" engine program specified in 40 Code of Federal Regulations, part 86, section 86.007-11(g)(4), as adopted January 18, 2001.

2. Early PM compliant engines. A manufacturer certifying engines to the 2007 and subsequent model year PM standard listed in section 1956.8(a)(2)(A) (without using credits, as determined in any averaging, banking, or trading program described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," to comply with the standards) before model year 2007 may reduce the number of engines that are required to meet the 2007 and subsequent model year PM standard listed in section 1956.8(a)(2)(A) in model year 2007, 2008 and/or 2009. To qualify for this option, a manufacturer must satisfy the PM emission requirements pursuant to the methods detailed in 40 Code of Federal Regulations, part 86, section 86.007-11 (g)(2)(ii), as adopted January 18, 2001.

(3) Formaldehyde exhaust emissions from new 1993 and subsequent model methanol-fueled diesel engines, shall not exceed:

Model Year	*Formaldehyde (g/bhp-hr)*
1993-1995	0.10
1996 and subsequent	0.05

(4) An engine family whose design allows engine operation in either of two distinct alternative fueling modes, where each fueling mode is characterized by use of one fuel or a combination of two fuels and by significantly different emission levels under each mode, may certify to a different NOx or NOx plus NMHC (as applicable depending on model year) standard for each fueling mode, provided it meets the following requirements:

(A) The NOx or NOx plus NMHC certification standard used for operation under the higher emitting fueling mode must be one of the standards denoted by footnote H in paragraph (a)(1) and footnote E in paragraph (a)(2).

(B) The NOx or NOx plus NMHC certification standard used for operation under the lower emitting fueling mode must be one of the reduced-emission standards denoted by footnote I in paragraph (a)(1) and footnote F in paragraph (a)(2).

(C) The engine family is not used to participate in any manufacturer's averaging, banking or trading program.

(D) The engine family meets all other emission requirements contained in this section.

(E) The higher emitting fueling mode must be intended only for fail-safe vehicle operation when a malfunction or inadvertent fuel depletion precludes operation in the lower emitting fueling mode, as evidenced by a significantly reduced horsepower versus engine speed curve when operating in the higher emitting fueling mode when compared to the similar curve for the lower emitting fueling mode.

(5) No crankcase emissions shall be discharged directly into the ambient atmosphere from any new 2007 or later model year diesel heavy-duty diesel engine, with the following exception: heavy-duty diesel engines equipped with turbochargers, pumps, blowers, or superchargers for air induction may discharge crankcase emissions to the ambient atmosphere if the emissions are added to the exhaust emissions (either physically or mathematically) during all emission testing. Manufacturers using this exception must manufacture the engines so that all crankcase emissions can be routed into a dilution tunnel (or other sampling system approved in advance by the

Executive Officer), and must account for deterioration in crankcase emissions when determining exhaust deterioration factors. For the purpose of section 1956.8(a)(2), crankcase emissions that are routed to the exhaust upstream of exhaust aftertreatment during all operation are not considered to be "discharged directly into the ambient atmosphere."

(6) Heavy-Duty Diesel Engine Idling Requirements.

(A) *Engine Shutdown System*. The requirements in this subsection apply to engine manufacturers and original equipment manufacturers, as applicable, that are responsible for the design and control of engine and/or vehicle idle controls.
1. Requirements. Except as provided in subsections (a)(6)(B) and (a)(6)(C), all new 2008 and subsequent model-year heavy-duty diesel engines shall be equipped with an engine shutdown system that automatically shuts down the engine after 300 seconds of continuous idling operation once the vehicle is stopped, the transmission is set to "neutral" or "park", and the parking brake is engaged. If the parking brake is not engaged, then the engine shutdown system shall shut down the engine after 900 seconds of continuous idling operation once the vehicle is stopped and the transmission is set to "neutral" or "park." The engine shutdown system must be tamper-resistant and non-programmable. A warning signal, such as a light or sound indicator inside the vehicle cabin, may be used to alert the driver 30 seconds prior to engine shutdown. The engine shutdown system must be capable of allowing the driver to reset the engine shutdown system timer by momentarily changing the position of the accelerator, brake, or clutch pedal, or other mechanism within 30 seconds prior to engine shutdown. Once reset, the engine shutdown system shall restart the engine shutdown sequence described in this paragraph above, and shall continue to do so until the engine shuts down or the vehicle is driven.

2. *Engine Shutdown System Override*: The engine shutdown system may be overridden, to allow the engine to run continuously at idle, only under the following conditions:

a. *If the engine is operating in power take-off (PTO) mode.*
The PTO system shall have a switch or a setting that can be switched "on" to override the engine shutdown system and will reset to the "off" position when the vehicle's engine is turned off or when the PTO equipment is turned off. Subject to advance Executive Officer approval, other methods for detecting or activating PTO operation may be allowed; or,

b. *If the vehicle's engine coolant temperature is below 60°F.*
The engine shutdown system shall automatically be activated once the coolant temperature reaches 60°F or above. The engine coolant temperature shall be measured with the engine's existing engine coolant temperature sensor used for engine protection, if so equipped. Other

methods of measuring engine coolant temperature may be allowed, subject to advance Executive Officer approval.

c. If an exhaust emission control device is regenerating, and keeping the engine running is necessary to prevent aftertreatment or engine damage, the engine shutdown system may be overridden for the duration necessary to complete the regeneration process up to a maximum of 30 minutes. Determination of what constitutes the need for regeneration will be based on data provided by the manufacturer at time of certification. Regeneration events that may require longer than 30 minutes of engine idling to complete shall require advance Executive Officer approval. At the end of the regeneration process, the engine shutdown system shall automatically be enabled to restart the engine shutdown sequence described in subparagraph (a)(6)(A)1. above. A vehicle that uses a regeneration strategy under engine idling operating conditions shall be equipped with a dashboard indicator light that, when illuminated, indicates that the exhaust emission control device is regenerating. Other methods of indicating that the exhaust emission control device is regenerating may be used with advance Executive Officer approval.

d. if servicing or maintenance of the engine requires extended idling operation. The engine's electronic control module may be set to temporarily deactivate the engine shutdown system for up to a maximum of 60 minutes. The deactivation of the engine shutdown system shall only be performed with the use of a diagnostic scan tool. At the end of the set deactivation period, the engine's electronic control module shall reset to restart the engine shutdown system sequence described in subparagraph (a)(6)(A)1. above.

(B) *Exempt Vehicles*. Heavy-duty diesel engines to be used in buses as defined in California Vehicle Code sections 233, 612 and 642, school buses as defined in California Vehicle Code section 545, recreational vehicles as defined in Health and Safety Code 18010, medium duty vehicles as defined in section 1900(b) of title 13, California Code of Regulations, military tactical vehicles as defined in section 1905 of title 13, California Code of Regulations, authorized emergency vehicles as defined in California Vehicle Code section 165, armored cars, as defined in California Vehicle Code sections 115, and workover rigs, as defined in section 2449 of title 13, California Code of Regulations are exempted from these requirements.

(C) *Optional NOx idling emission standard*. In lieu of the engine shutdown system requirements specified in subsection (a)(6)(A) above, an engine manufacturer may elect to certify its new 2008 and subsequent model-year heavy-duty diesel engines to an optional NOx idling emission standard of 30 grams per hour. Compliance with this optional standard will be determined based on testing conducted pursuant to the supplemental NOx idling test cycle and procedures

specified in section 86.1360-2007.B.4 of the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," as incorporated by reference in subsection (b). The manufacturer may request an alternative test procedure if the technology used cannot be demonstrated using the procedures in section 86.1360-2007.B.4, subject to advance approval of the Executive Officer. A manufacturer certifying to the optional NOx idling standard must not increase emissions of CO, PM, or NMHC, determined by comparing results from the supplemental NOx idling test cycle and procedures specified in section 86.1360-2007.B.4 of the referenced "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" to emission results from the idle mode of the supplemental steady state test cycle or emission results from idle portions of the transient test cycle for heavy duty diesel engines, respectively specified in sections 86-1360-2007 and 86.1327-98 of the referenced "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles." With advance Executive Officer approval, a manufacturer may use other methods of ensuring that emissions of CO, PM, and NMHC are not adversely affected in meeting the optional NOx requirement. Also, manufacturers shall state in their application for certification that meeting the optional NOx idling requirement will not adversely affect the associated emissions of CO, PM and NMHC.
An engine manufacturer certifying its engine to the optional NOx idling emission standard must also produce a vehicle label, as defined in subsection 35.B.4 of the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," as incorporated by reference in subsection (b).

(D) *Optional Alternatives to Main Engine Idling.* All new 2008 and subsequent model year heavy duty diesel engines may also be equipped with idling emission reduction devices that comply with the compliance requirements specified in title 13, CCR, section 2485(c)(3).

(7) Greenhouse Gas Emission Standards for new 2014 and Subsequent Model Heavy-Duty Diesel Engines, Heavy-Duty Natural Gas-Fueled and Liquefied-Petroleum-Gas-Fueled Engines Derived from Diesel-Cycle Engines, and Heavy-Duty Methanol-Fueled Diesel Engines.

(A) The CO_2 emissions from new 2014 and subsequent model heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed:

CO_2 Emission Standards for 2014 and Subsequent Model Heavy-Duty Diesel Engines [A, B, C] (in g/hp-hr)

Model Years	*Light heavy-duty-- vocational*	*Medium heavy-duty-- vocational*	*Heavy heavy-duty-- vocational*	*Medium heavy-duty-- tractor*	*Heavy heavy-duty-- tractor*
2014-2016	600	600	567	502	475
2017 and later	576	576	555	487	460

[A] *Family Certification Levels.* A Family Certification Level (FCL) must be specified for each engine family, which may not be less than the certified emission level for the engine family. The Family Emission Limit (FEL) for the engine family is equal to the FCL multiplied by 1.03. The FCL serves as the CO_2 emission standard for the engine family with respect to certification and confirmatory testing instead of the standards specified in this subsection (a)(7)(A). The FEL serves as the emission standard for the engine family with respect to all other testing.

[B] *Averaging, Banking, and Trading Program and Credits.* The requirements for the optional averaging, banking, and trading program and for generating credits are described in the applicable test procedures incorporated by reference in subsection (b).

[C] *Alternate Phase-in Emission Standards.* Alternate phase-in emission standards may be used in lieu of the required CO_2 emission standards in the table above. To qualify for these alternate phase-in emission standards, the manufacturer must begin certifying all of its model year 2013 diesel engines within a given primary intended service class to the applicable alternate emission standards of this footnote (c) and continue through model year 2016. This means that once a manufacturer chooses to certify a primary intended service class to the alternate emission standards of this footnote (c), it is not allowed to opt out of these standards. Engines certified to these alternate emission standards are not eligible for early credits. Note that these alternate emission standards for 2016 and later are the same as the otherwise applicable required emission standards for model year 2017 and later.

Alternate Phase-in CO_2 Emission Standards (in g/hp-hr)					
Model Years	***Light heavy-duty – vocational***	***Medium heavy-duty – vocational***	***Heavy heavy-duty – vocational***	***Medium heavy-duty – tractor***	***Heavy heavy-duty – tractor***
2013-2015	**618**	**618**	**577**	**512**	**485**
2016	**576**	**576**	**555**	**487**	**460**

[D] *Alternate Emission Standards Based on 2011 Model Year Engines.* For model years 2014 through 2016, heavy-duty diesel engines may be certified to these alternate emission standards based on 2011 model year engines, if they are not part of an averaging set in which a balance of banked credits remain. These alternate standards are determined from the measured emission rate of the test engine of the applicable baseline 2011 engine family(ies) as described in the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles," as incorporated by reference in section (b). The alternate CO_2 standard for light and medium heavy-duty vocational-certified engines is equal to the baseline 2011 emission rate

multiplied by 0.975. The alternative CO_2 standard for tractor-certified engines and all other heavy heavy-duty engines is equal to the baseline 2011 emission rate multiplied by 0.970.

(B) The methane (CH_4) emissions from new 2014 and subsequent model heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(C) The nitrous oxide (N_2O) emissions from new 2014 and subsequent model heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(b) *Test Procedures*. The test procedures for determining compliance with standards applicable to 1985 and subsequent model heavy-duty diesel engines and vehicles and the requirements for participating in the averaging, banking and trading programs, are set forth in the "California Exhaust Emission Standards and Test Procedures for 1985 through 2003 Model Heavy-Duty Diesel-Engines and Vehicles," adopted April 8, 1985, as last amended December 12, 2002, the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles," adopted December 12, 2002, as last amended October 21, 2014, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric and Other Hybrid Vehicles in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, as last amended October 21, 2014, which are incorporated by reference herein.

(c)(1)(A) The exhaust emissions from (i) new 1987 through 2004 model heavy-duty Otto-cycle engines (except methanol-fueled engines and except heavy-duty Otto-cycle natural-gas-fueled and liquified-petroleum-gas-fueled Otto-cycle engines derived from diesel-cycle engines) and (ii) from new 1993 through 2004 model heavy-duty methanol-fueled Otto-cycle engines (except in all cases engines used in medium-duty vehicles) shall not exceed:

Exhaust Emission Standards for Heavy-Duty Otto-Cycle Engines
(grams per brake horsepower-hour or g/bhp-hr)

Model Year	*Total Hydrocarbons or OMHCE*[A]	*Optional Non-Methane Hydrocarbons*[A]	*Carbon Monoxide*[B]	*Oxides of Nitrogen*
1987[C]	1.1[D]		14.4[D]	10.6
	1.9[E]		37.1[E]	10.6
1988-1989	1.1[D]		14.4[D]	6.0
	1.9[E]		37.1[E]	6.0
1990	1.1	0.9[D]	14.4[D]	6.0
	1.9[E]	1.7[E]	37.1[E]	6.0
1991-1994	1.1[D]	0.9[D]	14.4[D]	5.0
	1.9[E]	1.7[E]	37.1[E]	5.0
1995-1997	1.9[E]	1.7[E]	37.1[E]	5.0
	1.9[E]	1.7[E]	37.1[E]	2.5 to 5.0[F]
1998-2003[G]	1.9[E]	1.7[E]	37.1[E]	4.0
	1.9[E]	1.7[E]	37.1[E]	1.5 to 0.5[F]

	Non-Methane Hydrocarbons plus Oxides of Nitrogen (NMHC + NOx)	*Carbon Monoxide*
2004[G]	2.4 g/bph-hr; or 2.5 with 0.5 g/bhp-hr cap on NMHC	37.1

[A]The total or optional non-methane hydrocarbon standards apply to petroleum-fueled, natural-gas-fueled and liquefied-petroleum-gas-fueled engines and methanol-fueled engines beginning in 2004. The Organic Material Hydrocarbon Equivalent, or OMHCE, standards apply to 1987 through 2003 methanol-fueled engines.

[B]Prior to the 2002 model year, carbon monoxide emissions from engines utilizing exhaust after treatment technology shall also not exceed 0.5 percent of the exhaust gas flow at curb idle.

[C]Manufacturers with existing heavy-duty Otto-cycle engines certified to the California 1986 steady-state emission standards and test procedures may as an option certify those engines, for the 1987 model year only, in accordance with the standards and test procedures for 1986 heavy-duty Otto-cycle engines established in Section 1956.7.

[D]These standards are applicable to Otto-cycle engines intended for use in all heavy-duty vehicles.

[E]Applicable to heavy-duty Otto-cycle engines intended for use only in vehicles with a gross vehicle weight rating greater than 14,000 pounds. Also, as an option, a manufacturer may certify one or more 1988 through 1994 model Otto-cycle heavy-duty engine configurations intended for use in all heavy-duty vehicles to these emission standards, provided that the total model-year sales of such configuration(s) being certified to these emission standards represent no more than 5 percent of total model-year sales of all Otto-cycle heavy-duty engines intended for use in vehicles with a Gross Vehicle Weight Rating of up to 14,000 pounds by the manufacturer.

[F]These are optional standards and apply to all heavy-duty engines intended for use only in vehicles with a gross vehicle weight rating greater than 14,000 pounds. A manufacturer may elect to certify to an optional standard between the values, inclusive, by 0.5 grams per brake horsepower-hour increments.

[G]A manufacturer may request to certify to Option 1 or Option 2 federal NMHC + NOx standards as set forth in 40 CFR § 86.005-10(f), as adopted October 6, 2000.

(c)(1)(B) The exhaust emissions from new 2005 and subsequent model heavy-duty Otto-cycle engines, except for Otto-cycle medium- and heavy-duty engines subject to the alternative standards in 40 CFR §86.005-10(f), shall not exceed:

10/2/25
PER AGENCY
REQUEST
LSM

California Emission Standards for 2005 and Subsequent Model Heavy-Duty Otto-Cycle Engines[A] (in g/bhp-hr)

Model Year	*Emission Category*	*NMHC + NOx*	*NMHC*	*NOx*	*CO[G]*	*HCHO*	*PM*
Standards for Heavy-Duty Otto-Cycle Engines Used In 2005 through 2019 Model Incomplete Medium-Duty Vehicles 8,501 to 10,000 pounds GVW[B] and 2005 and Subsequent Model Incomplete Medium-Duty Vehicles 10,001 to 14,000 pounds GVW[C]							
2005 through 2007	ULEV	1.0[D,F]	n/a	n/a	14.4	0.05	n/a
	SULEV	0.5	n/a	n/a	7.2	0.025	n/a
2008 and subsequent	ULEV	n/a	0.14[F]	0.20[F]	14.4	0.01	0.01
	SULEV	n/a	0.07[F]	0.10[F]	7.2	0.005	0.005
Standards for Heavy-Duty Otto-Cycle Engines Used In Heavy-Duty Vehicles Over 14,000 pounds GVW							
2005 through 2007	n/a	1.0[D,F]	n/a	n/a	37.1	0.05[E]	n/a
2008 and subsequent	n/a	n/a	0.14[F]	0.20[F]	14.4	0.01	0.01
2015 and subsequent[H,I]	Optional	n/a	0.14	0.10, 0.05 or 0.02	14.4	0.01	0.01

A These standards apply to petroleum-fueled, alcohol-fueled, liquefied petroleum gas-fueled and natural gas-fueled Otto-cycle engines.

B For the 2020 and subsequent model years, medium-duty vehicles 8,501 to 10,000 pounds GVW must certify to the primary emission standards and test procedures for complete vehicles specified in section 1961.2, title 13, CCR.

C A manufacturer of engines used in incomplete medium-duty vehicles may choose to comply with these standards as an alternative to the primary emission standards and test procedures for complete vehicles specified in section 1961 or 1961.2, title 13, CCR. A manufacturer that chooses to comply with these optional heavy-duty engine standards and test procedures shall specify, in the Part I application for certification, an in-use compliance test procedure, as provided in section 2139(c), title 13 CCR.

[D] A manufacturer may request to certify to the Option 1 or Option 2 federal NMHC + NOx standards as set forth in 40 CFR § 86.005-10(f). However, for engines used in medium-duty vehicles, the formaldehyde level must meet the standard specified above.

[E] This standard only applies to methanol-fueled Otto-cycle engines.

[F] A manufacturer may elect to include any or all of its medium- and heavy-duty Otto-cycle engine families in any or all of the emissions ABT programs for HDEs, within the restrictions described in section I.15 of the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines," incorporated by reference in section 1956.8(d). For engine families certified to the Option 1 or 2 federal standards, the FEL must not exceed 1.5 g/bhp-hr. If a manufacturer elects to include engine families certified to the 2005 and subsequent model year standards, the NOx plus NMHC FEL must not exceed 1.0 g/bhp-hr. For engine families certified to the 2008 and subsequent model year standards, the FEL is the same as set forth in 40 CFR 86.008-10(a)(1).

[G] Idle carbon monoxide: For all Otto-cycle heavy-duty engines utilizing aftertreatment technology, and not certified to the on-board diagnostics requirements of section 1968, et seq, as applicable, the CO emissions shall not exceed 0.50 percent of exhaust gas flow at curb idle.

[H] Optional Low NOx emission standards. A manufacturer may choose to offer an engine that is 50%, 75%, or 90% below the current 0.20 g/bhp-hr NOx emission standards for heavy duty engines. A manufacturer may not include an engine family certified to the optional NOx emission standards in the ABT programs for NOx but may include it for NMHC.

[I] On Board Diagnostic (OBD) requirements are to be followed using Title 13, CCR, section 1971.1 with the exception of the NOx emission threshold malfunction criteria for all applicable monitors, in which case the malfunction criteria shall be as follows:

(A) for monitors that require detection of a malfunction before emissions exceed 1.5 times the applicable NOx standard, a malfunction criterion of 0.3 g/bhp-hr NOx shall be used (i.e., the OBD system is required to detect a malfunction before NOx emissions exceed 0.3 g/bhp-hr).

(B) for monitors that require detection of a malfunction before emissions exceed 1.75 times the applicable NOx standard, a malfunction criterion of 0.35 g/bhp-hr NOx shall be used (i.e., the OBD system is required to detect a malfunction before NOx emissions exceed 0.35 g/bhp-hr).

(C) for monitors that require detection of a malfunction before emissions exceed 3.0 times the applicable NOx standard, a malfunction criterion of 0.6 g/bhp-hr NOx shall be used (i.e., the OBD system is required to detect a malfunction before NOx emissions exceed 0.6 g/bhp-hr).

(2) Formaldehyde exhaust emissions from new 1993 and subsequent model methanol-fueled otto cycle engines shall not exceed:

Model Year	***Formaldehyde (g/bhp-hr)***
1993-1995	0.10
1996 and Subsequent	0.05

(3) *Optional Standards for Complete and Incomplete Heavy-Duty Vehicles that Use Heavy-Duty Otto-Cycle Engines.* Manufacturers may request to group complete and incomplete heavy-duty Otto-cycle vehicles into the same test group as Otto-cycle vehicles certifying to the LEV III exhaust emission standards and test procedures specified in title 13, CCR, §1961.2, so long as those complete and incomplete heavy-duty Otto-cycle vehicles meet the most stringent LEV III standards to which any vehicle within that test group certifies.

(4) Greenhouse Gas Emission Standards for New 2016 and Subsequent Model Heavy-Duty Otto-Cycle Engines.

(A) The CO_2 emissions from new 2016 and subsequent model heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, shall not exceed 627 g/hp-hr. An FCL must be specified for each engine family, which may not be less than the certified emission level for the engine family. The FEL for the engine family is equal to the FCL multiplied by 1.03. The FCL serves as the CO_2 emission standard for the engine family with respect to certification and confirmatory testing instead of the standard specified in this subsection (c)(4)(A). The FEL serves as the emission standard for the engine family with respect to all other testing. The requirements for the optional averaging, banking, and trading program and for generating credits are described in the applicable test procedures incorporated by reference in subsection (d).

(B) The CH_4 emissions from new 2016 and subsequent model heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(C) The N_2O emissions from new 2016 and subsequent model heavy-duty Otto-cycle engines, except in all cases engines used in medium-duty vehicles, shall not exceed 0.10 g/hp-hr.

(d) *Test Procedures.* The test procedures for determining compliance with standards applicable to 1987 and subsequent model heavy-duty Otto-cycle engines and vehicles

are set forth in the "California Exhaust Emission Standards and Test Procedures for 1987 through 2003 Model Heavy-Duty Otto-Cycle Engines and Vehicles," adopted April 25, 1986, as last amended December 27, 2000, the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles," adopted December 27, 2000, as last amended October 21, 2014, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric and Other Hybrid Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, as last amended October 21, 2014, which are incorporated by reference herein; and the "California Non-Methane Organic Gas Test Procedures for 1993 through 2016 Model Year Vehicles" and the "California Non-Methane Organic Gas Test Procedures for 2017 and Subsequent Model Year Vehicles," which are incorporated by reference in section 1961.2.

(e) A manufacturer may elect to certify complete heavy-duty vehicles of 14,000 pounds or less maximum gross vehicle weight rating as medium-duty vehicles under section 1960.1 or section 1961 of this chapter, in which event the heavy-duty emission standards and test procedures in this section shall not apply.

(f)(1) In 1985 and future years, the executive officer may authorize use of engines certified to meet federal emission standards, or which are demonstrated to meet appropriate federal emission standards, in up to a total of 100 heavy-duty vehicles, including otto-cycle and diesel heavy-duty vehicles, in any one calendar year when the executive officer has determined that no engine certified to meet California emission standards exists which is suitable for use in the vehicles.

(2) In order to qualify for an exemption, the vehicle manufacturer shall submit, in writing, to the executive officer the justification for such exemption. The exemption request shall show that, due to circumstances beyond the control of the vehicle manufacturer, California certified engines are unavailable for use in the vehicle. The request shall further show that redesign or discontinuation of the vehicle will result in extreme cost penalties and disruption of business. In evaluating a request for an exemption, the executive officer shall consider all relevant factors, including the number of individual vehicles covered by the request and the anti-competitive effect, if any, of granting the request. If a request is denied, the executive officer shall state in writing the reasons for the denial.

(3) In the event the executive officer determines that an applicant may meet the criteria for an exemption under this subsection, but that granting the exemption will, together with previous exemptions granted, result in over 100 vehicles being permitted under this subsection to use non-California engines in heavy-duty vehicles in any one calendar year, the exemption may be granted only by the state board, under the criteria set forth herein.

(g) The exhaust emissions from new 1995 through 2003 model-year engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles shall not exceed:

Exhaust Emission Standards [A]
(grams per brake horsepower-hour, or g/bhp-hr)

Model Year	*Carbon Monoxide*	*NMHC + NOx [B]*	*Particulates [C]*
1995[D] through 2003	14.4	3.9	0.10

[A] This set of standards is optional. Manufacturers of engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles from 8501-14,000 pounds, gross vehicle weight may choose to comply with these standards as a alternative to the primary emission standards and test procedures specified in section 1960.1, Title 13, California Code of Regulations. Manufacturers that choose to comply with these optional heavy-duty standards and test procedures shall specify, in the application for certification, an in-use compliance test procedure, as provided in section 2139(c), Title 13, California Code of Regulations.

[B] This standard is the sum of the individual non-methane hydrocarbon emissions and oxides of nitrogen emissions. For methanol-fueled engines, non-methane hydrocarbons shall mean organic material hydrocarbon equivalent.

[C] This standard shall only apply to diesel engines and vehicles.

[D] In the 1995 model-year only, manufacturers may certify up to 50 percent of their medium-duty engines or vehicles to the applicable 1994 model-year standards and test procedures. For the 1995 through 1997 models, alternative in-use compliance is available for medium-duty manufacturers. A manufacturer may use alternative in-use compliance for up to 100 percent of its fleet in the 1995 and 1996 model years and up to 50 percent of its fleet in the 1997 model year. The percentages shall be determined from the manufacturers' projected California sales of medium-duty vehicles. For engines certified to the standards and test procedures of this subsection, "alternative in-use compliance" shall consist of an allowance of 25 percent over the HC + NOx standard. In-use compliance testing shall be limited to vehicles or engines with less than 90,000 miles.

(h) The exhaust emissions from new:

(1) 1992 through 2004 model-year Otto-cycle engines used in incomplete medium-duty low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles; and

(2) 1992 and subsequent model diesel engines used in medium-duty low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles shall not exceed:

Exhaust Emission Standards for Engines Used in 1992 through 2004 Model Incomplete Otto-Cycle Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super Ultra-Low-Emission Vehicles, and 1992 and Subsequent Model Diesel Engines Used in Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super Ultra-Low-Emission Vehicles[A,F]
(grams per brake horsepower-hour)

Model Year	*Vehicle Emissions Category*[B]	*Carbon Monoxide*	*NMHC + NOx*[C]	*Non-Methane Hydrocarbons*	*Oxides of Nitrogen*	*Formaldehyde*	*Particulates*[D]
1992[E]-2001	LEV	14.4	3.5[K]	n/a	n/a	0.050	0.10[K]
2002-2003[E]	LEV	14.4	3.0[K]	n/a	n/a	0.050	0.10[K]
1992-2003[E,H]	ULEV	14.4	2.5[K]	n/a	n/a	0.050	0.10[K]
2004 – 2006[L]	ULEV – Opt A	14.4	2.5[I,J,K]	n/a	n/a	0.050	0.10[J,K]
2004 – 2006[L]	ULEV – Opt. Bn/a	14.4	2.4[I,J,K]	n/a	n/a	0.050	0.10[J,K]
2007 and subsequent[D] (diesel only)	ULEV	15.5	n/a	0.14	0.20	0.050	0.01
1992 – 2006[L]	SULEV	7.2	2.0[K]	n/a	n/a	0.025	0.05[K]
2007 and subsequent[D] (diesel only)	SULEV	7.7	n/a	0.07	0.10	0.025	0.005

[A]This set of standards is optional. For the 1992 through 2019 model years, manufacturers of engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles from 8501-10,000 pounds gross vehicle weight rating may choose to comply with these standards as a alternative to the primary emission standards and test procedures specified in section 1960.1, section 1961, or section 1961.2, Title 13, California Code of Regulations. For the 1992 and subsequent model years, manufacturers of engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles from 10,001-14,000 pounds gross vehicle weight rating may choose to comply with these standards as an alternative to the primary emission standards and test procedures specified in section 1960.1, section 1961, or section 1961.2, Title 13, California Code of Regulations. For the 2020 and subsequent model years, both incomplete medium-duty vehicles and medium-duty vehicles that use a diesel engine 8,501 to 10,000 pounds GVW must certify to the primary emission standards and test procedures for complete vehicles specified in section 1961.2, title 13, CCR. Manufacturers that choose to comply with these optional heavy-duty standards and test procedures shall specify, in the application for certification, an in-use compliance test procedure, as provided in section 2139(c), Title 13, California Code of Regulations.

[B]"LEV" means low-emission vehicle.

"ULEV" means ultra-low-emission vehicle.

"SULEV" means super ultra-low-emission vehicle.

[C]This standard is the sum of the individual non-methane hydrocarbon emissions and oxides of nitrogen emissions. For methanol-fueled engines, non-methane hydrocarbons shall mean organic material hydrocarbon equivalent ("OMHCE").

[D]These standards apply only to diesel engines and vehicles.

[E]Manufacturers may certify engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles to these standards to meet the requirements of section 1956.8 (g), Title 13, California Code of Regulations.

[F]In-use compliance testing shall be limited to vehicles or engines with fewer than 90,000 miles.

[G][Reserved]

[H]For engines certified to the 3.5 grams per brake horsepower-hour (g/bhp-hr) LEV standards, the in-use compliance standard shall be 3.7 g/bhp-hr for the first two model years of introduction. For engines certified to the 2002 and 2003 model year LEV standards, the in-use compliance standard shall be 3.2 g/bhp-hr. For engines certified to the 1992 through 2003 model year ULEV standards, the in-use compliance standard shall be 2.7 g/bhp-hr for the first two model years of introduction. For engines certified to the 1992 and subsequent SULEV standards, the in-use compliance standard shall be 2.2 g/bhp-hr for the first two model years of introduction.

[I]Manufacturers have the option of certifying to either option A or B. Manufacturers electing to certify to Option A must demonstrate that the NMHC emissions do not exceed 0.5 g/bhp-hr.

[J]Emissions averaging may be used to meet these standards for diesel engines, using the requirements for participation in averaging, banking and trading programs, as set forth in the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," incorporated by reference in section 1956.8(b), above.

[K]Engines of 1998 and subsequent model years may be eligible to generate averaging, banking and trading credits based on these standards according to the requirements of the averaging, banking and trading programs described in the "California Exhaust Emission Standards and Test Procedures for 1985 through 2003 Model Heavy-Duty Diesel Engines and Vehicles" and the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," incorporated by reference in section 1956.8(b), above.

[L]For the 2005 and 2006 model years, these emission standards only apply to diesel engines and vehicles.

(3) 2007 and later model year engines subject to (h)(2) have the following Phase-in Options.

(A) Early NOx compliant engines. For model years 2007, 2008, and 2009, a manufacturer may, at their option, certify one or more of their engine families to the combined NOx plus NMHC standard or FEL applicable to model year 2006 engines under section 1956.8(h)(2), in lieu of the separate NOx and NMHC standards or FELs applicable to the 2007 and subsequent model years, specified in section 1956.8(h)(2). Each engine certified under this phase-in option must comply with all other emission requirements applicable to model year 2007 engines. To qualify for this option, a manufacturer must satisfy the U.S.-directed production requirement of certifying no more than 50 percent of engines to the NOx plus NMHC standards or FELs applicable to 2006 engines, as specified in 40

Code of Federal Regulations, part 86, section 86.007-11(g)(1), as adopted January 18, 2001. In addition, a manufacturer may reduce the quantity of engines that are required to be phased-in using the early certification credit program specified in 40 Code of Federal Regulations, part 86, section 86.007-11(g)(2), as adopted January 18, 2001, and the "Blue Sky" engine program specified in 40 Code of Federal Regulations, part 86, section 86.007-11(g)(4), as adopted January 18, 2001.

(B) Early PM compliant engines. A manufacturer certifying engines to the 2007 and subsequent model year PM standard listed in section 1956.8 (h)(2) (without using credits, as determined in any averaging, banking, or trading program described in "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," to comply with the standards) before model year 2007 may reduce the number of engines that are required to meet the 2007 and subsequent model year PM standard listed in section 1956.8(h)(2) in model year 2007, 2008 and/or 2009. To qualify for this option, a manufacturer must satisfy the PM emission requirements pursuant to the methods detailed in 40 Code of Federal Regulations, part 86, section 86.007-11(g)(2)(ii), as adopted January 18, 2001.

(4) No crankcase emissions shall be discharged directly into the ambient atmosphere from any new 2007 or later model year diesel heavy-duty diesel engine, with the following exception: heavy-duty diesel engines equipped with turbochargers, pumps, blowers, or superchargers for air induction may discharge crankcase emissions to the ambient atmosphere if the emissions are added to the exhaust emissions (either physically or mathematically) during all emission testing. Manufacturers taking advantage of this exception must manufacture the engines so that all crankcase emission can be routed into a dilution tunnel (or other sampling system approved in advance by the Executive Officer), and must account for deterioration in crankcase emissions when determining exhaust deterioration factors. For the purpose of section 1956.8(h)(2), crankcase emissions that are routed to the exhaust upstream of exhaust aftertreatment during all operation are not considered to be "discharged directly into the ambient atmosphere."

(5) *Optional Standards for Complete and Incomplete Heavy-Duty Vehicles that Use Heavy-Duty Diesel Engines*. Manufacturers may request to group complete and incomplete heavy-duty diesel vehicles into the same test group as medium-duty diesel vehicles certifying to the LEV III exhaust emission standards and test procedures specified in title 13, CCR, §1961.2, so long as those complete and incomplete heavy-duty diesel vehicles meet the most stringent LEV III standards to which any vehicle within that test group certifies.

(6) Greenhouse Gas Emission Standards for New 2014 and Subsequent Model Heavy-Duty Diesel Engines and 2016 and Subsequent Heavy-Duty Otto-Cycle Engines Used in Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super-Ultra-Low-Emission Vehicles.

(A) The CO_2 emissions from new 2014 and subsequent model heavy-duty diesel engines and new 2016 and subsequent heavy-duty Otto-cycle engines used in medium-duty low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles shall not exceed:

CO_2 Emission Standards for 2014 and Subsequent Model Heavy-Duty Diesel Engines and 2016 and Subsequent Model Heavy-Duty Otto-Cycle Engines Used in Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super-Ultra-Low Emission Vehicles [A, B] (in g/hp-hr)

Model Years	Diesel Engines [C]	Otto-Cycle Engines
2014	600	-
2015	600	-
2016	600	627
2017 and later	576	627

A *Family Certification Levels.* An FCL must be specified for each engine family, which may not be less than the certified emission level for the engine family. The FEL for the engine family is equal to the FCL multiplied by 1.03. The FCL serves as the CO_2 emission standard for the engine family with respect to certification and confirmatory testing instead of the standards specified in this subsection (h)(6)(A). The FEL serves as the emission standard for the engine family with respect to all other testing.

B *Averaging, Banking, and Trading Program and Credits.* The requirements for the optional averaging, banking, and trading program and for generating credits are described in the applicable test procedures incorporated by reference in subsection (b).

C *Alternate Emission Standards Based on 2011 Model Year Engines.* For model years 2014 through 2016, heavy-duty diesel engines may be certified to these alternate emission standards if they are not part of an averaging set in which a balance of banked credits remain. These alternate standards are determined from the measured emission rate of the test engine of the applicable baseline 2011 engine family(ies) as described in the California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles, as incorporated by reference in section (b). The alternate CO_2 standard for light heavy-duty vocational-certified engines is equal to the baseline 2011 emission rate multiplied by 0.975.

(B) The CH_4 emissions from new 2014 and subsequent model heavy-duty diesel engines and new 2016 and subsequent heavy-duty Otto-cycle engines used in medium-duty low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles shall not exceed 0.10 g/hp-hr.

(C) The N_2O emissions from new 2014 and subsequent model heavy-duty diesel engines and new 2016 and subsequent heavy-duty Otto-cycle engines used in medium-duty low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles shall not exceed 0.10 g/hp-hr.

(i) Definitions Specific to this Section. The following definitions apply to this section 1956.8.

(1) "Certified emission level" means the highest deteriorated emission level in an engine family for a given pollutant from the applicable transient and/or steady-state testing, rounded to the same number of decimal places as the applicable standard. Note that there may be two certified emission levels for CO_2 if a family is certified for both vocational and tractor use.

(2) "Family certification level" (FCL) means a CO_2 emission level declared by the manufacturer that is at or above emission test results for all emission-data engines. The FCL serves as the emission standard for the engine family with respect to certification testing if it is different than the otherwise applicable standard. The FCL must be expressed to the same number of decimal places as the emission standard it replaces.

(3) "Family emission limit" (FEL) means an emission level declared by the manufacturer to serve in place of an otherwise applicable emission standard (other than CO_2 standards) under the Average, Banking, and Trading Program. The FEL must be expressed to the same number of decimal places as the emission standard it replaces. The FEL serves as the emission standard for the engine family with respect to all required testing except certification testing for CO_2. The CO_2 FEL is equal to the CO_2 FCL multiplied by 1.03 and rounded to the same number of decimal places as the standard (e.g., the nearest whole g/hp-hr for the 2016 CO_2 standards).

(4) "Heavy heavy-duty engine" means an engine used in a vehicle that normally exceeds 33,000 pounds GVWR. Heavy heavy-duty engines are designed for multiple rebuilds and have cylinder liners. Vehicles in this group are normally tractors, trucks, and buses used in inter-city, long-haul applications.

(5) "Light heavy-duty engine" means an engine used in a vehicle that is normally below 19,500 pounds GVWR. Light heavy-duty engines usually are not designed for rebuild and do not have cylinder liners. Vehicle body types in this group might include any heavy-duty vehicle built for a light-duty truck chassis, van trucks, multi-stop vans, motor homes and other recreational vehicles, and some straight trucks with a single rear axle. Typical applications would include personal transportation, light-load commercial delivery, passenger service, agriculture, and construction.

(6) "Medium heavy-duty engine" mean an engine used in a vehicle that is normally between 19,500 to 33,000 pounds GVWR. Medium heavy-duty engines may be designed for rebuild and may have cylinder liners. Vehicle body types in this group would typically include school buses, straight trucks with dual rear axles, city tractors, and a variety of special purpose vehicles such as small dump trucks, and refuse trucks. Typical applications would include commercial short haul and intra-city delivery and pickup.

(7) "Primary intended service class" means the class that best describes the vehicle for which the manufacturer designs and markets the engine. The three primary intended service classes are light heavy-duty, medium heavy-duty, and heavy heavy-duty.

(8) "Tractor" means a vehicle meeting the definition of "tractor" in 40 CFR §1037.801, but not classified as a "vocational tractor" under 40 CFR §1037.630, or relating to such a vehicle.

(9) "Tractor engine" means an engine certified for use in tractors. Where an engine family is certified for use in both tractors and vocational vehicles, "tractor engine" means an engine that the engine manufacturer reasonably believes will be (or has been) installed in a tractor. Note that the Executive Officer may require a manufacturer to document how it determines that an engine is a tractor engine.

(10) "Vocational engine" means an engine certified for use in vocational vehicles. Where an engine family is certified for use in both tractors and vocational vehicles, "vocational engine" means an engine that the engine manufacturer reasonably believes will be (or has been) installed in a vocational vehicle. Note that the provisions of this part may require a manufacturer to document how it determines that an engine is a vocational engine.

(11) "Vocational vehicle" means a vehicle meeting the definition of "vocational" vehicle in 40 CFR §1037.801.

Note: Authority cited: Sections 38501, 38505, 38510, 38560, 38580, 39500, 39600, 39601, 40000, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43107 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39010, 39017, 39033, 39500, 39600, 39601, 39610, 39650, 39657, 39667, 39701, 40000, 43000, 43000.5, 43009, 43009.5, 43013, 43017, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43202, 43204, 43205, 43205.5, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

§1968.2.1. Malfunction and Diagnostic System Requirements--2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *Purpose.*

The purpose of this regulation is to reduce motor vehicle and motor vehicle engine emissions by establishing emission standards and other requirements for onboard diagnostic systems (OBD II systems) that are installed on 2004 and subsequent model-year passenger cars, light-duty trucks, and medium-duty vehicles and engines certified for sale in California. The OBD II systems, through the use of an onboard computer(s), shall monitor emission systems in-use for the actual life of the vehicle and shall be capable of detecting malfunctions of the monitored emission systems, illuminating a malfunction indicator light (MIL) to notify the vehicle operator of detected malfunctions, and storing fault codes identifying the detected malfunctions. The use and operation of OBD systems will ensure reductions in in-use motor vehicle and motor vehicle engine emissions through improvements of emission system durability and performance.

(b) *Applicability.*

Except as specified elsewhere in this regulation (title 13, CCR section 1968.2.1), all 2004 and subsequent model-year vehicles, defined as passenger cars, light-duty trucks, and medium-duty vehicles, including medium-duty vehicles with engines certified on an engine dynamometer and medium-duty passenger vehicles, shall be equipped with an OBD II system and shall meet all applicable requirements of this regulation (title 13, CCR section 1968.2.1). Except as specified in section (d)(2.2.5), medium-duty vehicles with engines certified on an engine dynamometer may comply with these requirements on an engine model year certification basis rather than a vehicle model year basis.

(c) *Definitions.*

"Actual life" refers to the entire period that a vehicle is operated on public roads in California up to the time a vehicle is retired from use.

"Alternate phase-in" is a phase-in schedule that achieves equivalent compliance volume by the end of the last year of a scheduled phase-in provided in this regulation. The compliance volume is the number calculated by multiplying the percent of vehicles (based on the manufacturer's projected sales volume of all vehicles unless specifically stated otherwise in section (e) or (f)) meeting the new requirements per year by the number of years implemented prior to and including the last year of the scheduled phase-in and then summing these yearly results to determine a cumulative total (e.g., a three year, 30/60/100 percent scheduled phase-in would be calculated as (30*3 years) + (60*2 years) + (100*1 year) = 310). On phase-ins scheduled to

begin prior to the 2004 model year, manufacturers are allowed to include vehicles introduced before the first year of the scheduled phase-in (e.g., in the previous example, 10 percent introduced one year before the scheduled phase-in begins would be calculated as (10*4 years) and added to the cumulative total). However, on phase-ins scheduled to begin in 2004 or subsequent model years, manufacturers are only allowed to include vehicles introduced up to one model year before the first year of the scheduled phase-in. The Executive Officer shall consider acceptable any alternate phase-in that results in an equal or larger cumulative total by the end of the last year of the scheduled phase-in and ensures that all vehicles subject to the phase-in will comply with the respective requirements no later than two model years following the last year of the scheduled phase-in.

For alternate phase-in schedules resulting in all vehicles complying one model year following the last year of the scheduled phase-in, the compliance volume shall be calculated as described directly above. For example, a 30/60/100 percent scheduled phase-in during the 2010-2012 model years would have a cumulative total of 310. If the manufacturer's planned alternate phase-in schedule is 40/50/80/100 percent during the 2010-2013 model years, the final compliance volume calculation would be (40*3 years) + (50*2 years) + (80*1 year) = 300, which is less than 310 and therefore would not be acceptable as an alternate phase-in schedule.

For alternate phase-in schedules resulting in all vehicles complying two model years following the last year of the scheduled phase-in, the compliance volume calculation shall be calculated as described directly above and shall also include a negative calculation for vehicles not complying until one or two model years following the last year of the scheduled phase-in. The negative calculation shall be calculated by multiplying the percent of vehicles not meeting the new requirements in the final year of the phase-in by negative one and the percent of vehicles not meeting the new requirements in the one year after the final year of the phase-in by negative two. For example, if 10 percent of a manufacturer's vehicles did not comply by the final year of the scheduled phase-in and 5 percent did not comply by the end of the first year after the final year of the scheduled phase-in, the negative calculation result would be (10*(-1 years)) + (5*(-2 years)) = -20. The final compliance volume calculation is the sum of the original compliance volume calculation and the negative calculation. For example, a 30/60/100 percent scheduled phase-in during the 2010-2012 model years would have a cumulative total of 310. If a manufacturer's planned alternate phase-in schedule is 40/70/80/90/100 percent during the 2010-2014 model years, the final compliance volume calculation would be (40*3 years) + (70*2 years) + (80*1 year) + (20*(-1 year)) + (10*(-2 years)) = 300, which is less than 310 and therefore would not be acceptable as an alternate phase-in schedule.

"*Applicable standards*" refers to the specific exhaust emission standards or family emission limits (FEL) of the Federal Test Procedure (FTP) to which the vehicle or engine is certified. For 2010 and subsequent model year diesel engines, "applicable standards" shall also refer to the specific exhaust emission standards or family

emission limits (FEL) of either the FTP or the Supplemental Emission Test (SET) to which the engine is certified, as determined according to section (d)(6).

"Auxiliary Emission Control Device (AECD)" refers to any approved AECD (as defined by 40 Code of Federal Regulations (CFR) 86.082-2 and 86.094-2).

"Emission Increasing Auxiliary Emission Control Device (EI-AECD)" refers to any approved AECD that: reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and use; and the need for the AECD is justified in terms of protecting the vehicle against damage or accident. For medium-duty vehicles certified to an engine dynamometer tailpipe emission standard, an AECD that is certified as an NTE deficiency shall not be considered an EI-AECD. An AECD that does not sense, measure, or calculate any parameter or command or trigger any action, algorithm, or alternate strategy shall not be considered an EI-AECD. An AECD that is activated solely due to any of the following conditions shall not be considered an EI-AECD: (1) operation of the vehicle above 8000 feet in elevation; (2) ambient temperature; (3) when the engine is warming up and is not reactivated once the engine has warmed up in the same driving cycle; (4) failure detection (storage of a fault code) by the OBD system; (5) execution of an OBD monitor; or (6) execution of an infrequent regeneration event.

"Base fuel schedule" refers to the fuel calibration schedule programmed into the Powertrain Control Module or PROM when manufactured or when updated by some off-board source, prior to any learned on-board correction.

"Calculated load value" refers to an indication of the percent engine capacity that is being used and is defined in Society of Automotive Engineers (SAE) J1979 "E/E Diagnostic Test Modes", (SAE J1979), incorporated by reference (section (g)(1.4)[1]). For diesel applications, in lieu of the definition in SAE J1979, the calculated load value may alternatively be determined by the ratio of current output torque to maximum output torque at current engine speed as defined by suspect parameter number (SPN) 92 of SAE J1939 "Recommended Practice for a Serial Control and Communications Vehicle Network" (SAE J1939), incorporated by reference.

"Confirmed fault code" is defined as the diagnostic trouble code stored when an OBD II system has confirmed that a malfunction exists (e.g., typically on the second driving cycle that the malfunction is detected) in accordance with the requirements of sections (e), (f), and (g)(4.4).

"Continuously," if used in the context of monitoring conditions for circuit continuity, lack of circuit continuity, circuit faults, and out-of-range values, means monitoring is always enabled, unless alternate enable conditions have been approved by the Executive Officer in accordance with section (d)(3.1.1), and sampling of the signal used for monitoring occurs at a rate no less than two samples per second. If for

[1] Unless otherwise noted, all section references refer to section 1968.2.1 of title 13, CCR.

control purposes, a computer input component is sampled less frequently, the signal of the component may instead be evaluated each time sampling occurs.

"Deactivate" means to turn-off, shutdown, desensitize, or otherwise make inoperable through software programming or other means during the actual life of the vehicle.

"Diagnostic or emission critical" electronic powertrain control unit refers to the engine and transmission control unit(s). For the 2005 and subsequent model years, it also includes any other on-board electronic powertrain control unit containing software that: (1) has primary control over any of the monitors required by sections (e)(1.0) through (e)(14.0), (e)(16.0), (f)(1) through (f)(14), and (f)(16) or, (2) excluding anti-lock brake system (ABS) control units or stability/traction control units, has primary control over the diagnostics for more than two of the components required to be monitored by sections (e)(15.0) and (f)(15). For purposes of criterion (2) above, all glow plugs in an engine shall be considered "one" component in lieu of each glow plug being considered a separate component.

"Diesel engines" refers to engines using a compression ignition thermodynamic cycle.

"Driving cycle" consists of engine startup and engine shutoff and includes the period of engine off time up to the next engine startup. For vehicles that employ engine shutoff strategies (e.g., engine shutoff at idle), the manufacturer may request Executive Officer approval to use an alternate definition for driving cycle (e.g., key on and key off). Executive Officer approval of the alternate definition shall be based on equivalence to engine startup and engine shutoff signaling the beginning and ending of a single driving event for a conventional vehicle. For applications that are used in both medium-duty and heavy-duty classes, the manufacturer may use the driving cycle definition of title 13, CCR, section 1971.1.1 in lieu of this definition. Engine restarts following an engine shut-off that has been neither commanded by the vehicle operator nor by the engine control strategy but caused by an event such as an engine stall may be considered a new driving cycle or a continuation of the existing driving cycle.

"*Emission standard*," as it applies to OBD compliance and the remedies provided for in the Health and Safety Code for noncompliance, relates to the emission characteristics of a motor vehicle and engine and means:

(1) a numerical limit on the amount of a given pollutant that a motor vehicle or motor vehicle engine may emit into the atmosphere; or

(2) a requirement that a motor vehicle or motor vehicle engine be equipped with a certain type of pollution-control device or some other design feature related to the control of emissions.

"Engine misfire" means lack of combustion in the cylinder due to absence of spark, poor fuel metering, poor compression, or any other cause. This does not include lack of combustion events in non-active cylinders due to default fuel shut-off or cylinder deactivation strategies.

"Engine start" is defined as the point when the engine reaches a speed 150 rpm below the normal, warmed-up idle speed (as determined in the drive position for vehicles equipped with an automatic transmission). For hybrid vehicles or for engines employing alternate engine start hardware or strategies (e.g., integrated starter and generators, etc.), the manufacturer may request Executive Officer approval to use an alternate definition for engine start (e.g., ignition key "on"). Executive Officer approval of the alternate definition shall be based on equivalence to an engine start for a conventional vehicle.

"*Evaporative emission standards*" are a subset of emission standards that refer to the specific motor vehicle fuel evaporative emission standards and test procedures incorporated by reference in title 13, CCR section 1976 to which a vehicle is certified.

"*Exhaust emission standards*" or "*tailpipe emission standards*" are a subset of emission standards that collectively refer to the specific FTP standards and SET standards to which a vehicle is certified.

"*Family Emission Limit (FEL)*" refers to the exhaust emission levels to which an engine family is certified under the averaging, banking, and trading program incorporated by reference in title 13, CCR section 1956.8.

"Fault memory" means information pertaining to malfunctions stored in the onboard computer, including fault codes, stored engine conditions, and MIL status.

"Federal Test Procedure (FTP) test" refers to an exhaust emission test conducted according to the test procedures incorporated by reference in title 13, CCR section 1961(d) that is used to determine compliance with the FTP standard to which a vehicle is certified.

"FTP cycle". For passenger vehicles, light-duty trucks, and medium-duty vehicles certified on a chassis dynamometer, FTP cycle refers to the driving schedule in Code of Federal Regulations (CFR) 40, Appendix 1, Part 86, section (a) entitled, "EPA Urban Dynamometer Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks." For medium-duty engines certified on an engine dynamometer, FTP cycle refers to the engine dynamometer schedule in CFR 40, Appendix 1, Part 86, section (f)(1), entitled, "EPA Engine Dynamometer Schedule for Heavy-Duty Otto-Cycle Engines," or section (f)(2), entitled, "EPA Engine Dynamometer Schedule for Heavy-Duty Diesel Engines."

"FTP standard" refers to the certification tailpipe exhaust emission full useful life standards and test procedures applicable to the FTP cycle and to the class to which the vehicle is certified.

"FTP full useful life standard" refers to the FTP standard applicable when the vehicle reaches the end of its full useful life as defined in the certification requirements and test procedures incorporated by reference in title 13, CCR section 1961(d).

"Fuel trim" refers to feedback adjustments to the base fuel schedule. Short-term fuel trim refers to dynamic or instantaneous adjustments. Long-term fuel trim refers

to much more gradual adjustments to the fuel calibration schedule than short-term trim adjustments.

"Fueled engine operation" is the state where any fuel is introduced into the engine for the purpose of combustion.

"Functional check" for an output component or system means verification of proper response of the component and system to a computer command.

"*Gasoline engine*" refers to an Otto-cycle engine or an alternate-fueled engine.

"*Hybrid vehicle*" refers to a vehicle (including a plug-in hybrid electric vehicle) that can draw propulsion energy from either or both of the following on-vehicle sources of stored energy: 1) a consumable fuel and 2) an energy storage device such as a battery, capacitor, or flywheel.

"*Keep-alive memory (KAM),*" for the purposes of this regulation, is defined as a type of memory that retains its contents as long as power is provided to the on-board control unit. KAM is not erased upon shutting off the engine but may be erased if power to the on-board control unit is interrupted (e.g., vehicle battery disconnected, fuse to control unit removed). In some cases, portions of KAM may be erased with a scan tool command to reset KAM.

"Key on, engine off position" refers to a vehicle with the ignition key in the engine run position (not engine crank or accessory position) but with the engine not running.

"Light-duty truck" is defined in title 13, CCR section 1900 (b).

"Low Emission Vehicle I application" refers to a vehicle or engine certified in California to the exhaust emission standards defined in title 13, CCR sections 1956.8(g), 1960.1(g)(1), and 1960.1(h)(1) for any of the following vehicle emission categories: Transitional Low Emission Vehicle (TLEV), Low Emission Vehicle (LEV), Ultra Low Emission Vehicle (ULEV), or Super Ultra Low Emission Vehicle (SULEV). Additionally, vehicles certified to Federal emission standards (bins) in California but categorized in a Low Emission Vehicle I vehicle emission category for purposes of calculating NMOG fleet average in accordance with the certification requirements and test procedures incorporated by reference in title 13, CCR section 1961 (d) are subject to all monitoring requirements applicable to Low Emission Vehicle I applications but shall use the Federal tailpipe emission standard (i.e., the Federal bin) for purposes of determining the malfunction thresholds in sections (e) and (f).

"MDV SULEV vehicles" refer only to medium-duty Low Emission Vehicle I applications certified to the SULEV vehicle emission category.

"*TLEV vehicles*" refer only to Low Emission Vehicle I applications certified to the TLEV vehicle emission category.

"LEV vehicles" refer only to Low Emission Vehicle I applications certified to the LEV vehicle emission category.

"ULEV vehicles" refer only to Low Emission Vehicle I applications certified to the ULEV vehicle emission category.

"Low Emission Vehicle II application" refers to a vehicle or engine certified in California to the exhaust emission standards defined in title 13, CCR section 1961, or optionally certified to the exhaust emission standards defined in title 13, CCR section 1956.8, for any of the following emission categories: LEV, ULEV, or SULEV. Additionally, except as provided for in sections (e)(17.1.3) and (f)(17.1.2), vehicles certified to Federal emission standards (bins) in California but categorized in a Low Emission Vehicle II vehicle emission category for purposes of calculating NMOG fleet average in accordance with the certification requirements and test procedures incorporated by reference in title 13, CCR section 1961 (d) are subject to all monitoring requirements applicable to Low Emission Vehicle II applications but shall use the Federal tailpipe emission standard (i.e., the Federal bin) for purposes of determining the malfunction thresholds in sections (e) and (f).

"PC/LDT SULEV II vehicles" refer only to passenger car and light-duty truck Low Emission Vehicle II applications certified to the SULEV vehicle emission category.

"MDV SULEV II vehicles" refer only to medium-duty Low Emission Vehicle II applications certified to the SULEV vehicle emission category.

"LEV II vehicles" refer only to Low Emission Vehicle II applications certified to the LEV vehicle emission category.

"ULEV II vehicles" refer only to Low Emission Vehicle II applications certified to the ULEV vehicle emission category.

"Malfunction" means any deterioration or failure of a component that causes the performance to be outside of the applicable limits in sections (e) and (f).

"Medium-duty vehicle" is defined in title 13, CCR section 1900 (b).

"Medium-duty passenger vehicle" or *"MDPV"* is defined in Title 40, Section 86.1803-01, Code of Federal Regulations.

"*Non-volatile random access memory (NVRAM)*," for the purposes of this regulation, is defined as a type of memory that retains its contents even when power to the on-board control unit is interrupted (e.g., vehicle battery disconnected, fuse to control unit removed). NVRAM is typically made non-volatile either by use of a back-up battery within the control unit or through the use of an electrically erasable and programmable read-only memory (EEPROM) chip.

"Not-To-Exceed (NTE) control area" refers to the bounded region of the engine's torque and speed map, as defined in 40 CFR 86.1370-2007, where emissions must not exceed a specific emission cap for a given pollutant under the NTE requirement.

"Manufacturer-specific NOx NTE carve-out area" refers to regions within the NTE control area for NOx where the manufacturer has limited NTE testing as allowed by 40 CFR 86.1370-2007(b)(7).

"Manufacturer-specific PM NTE carve-out area" refers to regions within the NTE control area for PM where the manufacturer has limited NTE testing as allowed by 40 CFR 86.1370-2007(b)(7).

"NTE deficiency" refers to regions or conditions within the NTE control area for NOx or PM where the manufacturer has received a deficiency as allowed by 40 CFR 86.007-11(a)(4)(iv).

"Normal production" is the time after the start of production when the manufacturer has produced two percent of the projected volume for the test group or calibration, whichever is being evaluated in accordance with section (j).

"Passenger car" is defined in title 13, CCR section 1900 (b).

"Pending fault code" is defined as the diagnostic trouble code stored upon the initial detection of a malfunction (e.g., typically on a single driving cycle) prior to illumination of the MIL in accordance with the requirements of sections (e), (f), and (g)(4.4).

"Percentage of misfire" as used in (e)(3.2) and (f)(3.2) means the percentage of misfires out of the total number of firing events for the specified interval.

"*Permanent fault code*" is defined as a confirmed fault code that is currently commanding the MIL on and is stored in NVRAM as specified in sections (d)(2) and (g)(4.4).

"*Plug-in hybrid electric vehicle*" refers to a hybrid vehicle that has the capability to charge a battery from an off-vehicle electric energy source that cannot be connected or coupled to the vehicle in any manner while the vehicle is being driven.

"Power Take-Off (PTO) unit" refers to an engine driven output provision for the purposes of powering auxiliary equipment (e.g., a dump-truck bed, aerial bucket, or tow-truck winch).

"Propulsion system active" is the state where the powertrain (e.g., engine, electric machine) is enabled by the driver (e.g., after ignition on for conventional vehicles, after power button pushed for some hybrid vehicles, or after remote start activation) such that the vehicle is ready to be used (e.g., vehicle is ready to be driven, ready to be shifted from "park" to "drive", heating, ventilation, and air conditioning (HVAC) turned on to condition cabin prior to driving). For purposes of this definition, "the state where the powertrain is enabled" does not include activations that are not driver-initiated (e.g., conditions where portions of the vehicle system wake up to perform OBD II monitoring or off-board charging).

"Rationality fault diagnostic" for an input component means verification of the accuracy of the input signal while in the range of normal operation and when compared to all other available information.

"Redline engine speed" shall be defined by the manufacturer as either the recommended maximum engine speed as normally displayed on instrument panel tachometers or the engine speed at which fuel shutoff occurs.

"Response rate" for exhaust gas sensors refers to the delay from when the sensor is exposed to a different make-up of exhaust gas constituents until it outputs a signal reflecting the different make-up of exhaust gas constituents. For example, for oxygen sensors, response rate is the delay from when the oxygen sensor is exposed to a change in exhaust gas from richer/leaner than stoichiometric to leaner/richer than stoichiometric to the time when the oxygen sensor indicates the lean/rich condition. Similarly, for wide-range air-fuel (A/F) sensors, response rate is the delay from when the sensor is exposed to a different A/F ratio to the time it indicates the different A/F ratio. For NOx and PM sensors, response rate is the delay from when the sensor is exposed to a different NOx or PM exhaust gas level until it indicates the different NOx or PM exhaust gas level.

"SC03 emission standards" refers to the certification tailpipe exhaust emission standards for the air conditioning (A/C) test of the Supplemental Federal Test Procedure Off-Cycle Emission Standards specified in title 13, CCR section 1961(a) applicable to the class to which the vehicle is certified.

"Secondary air" refers to air introduced into the exhaust system by means of a pump or aspirator valve or other means that is intended to aid in the oxidation of HC and CO contained in the exhaust gas stream.

"Similar conditions" as used in sections (e)(3), (e)(6), (f)(3), and (f)(4) means engine conditions having an engine speed within 375 rpm, load conditions within 20 percent, and the same warm-up status (i.e., cold or hot) as the engine conditions stored pursuant to (e)(3.4.4), (e)(6.4.5), (f)(3.4.2)(C), and (f)(4.4.2)(E). The Executive Officer may approve other definitions of similar conditions based on comparable timeliness and reliability in detecting similar engine operation.

"Small volume manufacturer" is defined in title 13, CCR section 1900(b). However, for a manufacturer that transitions from a small volume manufacturer to a non-small volume manufacturer, the manufacturer is still considered a small volume manufacturer for the first three model years that it no longer meets the definition in title 13, CCR section 1900(b).

"Supplemental Emission Test (SET) cycle" refers to the driving schedule defined as the "supplemental steady state emission test" in 40 CFR 86.1360-2007, as amended July 13, 2005.

"SET standard" refers to the certification exhaust emission standards and test procedures applicable to the SET cycle incorporated by reference in title 13, CCR sections 1956.8(b) and (d) to which the engine is certified.

"Unified cycle" is defined in "Speed Versus Time Data for California's Unified Driving Cycle", dated December 12, 1996, incorporated by reference.

"US06 cycle" refers to the driving schedule in 40 CFR 86, Appendix 1, section (g), as amended July 13, 2005, entitled, "EPA US06 Driving Schedule for Light-Duty Vehicles and Light-Duty Trucks."

"Warm-up cycle" means a driving cycle with sufficient vehicle operation such that the coolant temperature has risen by at least 40 degrees Fahrenheit from engine starting and reaches a minimum temperature of at least 160 degrees Fahrenheit (140 degrees Fahrenheit for applications with diesel engines). Alternatively, manufacturers may define warm-up cycle as a driving cycle with vehicle operation in which the criteria specified in sections (d)(2.5.2)(B)(iii)a., b., and c. are met.

(d) *General Requirements.*

Section (d) sets forth the general requirements of the OBD II system. Specific performance requirements for components and systems that shall be monitored are set forth in sections (e) and (f) below.

(1) *The OBD II System.*

(1.1) If a malfunction is present as specified in sections (e) and (f), the OBD II system shall detect the malfunction, store a pending or confirmed fault code in the onboard computer's memory, and illuminate the MIL as required.

(1.2) The OBD II system shall be equipped with a standardized data link connector to provide access to the stored fault codes as specified in section (g).

(1.3) The OBD II system shall be designed to operate, without any required scheduled maintenance, for the actual life of the vehicle in which it is installed and may not be programmed or otherwise designed to deactivate based on age and/or mileage of the vehicle during the actual life of the vehicle. This section is not intended to alter existing law and enforcement practice regarding a manufacturer's liability for a vehicle beyond its useful life, except where a vehicle has been programmed or otherwise designed so that an OBD II system deactivates based on age and/or mileage of the vehicle.

(1.4) Computer-coded engine operating parameters may not be changeable without the use of specialized tools and procedures (e.g. soldered or potted computer components or sealed (or soldered) computer enclosures). Subject to Executive Officer approval, manufacturers may exempt from this requirement those product lines that are unlikely to require protection. Criteria to be evaluated in making an exemption include current availability of performance chips, high performance capability of the vehicle, and sales volume.

(2) *MIL and Fault Code Requirements.*

(2.1) MIL Specifications.

(2.1.1) The MIL shall be located on the driver's side instrument panel and be of sufficient illumination and location to be readily visible under all lighting conditions and shall be amber in color when illuminated. The MIL, when illuminated, shall display the phrase "Check Engine" or "Service Engine Soon". The word "Powertrain" may be substituted for "Engine" in the previous phrases. Alternatively, the International Standards Organization (ISO) engine symbol may be substituted for the word "Engine" or for the entire phrase.

(2.1.2) The MIL shall illuminate in the key on, engine off position before engine cranking to indicate that the MIL is functional. For all 2005 and subsequent model year vehicles, the MIL shall continuously illuminate during this functional check for a minimum of 15-20 seconds. During this functional check of the MIL, the data stream value for MIL status shall indicate commanded off (see section (g)(4.2)) unless the MIL has also been commanded on for a detected malfunction. This functional check of the MIL is not required during vehicle operation in the key on, engine off position subsequent to the initial engine cranking of each driving cycle (e.g., due to an engine stall or other non-commanded engine shutoff).

(2.1.3) At the manufacturer's option, the MIL may be used to indicate readiness status in a standardized format (see section (g)(4.1.3)) in the key on, engine off position.

(2.1.4) A manufacturer may request Executive Officer approval to also use the MIL to indicate which, if any, fault codes are currently stored (e.g., to "blink" the stored codes). The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated that the method used to indicate the fault codes will not be activated during a California Inspection and Maintenance test or during routine driver operation.

(2.1.5) The MIL may not be used for any purpose other than specified in this regulation.

(2.2) MIL Illumination and Fault Code Storage Protocol.

(2.2.1) Upon detection of a malfunction, the OBD system shall store a pending fault code within ten seconds indicating the likely area of the malfunction.

(2.2.2) After storage of a pending fault code, if the identified malfunction is again detected before the end of the next driving cycle in which monitoring occurs, the MIL shall illuminate continuously and a confirmed fault code shall be stored within 10 seconds. If a malfunction is not detected before the end of the next driving cycle in which monitoring occurs (i.e., there is no indication of the malfunction at any time during the driving cycle), the corresponding pending fault code set according to section (d)(2.2.1) shall be erased at the end of the driving cycle.

(2.2.3) The OBD system shall illuminate the MIL and store a fault code within 10 seconds to inform the vehicle operator whenever the powertrain enters a default or "limp home" mode of operation that can affect emissions or the performance of the OBD II system or in the event of a malfunction of an on-board computer(s) itself that can affect the performance of the OBD II system.

(A) If the default or "limp home" mode of operation is recoverable (i.e., the diagnostic or control strategy that caused the default or "limp home" mode of operation can run on the next driving cycle and confirm the presence of the condition that caused the default or "limp home" operation), the OBD II

system may, in lieu of illuminating the MIL within 10 seconds on the first driving cycle where the default or "limp home" mode of operation is entered, delay illumination of the MIL until the condition causing the default or "limp home" mode of operation is again detected before the end of the next driving cycle.

(B) MIL illumination and fault code storage is not required for engine overtemperature default strategies that are only initiated after the temperature gauge indicates a temperature in the red zone, or after an overtemperature "hot" light is illuminated, or due to the verified occurrence of severe operating conditions (e.g., extended trailer towing up a grade).

(2.2.4) For all 2010 and subsequent model year vehicles, the OBD II system shall default to a MIL on state if the instrument panel receives and/or processes instructions or commands from other diagnostic or emission critical electronic powertrain control units to illuminate the MIL and a malfunction occurs (e.g., communication is lost) such that the instrument panel is no longer able to properly receive the MIL illumination requests. Storage of a fault code is not required for this malfunction.

(2.2.5) For 50 percent of all 2010, 75 percent of all 2011, and 100 percent of all 2012 and subsequent model year vehicles (including 2012 model year medium-duty vehicles with 2011 model year engines certified on an engine dynamometer), before the end of an ignition cycle, the OBD II system shall store confirmed fault codes that are currently causing the MIL to be illuminated in NVRAM as permanent fault codes (as defined in section (g)(4.4.6)).

(2.2.6) A manufacturer may request Executive Officer approval to employ alternate statistical MIL illumination and fault code storage protocols to those specified in these requirements. The Executive Officer shall grant approval upon determining that the manufacturer has provided data and/or engineering evaluation that demonstrate that the alternative protocols can evaluate system performance and detect malfunctions in a manner that is equally effective and timely. Except as otherwise provided in section (e) for evaporative system malfunctions, strategies requiring on average more than six driving cycles for MIL illumination may not be accepted.

(2.2.7) A manufacturer shall store and erase "freeze frame" conditions (as defined in section (g)(4.3)) present at the time a malfunction is detected. A manufacturer shall store and erase freeze frame conditions in conjunction with storage and erasure of either pending or confirmed fault codes as required elsewhere in section (d)(2.2).

(2.3) Extinguishing the MIL.

Except as otherwise provided in sections (e)(3.4.5), (e)(4.4.2), (e)(6.4.6), (f)(3.4.2)(D), and (f)(4.4.2)(F) for misfire, evaporative system, and fuel system malfunctions, once the MIL has been illuminated it may be extinguished after

three subsequent sequential driving cycles during which the monitoring system responsible for illuminating the MIL functions and the previously detected malfunction is no longer present provided no other malfunction has been detected that would independently illuminate the MIL according to the requirements outlined above.

(2.4) Erasing a confirmed fault code. The OBD II system may erase a confirmed fault code if the identified malfunction has not been again detected in at least 40 engine warm-up cycles, and the MIL is presently not illuminated for that malfunction.

(2.5) Erasing a permanent fault code. The OBD system shall erase a permanent fault code under the following conditions:

(2.5.1) If the OBD II system is commanding the MIL on, the OBD II system shall erase a permanent fault code only if the OBD II system itself determines that the malfunction that caused the permanent fault code to be stored is no longer present and is not commanding the MIL on, pursuant to the requirements of section (d)(2.3) (which for purposes of this section shall apply to all monitors). Erasure of the permanent fault code shall occur in conjunction with extinguishing the MIL or no later than the start of the first driving cycle that begins with the MIL commanded off.

(2.5.2) If all fault information in the on-board computer other than the permanent fault code has been cleared (i.e., through the use of a scan tool or battery disconnect) and the OBD II system is not commanding the MIL on:

(A) Except as provided for in sections (d)(2.5.2)(C) through (E), if the monitor of the malfunction that caused the permanent fault code to be stored is subject to the minimum ratio requirements of section (d)(3.2) (e.g., catalyst monitor, comprehensive component input component rationality monitors), the OBD II system shall erase the permanent fault code at the end of a driving cycle if the monitor has run and made one or more determinations during a driving cycle that the malfunction of the component or the system is not present and has not made any determinations within the same driving cycle that the malfunction is present.

(B) Except as provided for in sections (d)(2.5.2)(D) and (E), if the monitor of the malfunction that caused the permanent fault code to be stored is not subject to the minimum ratio requirements of section (d)(3.2) (e.g., gasoline misfire monitor, fuel system monitor, comprehensive component circuit continuity monitors), the OBD II system shall erase the permanent fault code at the end of a driving cycle if:

(i) The monitor has run and made one or more determinations during a driving cycle that the malfunction of the component or the system is not present and has not made any determinations within the same driving cycle that the malfunction is present;

(ii) The monitor has not made any determinations that the malfunction is present subsequent to the most recent driving cycle in which the criteria of section (d)(2.5.2)(B)(i) are met; and

(iii) The following criteria are satisfied on any single driving cycle (which may be a different driving cycle than that in which the criteria of section (d)(2.5.2)(B)(i) are satisfied):

a. Except as provided in section (d)(2.5.2)(B)(iii)f. below, cumulative time since engine start is greater than or equal to 600 seconds;

b. Except as provided in section (d)(2.5.2)(B)(iii)e. below, cumulative vehicle operation at or above 25 miles per hour occurs for greater than or equal to 300 seconds (medium-duty vehicles with diesel engines certified on an engine dynamometer may use cumulative operation at or above 1150 rpm in lieu of at or above 25 miles per hour for purposes of this criteria);

c. Continuous vehicle operation at idle (i.e., accelerator pedal released by driver and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle (as determined in the drive position for vehicles equipped with an automatic transmission)) for greater than or equal to 30 seconds; and

d. For 2013 and subsequent model year engines, the monitor has not made any determination that the malfunction is present.

e. For 2004 through 2012 model year medium-duty vehicles with diesel engines certified on an engine dynamometer, manufacturers may use diesel engine operation at or above 15 percent calculated load in lieu of 1150 rpm for the criterion in section (d)(2.5.2)(B)(iii)b. above.

f. For hybrid vehicles, manufacturers shall use "cumulative propulsion system active time" in lieu of "cumulative time since engine start" for the criterion in section (d)(2.5.2)(B)(iii)a.

(iv) Monitors required to use "similar conditions" as defined in section (c) to store and erase pending and confirmed fault codes may not require that the similar conditions be met prior to erasure of the permanent fault code.

(C) For monitors subject to section (d)(2.5.2)(A), the manufacturer may choose to erase the permanent fault code using the criteria under section (d)(2.5.2)(B) in lieu of the criteria under section (d)(2.5.2)(A).

(D) For 2009 and 2010 model year vehicles meeting the permanent fault code requirements of section (d)(2.2.5), manufacturers may request Executive Officer approval to use alternate criteria to erase the permanent fault code. The Executive Officer shall approve alternate criteria that:

(i) Will not likely require driving conditions that are longer and more difficult to meet than those required under section (d)(2.5.2)(B), and

(ii) Do not require access to enhanced scan tools (i.e., tools that are not generic SAE J1978 scan tools) to determine conditions necessary to erase the permanent fault code.

(E) If alternate criteria to erase the permanent fault code are approved by the Executive Officer under section (d)(2.5.2)(D), a manufacturer may continue to use the approved alternate criteria for 2011 model year vehicles previously certified in the 2009 or 2010 model year to the alternate criteria and carried over to the 2011 model year.

(3) *Monitoring Conditions.*

Section (d)(3) sets forth the general monitoring requirements while sections (e) and (f) set forth the specific monitoring requirements as well as identify which of the following general monitoring requirements in section (d)(3) are applicable for each monitored component or system identified in sections (e) and (f).

(3.1) For all 2004 and subsequent model year vehicles:

(3.1.1) As specifically provided for in sections (e) and (f), manufacturers shall define monitoring conditions, subject to Executive Officer approval, for detecting malfunctions identified in sections (e) and (f). The Executive Officer shall approve manufacturer defined monitoring conditions that are determined (based on manufacturer submitted data and/or other engineering documentation) to be: technically necessary to ensure robust detection of malfunctions (e.g., avoid false passes and false indications of malfunctions), designed to ensure monitoring will occur under conditions which may reasonably be expected to be encountered in normal urban vehicle operation and use, and designed to ensure monitoring will occur during the FTP cycle or Unified cycle.

(3.1.2) Monitoring shall occur at least once per driving cycle in which the monitoring conditions are met.

(3.1.3) Manufacturers may request Executive Officer approval to define monitoring conditions that are not encountered during the FTP cycle or Unified cycle as required in section (d)(3.1.1). In evaluating the manufacturer's request, the Executive Officer shall consider the degree to which the requirement to run during the FTP or Unified cycle restricts in-use monitoring, the technical necessity for defining monitoring conditions that are not encountered during the FTP or Unified cycle, data and/or an engineering evaluation submitted by the manufacturer which demonstrate that the component/system does not normally function, or monitoring is otherwise not feasible, during the FTP or Unified cycle, and, where applicable in section (d)(3.2), the ability of the manufacturer to demonstrate the monitoring conditions will satisfy the minimum acceptable in-use monitor performance ratio requirement as defined in section (d)(3.2) (e.g., data which show in-use driving meets the

minimum requirements).

(3.2) As specifically provided for in sections (e) and (f), manufacturers shall define monitoring conditions in accordance with the criteria in sections (d)(3.2.1) through (3.2.3). The requirements of section (d)(3.2) shall be phased in as follows: 30 percent of all 2005 model year vehicles, 60 percent of all 2006 model year vehicles, and 100 percent of all 2007 and subsequent model year vehicles. Manufacturers may use an alternate phase-in schedule in lieu of the required phase-in schedule if the alternate phase-in schedule provides for equivalent compliance volume as defined in section (c) with the exception that 100 percent of 2007 and subsequent model year vehicles shall comply with the requirements. Small volume manufacturers shall meet the requirements on 100 percent of 2007 and subsequent model year vehicles but shall not be required to meet the specific phase-in requirements for the 2005 and 2006 model years.

(3.2.1) Manufacturers shall define monitoring conditions that, in addition to meeting the criteria in section (d)(3.1), ensure that the monitor yields an in-use performance ratio (as defined in section (d)(4)) that meets or exceeds the minimum acceptable in-use monitor performance ratio on in-use vehicles. For purposes of this regulation, except as provided below in section (d)(3.2.1)(D), the minimum acceptable in-use monitor performance ratio is:

(A) 0.260 for secondary air system monitors and other cold start related monitors utilizing a denominator incremented in accordance with section (d)(4.3.2)(E);

(B) For evaporative system monitors:

(i) 0.260 for monitors designed to detect malfunctions identified in section (e)(4.2.2)(C) (i.e., 0.020 inch leak detection); and

(ii) 0.520 for monitors designed to detect malfunctions identified in section (e)(4.2.2)(A) and (B) (i.e., purge flow and 0.040 inch leak detection);

(C) 0.336 for catalyst, oxygen sensor, EGR, VVT system, and all other monitors specifically required in sections (e) and (f) to meet the monitoring condition requirements of section (d)(3.2);

(D) For interim years:

(i) through the 2007 model year, for the first three years a vehicle is certified to the in-use performance ratio monitoring requirements of section (d)(3.2), 0.100 for all monitors specified in section (d)(3.2.1)(A) through (C) above. For example, the 0.100 ratio shall apply to the 2004, 2005, and 2006 model years for vehicles first certified in the 2004 model year and to the 2007, 2008, and 2009 model years for vehicles first certified in the 2007 model year;

(ii) through the 2014 model year, for fuel system air-fuel ratio cylinder

imbalance monitors, 0.100;

(iii) through the 2011 model year, for secondary exhaust gas sensor monitors specified in (e)(7.2.2)(C), 0.100;

(iv) through the 2012 model year, for vehicles subject to the monitoring requirements of section (f), 0.100 for all monitors specified in section (d)(3.2.1)(C) above;

(v) through the 2016 model year for plug-in hybrid electric vehicles, 0.100 for all monitors specifically required in sections (e) and (f) to meet the monitoring condition requirements of section (d)(3.2) and that are for systems or components that require engine operation;

(vi) for 2016 through 2018 model year medium-duty vehicles certified to an engine dynamometer tailpipe emission standard, 0.100 for diesel PM filter filtering performance monitors (section (f)(9.2.1)) and missing substrate monitors (section (f)(9.2.5)) not using the denominator criteria in section(d)(4.3.2)(G).

(3.2.2) In addition to meeting the requirements of section (d)(3.2.1), manufacturers shall implement software algorithms in the OBD II system to individually track and report in-use performance of the following monitors in the standardized format specified in section (d)(5):

a. Catalyst (section (e)(1.3) or, where applicable, (f)(1.3));

b. Oxygen/exhaust gas sensor (section (e)(7.3.1)(A) or, where applicable, (f)(5.3.1)(A));

c. Evaporative system (section (e)(4.3.2));

d. EGR system (section (e)(8.3.1)) and VVT system (section (e)(13.3) or, where applicable, (f)(6.3.1)(A), (f)(6.3.2), (f)(6.3.4), and, (f)(13.3));

e. Secondary air system (section (e)(5.3.2)(B));

f. PM filter (section (f)(9.3));

g. NOx adsorber (section (f)(8.3.1)) and NOx catalyst (section (f)(2.3.1));

h. Secondary oxygen sensor (section (e)(7.3.2)(A));

i. Boost pressure control system (sections (f)(7.3.2) and (f)(7.3.3)); and

j. Fuel system (section (f)(4.3.3)).

The OBD II system is not required to track and report in-use performance for monitors other than those specifically identified above.

(3.2.3) Manufacturers may not use the calculated ratio (or any element thereof) or any other indication of monitor frequency as a monitoring condition for any

monitor (e.g., using a low ratio to enable more frequent monitoring through diagnostic executive priority or modification of other monitoring conditions, or using a high ratio to enable less frequent monitoring).

(4) *In-Use Monitor Performance Ratio Definition.*

(4.1) For monitors required to meet the minimum in-use monitor performance ratio in section (d)(3.2.1), the ratio shall be calculated in accordance with the following specifications for the numerator, denominator, and ratio.

(4.2) Numerator Specifications

(4.2.1) Definition: The numerator is defined as a measure of the number of times a vehicle has been operated such that all monitoring conditions necessary for a specific monitor to detect a malfunction have been encountered.

(4.2.2) Specifications for incrementing:

(A) Except as provided for in sections (d)(4.2.2)(E) and (F), the numerator, when incremented, shall be incremented by an integer of one. The numerator may not be incremented more than once per driving cycle.

(B) The numerator for a specific monitor shall be incremented within ten seconds if and only if the following criteria are satisfied on a single driving cycle:

(i) Every monitoring condition necessary for the monitor of the specific component to detect a malfunction and store a pending fault code has been satisfied, including enable criteria, presence or absence of related fault codes, sufficient length of monitoring time, and diagnostic executive priority assignments (e.g., diagnostic "A" must execute prior to diagnostic "B", etc.). For the purpose of incrementing the numerator, satisfying all the monitoring conditions necessary for a monitor to determine the component is passing may not, by itself, be sufficient to meet this criteria;

(ii) For monitors that require multiple stages or events in a single driving cycle to detect a malfunction, every monitoring condition necessary for all events to have completed must be satisfied;

(iii) For monitors that require intrusive operation of components to detect a malfunction, a manufacturer shall request Executive Officer approval of the strategy used to determine that, had a malfunction been present, the monitor would have detected the malfunction. Executive Officer approval of the request shall be based on the equivalence of the strategy to actual intrusive operation and the ability of the strategy to accurately determine if every monitoring condition necessary for the intrusive event to occur was satisfied.

(iv) In addition to the requirements of section (d)(4.2.2)(B)(i) through (iii) above, the secondary air system monitor numerator(s) shall be

incremented if and only if the criteria in section (B) above have been satisfied during normal operation of the secondary air system for vehicles that require monitoring during normal operation (sections (e)(5.2.2) through (5.2.4)). Monitoring during intrusive operation of the secondary air system later in the same driving cycle solely for the purpose of monitoring may not, by itself, be sufficient to meet this criteria.

(C) For monitors that can generate results in a "gray zone" or "non-detection zone" (i.e., results that indicate neither a passing system nor a malfunctioning system) or in a "non-decision zone" (e.g., monitors that increment and decrement counters until a pass or fail threshold is reached), the manufacturer shall submit a plan for appropriate incrementing of the numerator to the Executive Officer for review and approval. In general, the Executive Officer shall not approve plans that allow the numerator to be incremented when the monitor indicates a result in the "non-detection zone" or prior to the monitor reaching a decision. In reviewing the plan for approval, the Executive Officer shall consider data and/or engineering evaluation submitted by the manufacturer demonstrating the expected frequency of results in the "non-detection zone" and the ability of the monitor to accurately determine if a monitor would have detected a malfunction instead of a result in the "non-detection zone" had an actual malfunction been present.

(D) For monitors that run or complete during engine off operation, the numerator shall be incremented within 10 seconds after the monitor has completed during engine off operation or during the first 10 seconds of engine start on the subsequent driving cycle.

(E) Except as specified in section (d)(4.2.2)(F) for exponentially weighted moving averages, manufacturers utilizing alternate statistical MIL illumination protocols as allowed in section (d)(2.2.6) for any of the monitors requiring a numerator shall submit a plan for appropriate incrementing of the numerator to the Executive Officer for review and approval. Executive Officer approval of the plan shall be conditioned upon the manufacturer providing supporting data and/or engineering evaluation for the proposed plan, the equivalence of the incrementing in the manufacturer's plan to the incrementing specified in section (d)(4.2.2) for monitors using the standard MIL illumination protocol, and the overall equivalence of the manufacturer's plan in determining that the minimum acceptable in-use performance ratio in section (d)(3.2.1) is satisfied.

(F) Manufacturers using an exponentially weighted moving average (EWMA) as the alternate statistical MIL illumination protocol approved in accordance with section (d)(2.2.6) shall increment the numerator as follows:

(i) Following a reset or erasure of the EWMA result, the numerator may not be incremented until after the requisite number of decisions necessary for MIL illumination have been fully executed.

(ii) After the number of decisions required in section (d)(4.2.2)(F)(i) above, the numerator, when incremented, shall be incremented by an integer of one and may not be incremented more than once per driving cycle. Incrementing of the numerator shall also be in accordance with sections (d)(4.2.2)(B), (C), and (D).

(4.3) Denominator Specifications

(4.3.1) Definition: The denominator is defined as a measure of the number of times a vehicle has been operated as defined in (d)(4.3.2).

(4.3.2) Specifications for incrementing:

(A) The denominator, when incremented, shall be incremented by an integer of one. The denominator may not be incremented more than once per driving cycle.

(B) Except as provided for in sections (d)(4.3.2)(H), (J), and (K), the denominator for each monitor shall be incremented within ten seconds if and only if the following criteria are satisfied on a single driving cycle:

(i) Cumulative time since engine start is greater than or equal to 600 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit;

(ii) Except as provided in section (d)(4.3.2)(B)(iv) below, cumulative vehicle operation at or above 25 miles per hour occurs for greater than or equal to 300 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit (medium-duty vehicles with diesel engines certified on an engine dynamometer may use cumulative operation at or above 1150 rpm in lieu of at or above 25 miles per hour for purposes of this criteria);

(iii) Continuous vehicle operation at idle (i.e., accelerator pedal released by driver and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle (as determined in the drive position for vehicles equipped with an automatic transmission)) for greater than or equal to 30 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit.

(iv) For 2004 through 2012 model year medium-duty vehicles with diesel engines certified on an engine dynamometer, manufacturers may use diesel engine operation at or above 15 percent calculated load in lieu of 1150 rpm for the criterion in section (d)(4.3.2)(B)(ii) above.

(C) In addition to the requirements of section (d)(4.3.2)(B) above, the secondary air system monitor denominator(s) shall be incremented if and only if commanded "on" operation of the secondary air system occurs for a

time greater than or equal to ten seconds. For purposes of determining this commanded "on" time, the OBD II system may not include time during intrusive operation of the secondary air system solely for the purposes of monitoring;

(D) Except as provided for in sections (d)(4.3.2)(D)(iv) and (d)(4.3.2)(L), the evaporative system monitor denominator(s) shall be incremented if and only if:

(i) The requirements of section (d)(4.3.2)(B) have been met;

(ii) Cumulative time since engine start is greater than or equal to 600 seconds while at an ambient temperature of greater than or equal to 40 degrees Fahrenheit but less than or equal to 95 degrees Fahrenheit; and

(iii) Engine cold start occurs with engine coolant temperature at engine start greater than or equal to 40 degrees Fahrenheit but less than or equal to 95 degrees Fahrenheit and less than or equal to 12 degrees Fahrenheit higher than ambient temperature at engine start.

(iv) For plug-in hybrid electric vehicles, manufacturers may choose to increment the evaporative system denominator(s) using the criteria under section (d)(4.3.2)(L) in lieu of the criteria under sections (d)(4.3.2)(D)(i) through (iii) above.

(E) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator(s) for the following monitors shall be incremented if and only if the component or strategy is commanded "on" for a time greater than or equal to ten seconds:

(i) Heated catalyst (section (e)(2))

(ii) Cold Start Emission Reduction Strategy (sections (e)(11) and (f)(12))

(iii) Components or systems that operate only at engine start-up (e.g., glow plugs, intake air heaters, etc.) and are subject to monitoring under "other emission control or source devices" (sections (e)(16) and (f)(16)) or comprehensive component output components (sections (e)(15) and (f)(15))

For purposes of determining this commanded "on" time, the OBD II system may not include time during intrusive operation of any of the components or strategies later in the same driving cycle solely for the purposes of monitoring.

(F) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator(s) for the following monitors of components (except those operated only at engine start-up and subject to the requirements of the previous section (d)(4.3.2)(E)) shall be incremented if and only if the component is commanded to function (e.g., commanded "on", "open",

"closed", "locked", etc.) on two or more occasions for greater than two seconds during the driving cycle or for a cumulative time greater than or equal to ten seconds, whichever occurs first:

(i) Air conditioning system (section (e)(12))

(ii) Variable valve timing and/or control system (sections (e)(13) and (f)(13))

(iii) "Other emission control or source device" (sections (e)(16) and (f)(16))

(iv) Comprehensive component output component (sections (e)(15) and (f)(15)) (e.g., turbocharger waste-gates, variable length manifold runners, torque converter clutch lock-up solenoids, etc.)

(v) PM sensor heater (section (f)(5.2.4)(A))

(vi) PM filter active/intrusive injection (section (f)(9.2.6))

For the PM sensor heater monitor, as an alternative for 2013 through 2015 model year vehicles, the manufacturer may use the criteria in section (d)(4.3.2)(B) in lieu of the criteria specified in section (d)(4.3.2)(F) above.

For the PM filter active/intrusive injection monitor, as an alternative for 2013 through 2015 model year vehicles, the manufacturer may use the criteria in section (d)(4.3.2)(I) in lieu of the criteria specified in section (d)(4.3.2)(F) above.

(G) For the following monitors, the denominator(s) shall be incremented by one during a driving cycle in which the following two criteria are met: (1) the requirements of section (d)(4.3.2)(B) have been met on at least one driving cycle since the denominator was last incremented, and (2) the number of cumulative miles of vehicle operation since the denominator was last incremented is greater than or equal to 500 miles:

(i) Diesel NMHC converting catalyst (section (f)(1.2.2))

(ii) Diesel NMHC converting catalyst other aftertreatment assistance functions (sections (f)(1.2.3)(B) and (f)(1.2.3)(D))

(iii) Diesel PM filter NMHC conversion (section (f)(9.2.4))

(iv) Diesel PM filter filtering performance and missing substrate (sections (f)(9.2.1) and (f)(9.2.5)) for passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard

(v) Diesel PM filter filtering performance and missing substrate (sections (f)(9.2.1) and (f)(9.2.5)) for 2004 through 2015 model year medium-duty vehicles certified to an engine dynamometer tailpipe emission standard

(H) For monitors of the following components, the manufacturer may request Executive Officer approval to use alternate or additional criteria to that set forth in section (d)(4.3.2)(B) above for incrementing the denominator. Executive Officer approval of the proposed criteria shall be based on the

equivalence of the proposed criteria in measuring the frequency of monitor operation relative to the amount of vehicle operation in accordance with the criteria in section (d)(4.3.2)(B) above:

(i) Engine cooling system input components (sections (e)(10) and (f)(11))

(ii) Air conditioning system input components (section (e)(12))

(iii) Direct ozone reduction systems (section (e)(14))

(iv) "Other emission control or source devices" (sections (e)(16) and (f)(16))

(v) Comprehensive component input components that require extended monitoring evaluation (sections (e)(15) and (f)(15)) (e.g., stuck fuel level sensor rationality)

(vi) Comprehensive component input component temperature sensor rationality monitors (sections (e)(15) and (f)(15)) (e.g, intake air temperature sensor, ambient temperature sensor, fuel temperature sensor)

(vii) PM filter frequent regeneration (section (f)(9.2.2))

(viii) PM sensor monitoring capablity monitor (section (f)(5.2.2)(D))

(I) For 2013 and subsequent model year vehicles, in addition to the requirements of section (d)(4.3.2)(B) above, the denominator(s) for the following monitors shall be incremented if and only if a regeneration event is commanded for a time greater than or equal to ten seconds:

(i) Diesel NMHC converting catalyst other aftertreatment assistance functions (sections (f)(1.2.3)(A) and (f)(1.2.3)(C))

(ii) PM filter incomplete regeneration (section (f)(9.2.3))

(J) For vehicles that employ alternate engine start hardware or strategies (e.g., integrated starter and generators) or alternate fuel vehicles (e.g., dedicated, bi-fuel, or dual-fuel applications), the manufacturer may request Executive Officer approval to use alternate criteria to that set forth in section (d)(4.3.2)(B) above for incrementing the denominator. In general, the Executive Officer shall not approve alternate criteria for vehicles that only employ engine shut off at or near idle/vehicle stop conditions. Executive Officer approval of the alternate criteria shall be based on the equivalence of the alternate criteria to determine the amount of vehicle operation relative to the measure of conventional vehicle operation in accordance with the criteria in section (d)(4.3.2)(B) above.

(K) For 2014 and subsequent model year hybrid vehicles, in lieu of the criteria in section (d)(4.3.2)(B) above, the denominator for each monitor shall be incremented within ten seconds if and only if the following criteria are satisfied on a single driving cycle:

(i) Cumulative propulsion system active time is greater than or equal to 600 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit;

(ii) Cumulative vehicle operation at or above 25 miles per hour occurs for greater than or equal to 300 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit (medium-duty vehicles with diesel engines certified on an engine dynamometer may use cumulative operation at or above 1150 rpm in lieu of at or above 25 miles per hour for purposes of this criteria);

(iii) Continuous vehicle operation at idle (i.e., accelerator pedal released by driver and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle (as determined in the drive position for vehicles equipped with an automatic transmission)) for greater than or equal to 30 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit; and

(iv) Cumulative fueled engine operation for greater than or equal to 10 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit.

(L) For 2015 and subsequent model year plug-in hybrid electric vehicles, in addition to the requirements of sections (d)(4.3.2)(K)(i) through (iii) above, the evaporative system monitor denominator(s) shall be incremented if and only if:

(i) Cumulative propulsion system active time is greater than or equal to 600 seconds while at an ambient temperature of greater than or equal to 40 degrees Fahrenheit but less than or equal to 95 degrees Fahrenheit;

(ii) Engine coolant temperature at the start of propulsion system active is greater than or equal to 40 degrees Fahrenheit but less than or equal to 95 degrees Fahrenheit; and

(iii) Continuous time while the vehicle is not in the state of 'propulsion system active' during the period immediately preceding the start of the driving cycle is greater than or equal to 6 hours.

(4.4) Ratio Specifications

(4.4.1) Definition: The ratio is defined as the numerator divided by the denominator.

(4.5) Disablement of Numerators and Denominators

(4.5.1) Within ten seconds of a malfunction that disables a monitor required to meet the monitoring conditions in section (d)(3.2.1) being detected (i.e., a pending or confirmed code is stored), the OBD II system shall disable further incrementing of the corresponding numerator and denominator for each monitor that is disabled. When the malfunction is no longer detected (i.e., the pending code is erased through self-clearing or through a scan tool command), incrementing of all corresponding numerators and denominators shall resume within ten seconds.

(4.5.2) Within ten seconds of the start of a PTO (see section (c)) operation that disables a monitor required to meet the monitoring conditions in section (d)(3.2.1), the OBD II system shall disable further incrementing of the corresponding numerator and denominator for each monitor that is disabled. When the PTO operation ends, incrementing of all corresponding numerators and denominators shall resume within ten seconds.

(4.5.3) The OBD II system shall disable further incrementing of all numerators and denominators within ten seconds if a malfunction of any component used to determine if the criteria in sections (d)(4.3.2)(B) through (D) are satisfied (i.e., vehicle speed, ambient temperature, elevation, idle operation, engine cold start, or time of operation) has been detected (i.e., a pending or confirmed fault code has been stored). Incrementing of all numerators and denominators shall resume within ten seconds when the malfunction is no longer present (e.g., pending code erased through self-clearing or by a scan tool command).

(5) *Standardized tracking and reporting of monitor performance.*

(5.1) For monitors required to track and report in-use monitor performance in section (d)(3.2.2), the performance data shall be tracked and reported in accordance with the specifications in sections (d)(4), (d)(5), and (g)(5). The OBD II system shall separately report an in-use monitor performance numerator and denominator for each of the following components: catalyst bank 1, catalyst bank 2, primary oxygen/exhaust gas sensor bank 1, primary oxygen/exhaust gas sensor bank 2, evaporative 0.020 inch leak detection system, EGR/VVT system, secondary air system, diesel fuel system, PM filter, NOx aftertreatment (e.g., NOx adsorber, NOx catalyst), secondary oxygen sensor, and boost pressure control system. The OBD II system shall also report a general denominator and an ignition cycle counter in the standardized format specified in sections (d)(5.5), (d)(5.6) and (g)(5).

(5.2) Numerator

(5.2.1) The OBD II system shall report a separate numerator for each of the components listed in section (d)(5.1).

(5.2.2) For specific components or systems that have multiple monitors that are required to be reported under sections (e) or (f) (e.g., oxygen sensor bank 1 may have multiple monitors for sensor response or other sensor

characteristics), the OBD II system shall separately track numerators and denominators for each of the specific monitors and report only the corresponding numerator and denominator for the specific monitor that has the lowest numerical ratio. If two or more specific monitors have identical ratios, the corresponding numerator and denominator for the specific monitor that has the highest denominator shall be reported for the specific component.

(5.2.3) The numerator(s) shall be reported in accordance with the specifications in section (g)(5.2.1).

(5.3) Denominator

(5.3.1) The OBD II system shall report a separate denominator for each of the components listed in section (d)(5.1).

(5.3.2) The denominator(s) shall be reported in accordance with the specifications in section (g)(5.2.1).

(5.4) Ratio

(5.4.1) For purposes of determining which corresponding numerator and denominator to report as required in section (d)(5.2.2), the ratio shall be calculated in accordance with the specifications in section (g)(5.2.2).

(5.5) Ignition cycle counter

(5.5.1) Definition:

(A) The ignition cycle counter is defined as a counter that indicates the number of ignition cycles a vehicle has experienced as defined in section(s) (d)(5.5.2)(B) and (C).

(B) Except as required in section (d)(5.5.1)(C) below, the OBD II system shall report one ignition cycle counter (as defined in section (d)(5.5.2)(B)).

(C) For 2014 and subsequent model year plug-in hybrid electric vehicles, the OBD II system shall report two ignition cycle counters (as defined in sections (d)(5.5.2)(B) and (C)).

(D) The ignition cycle counter shall be reported in accordance with the specifications in section (g)(5.2.1).

(5.5.2) Specifications for incrementing:

(A) The ignition cycle counter(s), when incremented, shall be incremented by an integer of one. The ignition cycle counter(s) may not be incremented more than once per driving cycle.

(B) The ignition cycle counter shall be incremented within ten seconds if and only if the following criteria are met:

(i) Except as required in section (d)(5.5.2)(B)(ii) below, the vehicle meets

the engine start definition (see section (c)) for at least two seconds plus or minus one second.

(ii) For hybrid vehicles, the vehicle meets the propulsion system active definition (see section (c)) for at least two seconds plus or minus one second.

(C) In addition to the counter described in section (d)(5.5.2)(B) above, 2014 and subsequent model year plug-in hybrid electric vehicles shall track and report a second ignition cycle counter that shall be incremented within ten seconds if and only if the vehicle has met the fueled engine operation definition (see section (c)) for at least two seconds plus or minus one second.

(D) The OBD II system shall disable further incrementing of the ignition cycle counter(s) within ten seconds if a malfunction of any component used to determine if the criteria in section (d)(5.5.2)(B) and (C) are satisfied (e.g., engine speed or time of operation) has been detected and the corresponding pending fault code has been stored. The ignition cycle counter(s) may not be disabled from incrementing for any other condition. Incrementing of the ignition cycle counter(s) shall resume within ten seconds when the malfunction is no longer present (e.g., pending code erased through self-clearing or by a scan tool command).

(5.6) General Denominator

(5.6.1) Definition:

(A) The general denominator is defined as a measure of the number of times a vehicle has been operated as defined in section (d)(5.6.2)(B).

(B) The general denominator shall be reported in accordance with the specifications in section (g)(5.2.1).

(5.6.2) Specifications for incrementing:

(A) The general denominator, when incremented, shall be incremented by an integer of one. The general denominator may not be incremented more than once per driving cycle.

(B) The general denominator shall be incremented within ten seconds if and only if the criteria identified in section (d)(4.3.2)(B) are satisfied on a single driving cycle.

(C) The OBD II system shall disable further incrementing of the general denominator within ten seconds if a malfunction of any component used to determine if the criteria in section (d)(4.3.2)(B) are satisfied (i.e., vehicle speed, ambient temperature, elevation, idle operation, or time of operation) has been detected and the corresponding pending fault code has been stored. The general denominator may not be disabled from incrementing for any other condition (e.g., the disablement criteria in sections (d)(4.5.1)

and (d)(4.5.2) may not disable the general denominator). Incrementing of the general denominator shall resume within ten seconds when the malfunction is no longer present (e.g., pending code erased through self-clearing or by a scan tool command).

(6) *Malfunction Criteria Determination for Diesel Vehicles.*

(6.1) For 2010 and subsequent model year medium-duty vehicles certified to an engine dynamometer exhaust emission standard, in determining the malfunction criteria for diesel engine monitors in section (f) that are required to indicate a malfunction before emissions exceed an emission threshold based on the applicable standard, the manufacturer shall:

(6.1.1) Use the emission test cycle and standard (i.e., FTP or SET) determined by the manufacturer, through use of data and/or engineering analysis, to be more stringent (i.e., to result in higher emissions with the same level of monitored component malfunction) as the "applicable standard".

(6.1.2) Identify in the certification documentation required under section (i) the test cycle and standard determined by the manufacturer to be more stringent for each applicable monitor.

(6.1.3) If the Executive Officer reasonably believes that a manufacturer has incorrectly determined the test cycle and standard that is more stringent, the Executive Officer shall require the manufacturer to provide emission data and/or engineering analysis showing that the other test cycle and standard are less stringent.

(6.2) For 2007 and subsequent model year light-duty and medium-duty vehicles equipped with emission controls that experience infrequent regeneration events (e.g., active PM filter regeneration, NOx adsorber desulfation), a manufacturer shall adjust the emission test results that are used to determine the malfunction criterion for monitors that are required to indicate a malfunction before emissions exceed a certain emission threshold. Except as provided in section (d)(6.2.7), for each monitor on medium-duty vehicles using engines certified on an engine dynamometer, the manufacturer shall adjust the emission result using the procedure described in CFR title 40, part 86.004-28(i) with the component for which the malfunction criteria is being established deteriorated to the malfunction threshold. For light-duty and medium-duty vehicles certified on a chassis dynamometer, the manufacturer shall submit a plan for Executive Officer approval to adjust the emission results using an approach similar to the procedure described in CFR title 40, part 86.004-28(i). Executive Officer approval shall be based on the effectiveness of the proposed plan to quantify the emission impact and frequency of regeneration events. The adjusted emission value shall be used for purposes of determining whether or not the specified emission threshold is exceeded (e.g., a malfunction must be detected before the adjusted emission value exceeds 1.5 times any applicable standard).

(6.2.1) For purposes of section (d)(6.2), "regeneration" means an event during which emission levels change while the emission control performance is being restored by design.

(6.2.2) For purposes of section (d)(6.2), "infrequent" means having an expected frequency of less than once per FTP cycle.

(6.2.3) Except as specified in section (d)(6.2.4) for NMHC catalyst monitoring, for 2007 through 2009 model year vehicles, in lieu of establishing the adjustment factor for each monitor with the component for which the malfunction criteria is being established deteriorated to the malfunction threshold as required in section (d)(6.2), the manufacturer may use the adjustment factor established for certification (e.g., without components deteriorated to the malfunction threshold).

(6.2.4) For NMHC catalyst monitoring (section (f)(1)) on 2008 and subsequent model year vehicles, a manufacturer shall establish the adjustment factor for the NMHC catalyst monitor with the NMHC catalyst deteriorated to the malfunction threshold as required in section (d)(6.2). In lieu of establishing this adjustment factor for 2008 and 2009 model year vehicles, a manufacturer may provide emission data demonstrating that the worst case emission levels from a deteriorated NMHC catalyst are below the malfunction threshold specified in section (f)(1.2.2). The demonstration shall include emission testing with a NMHC catalyst deteriorated to the malfunction threshold or worse and with both the infrequent regeneration event occurring and without it occurring. The manufacturer shall calculate the worst case emission level by applying the frequency factor ("F" as calculated according to CFR, title 40, part 86.004-28(i)) of the infrequent regeneration event used for tailpipe certification to the measured emissions with the infrequent regeneration event occurring and adding that result to the measured emissions without the infrequent regeneration event occurring. This calculated final sum shall be used as the adjusted emission level and compared to the malfunction threshold for purposes of determining compliance with the monitoring requirements. The manufacturer shall submit a test plan for Executive Officer approval describing the emission testing procedure and how the worst case components will be established. The Executive Officer shall approve it upon finding the test procedure and components used will likely generate a worst case emission level.

(6.2.5) For purposes of determining the adjustment factors for each monitor, the manufacturer shall submit engineering data, analysis, and/or emission data to the Executive Officer for approval. The Executive Officer shall approve the factors upon finding the submitted information supports the adjustment factors.

(6.2.6) For purposes of enforcement testing in accordance with section (d)(7) and title 13, CCR section 1968.5.1, the adjustment factors established for each monitor by the manufacturer according to section (d)(6.2) shall be used

when determining compliance with emission thresholds.

(6.2.7) In lieu of using the procedure described in CFR title 40, part 86.004-28(i), the manufacturer may submit an alternate plan to calculate the adjustment factors for determining the adjusted emission values to the Executive Officer for review and approval. Executive Officer approval of the plan shall be conditioned upon the manufacturer providing data and/or engineering evaluation demonstrating the procedure is consistent with good engineering judgment in determining appropriate modifications to the tailpipe certification adjustment factors.

(6.3) For every 2007 through 2012 model year light-duty vehicle test group certified to the higher allowable emission thresholds specified in section (f) (e.g., 5.0 or 3.0 times the applicable standards for NMHC converting catalyst monitoring) for vehicles prior to the 2013 model year:

(6.3.1) The manufacturer shall conduct in-use enforcement testing for compliance with the tailpipe emission standards in accordance with title 13, CCR sections 2136 through 2140. Within six months after OBD II certification of a test group, the manufacturer shall submit a plan for conducting the testing to the Executive Officer for approval. The Executive Officer shall approve the plan upon determining that the testing will be done in accordance with the procedures used by ARB when conducting such testing, that the plan will allow for a valid sample of at least 10 vehicles in the mileage range of 30,000 to 40,000 miles for comparison to the FTP intermediate (e.g., 50,000 mile) useful life standard and at least 10 vehicles in the mileage range of 90,000 to 100,000 miles for comparison to the FTP full useful life standard, and that copies of all records and data collected during the program will be provided to ARB. Manufacturers may also submit testing plans and supporting data for Executive Officer approval that differ from compliance testing under title 13, CCR, sections 2136 through 2140. The Executive Officer shall also approve the plans upon determining that the plan provides equivalent assurance in verifying vehicles are meeting the tailpipe emission standards within the useful life. The Executive Officer may use the submitted data in lieu of or in addition to data collected pursuant to title 13, CCR section 2139 for purposes of the notification and use of test results described in title 13, CCR section 2140; and

(6.3.2) The certification shall be conditioned upon the manufacturer agreeing that, for any test group(s) determined to be noncompliant in accordance with title 13, CCR section 2140 or title 13, CCR section 1968.5.1, the Executive Officer shall determine the excess emissions caused by the noncompliance and the manufacturer shall fund a program(s) that will offset any such excess emissions.

(7) *Enforcement Testing.*

(7.1) The procedures used to assure compliance with the requirements of title 13,

CCR section 1968.2.1 are set forth in title 13, CCR section 1968.5.1.

(7.2) Consistent with the requirements of title 13, CCR section 1968.5.1(b)(4)(A) for enforcement OBD II emission testing, the manufacturer shall make available upon request by the Executive Officer all test equipment (e.g., malfunction simulators, deteriorated "threshold" components, etc.) necessary to determine the malfunction criteria in sections (e) and (f) for major monitors subject to OBD II emission testing as defined in title 13, CCR section 1968.5.1. To meet the requirements of this section, the manufacturers shall only be required to make available test equipment necessary to duplicate "threshold" testing performed by the manufacturer. This test equipment shall include, but is not limited to, aged "threshold" catalyst systems and computer equipment used to simulate misfire, oxygen sensor, fuel system, VVT system, and cold start reduction strategy system faults. The manufacturer is not required to make available test equipment for vehicles that exceed the applicable full useful life age (e.g., 10 years for vehicles certified to a full useful life of 10 years and 100,000 miles).

(e) *Monitoring Requirements for Gasoline/Spark-Ignited Engines.*

(1) *Catalyst Monitoring*

(1.1) Requirement: The OBD II system shall monitor the catalyst system for proper conversion capability.

(1.2) Malfunction Criteria:

(1.2.1) Low Emission Vehicle I applications: The OBD II system shall detect a catalyst system malfunction when the catalyst system's conversion capability decreases to the point that either of the following occurs:

(A) Non-Methane Organic Gas (NMOG) emissions exceed 1.75 times the FTP full useful life standards to which the vehicle has been certified with NMOG emissions multiplied by the certification reactivity adjustment factor for the vehicle;

(B) The average FTP test Non-Methane Hydrocarbon (NMHC) conversion efficiency of the monitored portion of the catalyst system falls below 50 percent (i.e., the cumulative NMHC emissions measured at the outlet of the monitored catalyst(s) are more than 50 percent of the cumulative engine-out emissions measured at the inlet of the catalyst(s)). With Executive Officer approval, manufacturers may use a conversion efficiency malfunction criteria of less than 50 percent if the catalyst system is designed such that the monitored portion of the catalyst system must be replaced along with an adjacent portion of the catalyst system sufficient to ensure that the total portion replaced will meet the 50 percent conversion efficiency criteria. Executive Officer approval shall be based on data and/or engineering evaluation demonstrating the conversion efficiency of the monitored portion and the total portion designed to be replaced, and

the likelihood of the catalyst system design to ensure replacement of the monitored and adjacent portions of the catalyst system.

(1.2.2) Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles:

(A) 2004 model year vehicles.

(i) All LEV II, ULEV II, and MDV SULEV II vehicles shall use the malfunction criteria specified for Low Emission Vehicle I applications in section (e)(1.2.1).

(ii) All PC/LDT SULEV II vehicles shall use the malfunction criteria specified for Low Emission Vehicle I applications in section (e)(1.2.1) except the malfunction criterion in paragraph (e)(1.2.1)(A) shall be 2.5 times the applicable FTP full useful life NMOG standard.

(B) Except as provided below in section (e)(1.2.4), for 2005 through 2008 model years, the OBD II system shall detect a catalyst system malfunction when the catalyst system's conversion capability decreases to the point that any of the following occurs:

(i) For all vehicles other than PC/LDT SULEV II vehicles.

a. NMOG emissions exceed the criteria specified for Low Emission Vehicle I applications in section (e)(1.2.1)(A).

b. The average FTP test NMHC conversion efficiency is below the criteria specified for Low Emission Vehicle I applications in section (e)(1.2.1)(B).

c. Oxides of nitrogen (NOx) emissions exceed 3.5 times the FTP full useful life NOx standard to which the vehicle has been certified.

(ii) PC/LDT SULEV II vehicles shall use the same malfunction criteria as 2005 through 2008 model year LEV II, ULEV II, and MDV SULEV II vehicles (section (e)(1.2.2)(B)(i)) except the malfunction criteria in paragraph a. shall be 2.5 times the applicable FTP full useful life NMOG standard.

(C) Except as provided below in section (e)(1.2.5), for 2009 and subsequent model years, the OBD II system shall detect a catalyst system malfunction when the catalyst system's conversion capability decreases to the point that any of the following occurs.

(i) For all vehicles other than PC/LDT SULEV II vehicles.

a. NMOG emissions exceed the criteria specified for Low Emission Vehicle I applications in section (e)(1.2.1)(A).

b. The average FTP test NMHC conversion efficiency is below the criteria specified for Low Emission Vehicle I applications in section (e)(1.2.1)(B).

c. NOx emissions exceed 1.75 times the FTP full useful life NOx standard to which the vehicle has been certified.

(ii) For PC/LDT SULEV II vehicles.

a. NMOG emissions exceed 2.5 times the applicable FTP full useful life NMOG standard to which the vehicle has been certified.

b. The average FTP test NMHC conversion efficiency is below the criteria specified for Low Emission Vehicle I applications in section (e)(1.2.1)(B).

c. NOx emissions exceed 2.5 times the applicable FTP full useful life NOx standard to which the vehicle has been certified.

(1.2.3) 2004 through 2008 model year non-Low Emission Vehicle I or II applications: The OBD II system shall detect a catalyst system malfunction when the catalyst system's conversion capability decreases to the point that NMHC emissions increase by more than 1.5 times the applicable FTP full useful life standards over an FTP test performed with a representative 4000 mile catalyst system.

(1.2.4) In lieu of using the malfunction criteria in section (e)(1.2.2)(B) for all 2005 and 2006 model year Low Emission Vehicle II applications, a manufacturer may phase-in the malfunction criteria on a portion of its Low Emission Vehicle II applications as long as that portion of Low Emission Vehicle II applications comprises at least 30 percent of all 2005 model year vehicles and 60 percent of all 2006 model year vehicles. For 2005 and 2006 model year Low Emission Vehicle II applications not included in the phase-in, the malfunction criteria in section (e)(1.2.2)(A) shall be used.

(1.2.5) In lieu of using the malfunction criteria in section (e)(1.2.2)(C) for all 2009 model year vehicles, for the 2009 model year only, a manufacturer may continue to use the malfunction criteria in section (e)(1.2.2)(B) for any vehicles previously certified in the 2005, 2006, 2007, or 2008 model year to the malfunction criteria in section (e)(1.2.2.)(B) and carried over to the 2009 model year.

(1.2.6) For purposes of determining the catalyst system malfunction criteria in sections (e)(1.2.1), (1.2.2)(A), and (1.2.3), the malfunction criteria shall be established by using a catalyst system with all monitored catalysts simultaneously deteriorated to the malfunction criteria while unmonitored catalysts shall be deteriorated to the end of the vehicle's full useful life.

(1.2.7) For purposes of determining the catalyst system malfunction criteria in sections (e)(1.2.2)(B) and (C):

(A) The manufacturer shall use a catalyst system deteriorated to the malfunction criteria using methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning operating conditions.

(B) Except as provided below in section (e)(1.2.7)(C), the malfunction criteria shall be established by using a catalyst system with all monitored and unmonitored (downstream of the sensor utilized for catalyst monitoring) catalysts simultaneously deteriorated to the malfunction criteria.

(C) For vehicles using fuel shutoff to prevent over-fueling during misfire conditions (see section (e)(3.4.1)(D)), the malfunction criteria shall be established by using a catalyst system with all monitored catalysts simultaneously deteriorated to the malfunction criteria while unmonitored catalysts shall be deteriorated to the end of the vehicle's full useful life.

(1.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(1.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (e)(1.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(1.4) MIL Illumination and Fault Code Storage:

(1.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(1.4.2) The monitoring method for the catalyst(s) shall be capable of detecting when a catalyst fault code has been cleared (except OBD II system self-clearing), but the catalyst has not been replaced (e.g., catalyst overtemperature approaches may not be acceptable).

(2) *Heated Catalyst Monitoring*

(2.1) Requirement:

(2.1.1) The OBD II system shall monitor all heated catalyst systems for proper heating.

(2.1.2) The efficiency of heated catalysts shall be monitored in conjunction with the requirements of section (e)(1).

(2.2) Malfunction Criteria:

(2.2.1) The OBD II system shall detect a catalyst heating system malfunction when the catalyst does not reach its designated heating temperature within a requisite time period after engine starting. The manufacturer shall determine the requisite time period, but the time period may not exceed the time that would cause emissions from a vehicle equipped with the heated catalyst system to exceed 1.75 times any of the applicable FTP full useful life standards.

(2.2.2) Manufacturers may use other monitoring strategies for the heated catalyst but must submit the alternate plan to the Executive Officer for approval. The Executive Officer shall approve alternate strategies for monitoring heated catalyst systems based on comparable reliability and timeliness to these requirements in detecting a catalyst heating malfunction.

(2.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(2.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(2.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(3) *Misfire Monitoring*

(3.1) Requirement:

(3.1.1) The OBD II system shall monitor the engine for misfire causing catalyst damage and misfire causing excess emissions.

(3.1.2) The OBD II system shall identify the specific cylinder that is experiencing misfire. Manufacturers may request Executive Officer approval to store a general misfire fault code instead of a cylinder specific fault code under certain operating conditions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that the misfiring cylinder cannot be reliably identified when the conditions occur.

(3.1.3) If more than one cylinder is misfiring, a separate fault code shall be stored indicating that multiple cylinders are misfiring except as allowed below. When identifying multiple cylinder misfire, the manufacturer is not required to also identify each of the misfiring cylinders individually through separate fault codes. For 2005 and subsequent model year vehicles, if more than 90 percent of the detected misfires occur in a single cylinder, the manufacturer may elect to store the appropriate fault code indicating the specific misfiring cylinder in lieu of the multiple cylinder misfire fault code. If, however, two or more cylinders individually have more than 10 percent of the total number of detected misfires, a multiple cylinder fault code must be stored.

(3.2) Malfunction Criteria: The OBD II system shall detect a misfire malfunction pursuant to the following:

(3.2.1) Misfire causing catalyst damage:

(A) Manufacturers shall determine the percentage of misfire evaluated in 200 revolution increments for each engine speed and load condition that would result in a temperature that causes catalyst damage. The manufacturer shall submit documentation to support this percentage of misfire as required in section (i)(2.5). For every engine speed and load condition that

this percentage of misfire is determined to be lower than five percent, the manufacturer may set the malfunction criteria at five percent.

(B) Subject to Executive Officer approval, a manufacturer may employ a longer interval than 200 revolutions but only for determining, on a given driving cycle, the first misfire exceedance as provided in section (e)(3.4.1)(A) below. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that catalyst damage would not occur due to unacceptably high catalyst temperatures before the interval has elapsed.

(C) A misfire malfunction shall be detected if the percentage of misfire established in section (e)(3.2.1)(A) is exceeded.

(D) For purposes of establishing the temperature at which catalyst damage occurs as required in section (e)(3.2.1)(A), on 2005 and subsequent model year vehicles, manufacturers may not define catalyst damage at a temperature more severe than what the catalyst system could be operated at for ten consecutive hours and still meet the applicable FTP full useful life standards.

(3.2.2) Misfire causing emissions to exceed 1.5 times the FTP standards:

(A) Manufacturers shall determine the percentage of misfire evaluated in 1000 revolution increments that would cause emissions from an emission durability demonstration vehicle to exceed 1.5 times any of the applicable FTP standards if the percentage of misfire were present from the beginning of the test. To establish this percentage of misfire, the manufacturer shall utilize misfire events occurring at equally spaced, complete engine cycle intervals, across randomly selected cylinders throughout each 1000-revolution increment. If this percentage of misfire is determined to be lower than one percent, the manufacturer may set the malfunction criteria at one percent.

(B) Subject to Executive Officer approval, a manufacturer may employ other revolution increments. The Executive Officer shall grant approval upon determining that the manufacturer has demonstrated that the strategy would be equally effective and timely in detecting misfire.

(C) A malfunction shall be detected if the percentage of misfire established in section (3.2.2)(A) is exceeded regardless of the pattern of misfire events (e.g., random, equally spaced, continuous, etc.).

(3.3) Monitoring Conditions:

(3.3.1) Manufacturers shall continuously monitor for misfire under the following conditions:

(A) Except as provided in section (e)(3.3.6) below, from no later than the end of the second crankshaft revolution after engine start,

(B) While under positive torque conditions during the rise time and settling time for engine speed to reach the desired idle engine speed at engine start-up (i.e., "flare-up" and "flare-down"), and

(C) Under all positive torque engine speeds and load conditions except within the following range: the engine operating region bound by the positive torque line (i.e., engine load with the transmission in neutral), and the two following engine operating points: an engine speed of 3000 rpm with the engine load at the positive torque line, and the redline engine speed (defined in section (c)) with the engine's manifold vacuum at four inches of mercury lower than that at the positive torque line.

(3.3.2) If a monitoring system cannot detect all misfire patterns under all required engine speed and load conditions as required in section (e)(3.3.1) above, the manufacturer may request Executive Officer approval to accept the monitoring system. In evaluating the manufacturer's request, the Executive Officer shall consider the following factors: the magnitude of the region(s) in which misfire detection is limited, the degree to which misfire detection is limited in the region(s) (i.e., the probability of detection of misfire events), the frequency with which said region(s) are expected to be encountered in-use, the type of misfire patterns for which misfire detection is troublesome, and demonstration that the monitoring technology employed is not inherently incapable of detecting misfire under required conditions (i.e., compliance can be achieved on other engines). The evaluation shall be based on the following misfire patterns: equally spaced misfire occurring on randomly selected cylinders, single cylinder continuous misfire, and paired cylinder (cylinders firing at the same crank angle) continuous misfire.

(3.3.3) A manufacturer may request Executive Officer approval of a monitoring system that has reduced misfire detection capability during the portion of the first 1000 revolutions after engine start that a cold start emission reduction strategy that reduces engine torque (e.g., spark retard strategies) is active. The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated that the probability of detection is greater than or equal to 75 percent during the worst case condition (i.e., lowest generated torque) for a vehicle operated continuously at idle (park/neutral idle) on a cold start between 50-86 degrees Fahrenheit and that the technology cannot reliably detect a higher percentage of the misfire events during the conditions.

(3.3.4) A manufacturer may request Executive Officer approval to disable misfire monitoring or employ an alternate malfunction criterion when misfire cannot be distinguished from other effects.

(A) Upon determining that the manufacturer has presented documentation that demonstrates the disablement interval or period of use of an alternate malfunction criterion is limited only to that necessary for avoiding false detection, the Executive Officer shall approve the disablement or use of the alternate malfunction criterion for conditions involving:

(i) rough road,

(ii) fuel cut,

(iii) gear changes for manual transmission vehicles,

(iv) traction control or other vehicle stability control activation such as anti-lock braking or other engine torque modifications to enhance vehicle stability,

(v) off-board control or intrusive activation of vehicle components or diagnostics during service or assembly plant testing,

(vi) portions of intrusive evaporative system or EGR diagnostics that can significantly affect engine stability (i.e., while the purge valve is open during the vacuum pull-down of a evaporative system leak check but not while the purge valve is closed and the evaporative system is sealed or while an EGR diagnostic causes the EGR valve to be intrusively cycled on and off during positive torque conditions), or

(vii) engine speed, load, or torque transients due to throttle movements more rapid than occurs over the US06 cycle for the worst case vehicle within each test group.

(B) Additionally, the Executive Officer will approve a manufacturer's request in accordance with sections (e)(17.3), (17.4), and (17.6) to disable misfire monitoring when fuel level is 15 percent or less of the nominal capacity of the fuel tank, when PTO units are active, or while engine coolant temperature is below 20 degrees Fahrenheit. The Executive Officer will approve a request to continue disablement on engine starts when engine coolant temperature is below 20 degrees Fahrenheit at engine start until engine coolant temperature exceeds 70 degrees Fahrenheit.

(C) In general, for 2005 and subsequent model year vehicles, the Executive Officer shall not approve disablement for conditions involving normal air conditioning compressor cycling from on-to-off or off-to-on, automatic transmission gear shifts (except for shifts occurring during wide open throttle operation), transitions from idle to off-idle, normal engine speed or load changes that occur during the engine speed rise time and settling time (i.e., "flare-up" and "flare-down") immediately after engine starting without any vehicle operator-induced actions (e.g., throttle stabs), or excess acceleration (except for acceleration rates that exceed the maximum acceleration rate obtainable at wide open throttle while the vehicle is in gear due to abnormal conditions such as slipping of a clutch).

(D) The Executive Officer may approve misfire monitoring disablement or use of an alternate malfunction criterion for any other condition on a case by case basis upon determining that the manufacturer has demonstrated that the request is based on an unusual or unforeseen circumstance and that it is applying the best available computer and monitoring technology.

(3.3.5) For engines with more than eight cylinders that cannot meet the requirements of section (e)(3.3.1), a manufacturer may request Executive Officer approval to use alternative misfire monitoring conditions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that misfire detection throughout the required operating region cannot be achieved when employing proven monitoring technology (i.e., a technology that provides for compliance with these requirements on other engines) and provided misfire is detected to the fullest extent permitted by the technology. However, the Executive Officer may not grant the request if the misfire detection system is unable to monitor during all positive torque operating conditions encountered during an FTP cycle.

(3.3.6) For engines that employ engine shutoff strategies that do not require the vehicle operator to restart the engine to continue driving (e.g., hybrid vehicle with engine shutoff at idle), a manufacturer shall request Executive Officer approval of the monitoring conditions under which misfire monitoring occurs after engine fueling begins for the initial start and after each time fueling resumes. Executive Officer approval of the monitoring conditions shall be based on the equivalence of the conditions to those specified in section (e)(3.3.1)(A) above.

(3.4) MIL Illumination and Fault Code Storage:

(3.4.1) Misfire causing catalyst damage. Upon detection of the percentage of misfire specified in section (e)(3.2.1) above, the following criteria shall apply for MIL illumination and fault code storage:

(A) Pending fault codes

(i) A pending fault code shall be stored immediately if, during a single driving cycle, the specified percentage of misfire is exceeded three times when operating in the positive torque region encountered during an FTP cycle or is exceeded on a single occasion when operating at any other engine speed and load condition in the positive torque region defined in section (e)(3.3.1).

(ii) Immediately after a pending fault code is stored as specified in section (e)(3.4.1)(A)(i) above, the MIL shall blink once per second at all times while misfire is occurring during the driving cycle.

a. The MIL may be extinguished during those times when misfire is not occurring during the driving cycle.

b. If, at the time a misfire malfunction occurs, the MIL is already illuminated for a malfunction other than misfire, the MIL shall blink as previously specified in section (e)(3.4.1)(A)(ii) while misfire is occurring. If misfiring ceases, the MIL shall stop blinking but remain illuminated as required by the other malfunction.

(B) Confirmed fault codes

(i) If a pending fault code for exceeding the percentage of misfire set forth in section (e)(3.2.1) is stored, the OBD II system shall immediately store a confirmed fault code if the percentage of misfire specified in section (e)(3.2.1) is again exceeded one or more times during either: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to the engine conditions that occurred when the pending fault code was stored are encountered.

(ii) If a pending fault code for exceeding the percentage of misfire set forth in section (e)(3.2.2) is stored from a previous drive cycle, the OBD II system shall immediately store a confirmed fault code if the percentage of misfire specified in section (e)(3.2.1) is exceeded one or more times regardless of the conditions encountered.

(iii) Upon storage of a confirmed fault code, the MIL shall blink as specified in subparagraph (e)(3.4.1)(A)(ii) above as long as misfire is occurring and the MIL shall remain continuously illuminated if the misfiring ceases.

(C) Erasure of pending fault codes

Pending fault codes shall be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without any exceedance of the specified percentage of misfire. The pending code may also be erased if similar driving conditions are not encountered during the next 80 driving cycles subsequent to the initial detection of a malfunction.

(D) Exemptions for vehicles with fuel shutoff and default fuel control. Notwithstanding sections (e)(3.4.1)(A) and (B) above, in vehicles that provide for fuel shutoff and default fuel control to prevent over fueling during catalyst damage misfire conditions, the MIL need not blink. Instead, the MIL may illuminate continuously in accordance with the requirements for continuous MIL illumination in sections (e)(3.4.1)(B)(iii) above upon detection of misfire, provided that the fuel shutoff and default control are activated as soon as misfire is detected. Fuel shutoff and default fuel control may be deactivated only to permit fueling outside of the misfire range. Manufacturers may also periodically, but not more than once every 30 seconds, deactivate fuel shutoff and default fuel control to determine if the specified percentage of misfire for catalyst damage is still being exceeded. Normal fueling and fuel control may be resumed if the specified percentage of misfire for catalyst damage is no longer being exceeded.

(E) Manufacturers may request Executive Officer approval of strategies that continuously illuminate the MIL in lieu of blinking the MIL during extreme

catalyst damage misfire conditions (i.e., catalyst damage misfire occurring at all engine speeds and loads). Executive Officer approval shall be granted upon determining that the manufacturer employs the strategy only when catalyst damage misfire levels cannot be avoided during reasonable driving conditions and the manufacturer has demonstrated that the strategy will encourage operation of the vehicle in conditions that will minimize catalyst damage (e.g., at low engine speeds and loads).

(3.4.2) Misfire causing emissions to exceed 1.5 times the FTP standards. Upon detection of the percentage of misfire specified in section (e)(3.2.2), the following criteria shall apply for MIL illumination and fault code storage:

(A) Misfire within the first 1000 revolutions after engine start.

(i) A pending fault code shall be stored no later than after the first exceedance of the specified percentage of misfire during a single driving cycle if the exceedance occurs within the first 1000 revolutions after engine start (defined in section (c)) during which misfire detection is active.

(ii) If a pending fault code is stored, the OBD II system shall illuminate the MIL and store a confirmed fault code within ten seconds if an exceedance of the specified percentage of misfire is again detected in the first 1000 revolutions during any subsequent driving cycle, regardless of the conditions encountered during the driving cycle.

(iii) The pending fault code shall be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without an exceedance of the specified percentage of misfire. The pending code may also be erased if similar conditions are not encountered during the next 80 driving cycles immediately following the initial detection of the malfunction.

(B) Exceedances after the first 1000 revolutions after engine start.

(i) A pending fault code shall be stored no later than after the fourth exceedance of the percentage of misfire specified in section (e)(3.2.2) during a single driving cycle.

(ii) If a pending fault code is stored, the OBD II system shall illuminate the MIL and store a confirmed fault code within ten seconds if the percentage of misfire specified in section (e)(3.2.2) is again exceeded four times during: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to the engine conditions that occurred when the pending fault code was stored are encountered.

(iii) The pending fault code may be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without an exceedance of the specified percentage of misfire. The pending code may also be erased if similar conditions are not encountered during the next 80 driving cycles immediately following initial detection of the malfunction.

(3.4.3) Storage of freeze frame conditions.

(A) A manufacturer shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing and erasing a confirmed fault code.

(B) If freeze frame conditions are stored for a malfunction other than misfire or fuel system malfunction (see section (e)(6)) when a fault code is stored as specified in section (e)(3.4) above, the stored freeze frame information shall be replaced with freeze frame information regarding the misfire malfunction.

(3.4.4) Storage of misfire conditions for similar conditions determination. Upon detection of misfire under sections (e)(3.4.1) or (3.4.2), manufacturers shall store the following engine conditions: engine speed, load, and warm-up status of the first misfire event that resulted in the storage of the pending fault code.

(3.4.5) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without an exceedance of the specified percentage of misfire.

(4) *Evaporative System Monitoring*

(4.1) Requirement: The OBD II system shall verify purge flow from the evaporative system and shall monitor the complete evaporative system, excluding the tubing and connections between the purge valve and the intake manifold, for vapor leaks to the atmosphere. Individual components of the evaporative system (e.g. valves, sensors, etc.) shall be monitored in accordance with the comprehensive components requirements in section (e)(15) (e.g., for circuit continuity, out of range values, rationality, proper functional response, etc.). Vehicles not required to be equipped with evaporative emission systems shall be exempt from monitoring of the evaporative system.

(4.2) Malfunction Criteria:

(4.2.1) For purposes of section (e)(4), an orifice shall be defined as an O'Keefe Controls Co. precision metal "Type B" orifice with NPT connections with a diameter of the specified dimension (e.g., part number B-20-SS for a stainless steel 0.020 inch diameter orifice).

(4.2.2) The OBD II system shall detect an evaporative system malfunction when any of the following conditions exist:

(A) No purge flow from the evaporative system to the engine can be detected by the OBD II system;

(B) The complete evaporative system contains a leak or leaks that cumulatively are greater than or equal to a leak caused by a 0.040 inch diameter orifice; or

(C) The complete evaporative system contains a leak or leaks that cumulatively are greater than or equal to a leak caused by a 0.020 inch diameter orifice.

(4.2.3) On vehicles with fuel tank capacity greater than 25.0 gallons, a manufacturer may request the Executive Officer to revise the orifice size in sections (e)(4.2.2)(B) and/or (C) if the most reliable monitoring method available cannot reliably detect a system leak of the magnitudes specified. The Executive Officer shall approve the request upon determining that the manufacturer has provided data and/or engineering analysis that demonstrate the need for the request.

(4.2.4) Upon request by the manufacturer and upon determining that the manufacturer has submitted data and/or engineering evaluation which support the request, the Executive Officer shall revise the orifice size in sections (e)(4.2.2)(B) and/or (C) upward to exclude detection of leaks that cannot cause evaporative or running loss emissions to exceed 1.5 times the applicable standards.

(4.2.5) A manufacturer may request Executive Officer approval to revise the orifice size in section (e)(4.2.2)(B) to a 0.090 inch diameter orifice. The Executive Officer shall approve the request upon the manufacturer submitting data and/or engineering analysis and the Executive Officer finding that:

(A) the monitoring strategy for detecting orifices specified in section (e)(4.2.2)(C) meets the monitoring conditions requirements of section (e)(4.3.2); and

(B) the monitoring strategy for detecting 0.090 inch diameter orifices yields an in-use monitor performance ratio (as defined in section (d)(4)) that meets or exceeds 0.620.

(4.2.6) For the 2004 and 2005 model years only, manufacturers that use separate monitors to identify leaks (as specified in (e)(4.2.2.)(B) or (C)) in different portions of the complete evaporative system (e.g., separate monitors for the fuel tank to canister portion and for the canister to purge valve portion of the system) may request Executive Officer approval to revise the malfunction criteria in sections (e)(4.2.2)(B) and (C) to identify a malfunction when the separately monitored portion of the evaporative system (e.g., the fuel tank to canister portion) has a leak (or leaks) that is greater than or equal to the specified size in lieu of when the complete evaporative system has a leak (or leaks) that is greater than or equal to the

specified size. The Executive Officer shall approve the request upon determining that the manufacturer utilized the same monitoring strategy (e.g., monitoring portions of the complete system with separate monitors) on vehicles prior to the 2004 model year and that the monitoring strategy provides further isolation of the malfunction for repair technicians by utilizing separate fault codes for each monitored portion of the evaporative system.

(4.2.7) For vehicles that utilize more than one purge flow path (e.g., a turbo-charged engine with a low pressure purge line and a high pressure purge line), the OBD II system shall verify the criteria of (e)(4.2.2)(A) (i.e., purge flow to the engine) for both purge flow paths. If a manufacturer demonstrates that blockage, leakage, or disconnection of one of the purge flow paths cannot cause a measurable emission increase during any reasonable in-use driving conditions, monitoring of that flow path is not required.

(4.3) Monitoring Conditions:

(4.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(4.2.2)(A) and (B) (i.e., purge flow and 0.040 inch leak detection) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(4.3.2) Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(4.2.2)(C) (i.e., 0.020 inch leak detection) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (e)(4.2.2)(C) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(4.3.3) Manufacturers may disable or abort an evaporative system monitor when the fuel tank level is over 85 percent of nominal tank capacity or during a refueling event.

(4.3.4) Manufacturers may request Executive Officer approval to execute the evaporative system monitor only on driving cycles determined by the manufacturer to be cold starts if the condition is needed to ensure reliable monitoring. The Executive Officer may not approve criteria that exclude engine starts from being considered as cold starts solely on the basis that ambient temperature exceeds (i.e., indicates a higher temperature than) engine coolant temperature at engine start. The Executive Officer shall approve the request upon determining that data and/or an engineering evaluation submitted by the manufacturer demonstrate that a reliable check can only be made on driving cycles when the cold start criteria are satisfied.

(4.3.5) Manufacturers may temporarily disable the evaporative purge system to perform an evaporative system leak check.

(4.4) MIL Illumination and Fault Code Storage:

(4.4.1) Except as provided below for fuel cap leaks and alternate statistical MIL illumination protocols, general requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(4.4.2) If the OBD II system is capable of discerning that a system leak is being caused by a missing or improperly secured fuel cap:

(A) The manufacturer is not required to illuminate the MIL or store a fault code if the vehicle is equipped with an alternative indicator for notifying the vehicle operator of the malfunction. The alternative indicator shall be of sufficient illumination and location to be readily visible under all lighting conditions.

(B) If the vehicle is not equipped with an alternative indicator and the MIL illuminates, the MIL may be extinguished and the corresponding fault codes erased once the OBD II system has verified that the fuel cap has been securely fastened and the MIL has not been illuminated for any other type of malfunction.

(C) The Executive Officer may approve other strategies that provide equivalent assurance that a vehicle operator will be promptly notified of a missing or improperly secured fuel cap and that corrective action will be undertaken.

(4.4.3) Notwithstanding section (d)(2.2.6), manufacturers may request Executive Officer approval to use alternative statistical MIL illumination and fault code storage protocols that require up to twelve driving cycles on average for monitoring strategies designed to detect malfunctions specified by section (e)(4.2.2)(C). Executive Officer approval shall be granted in accordance with the bases identified in section (d)(2.2.6) and upon determination that the manufacturer has submitted data and/or an engineering analysis demonstrating that the most reliable monitoring method available cannot reliably detect a malfunction of the specified size without the additional driving cycles and that the monitoring system will still meet the monitoring conditions requirements specified in sections (d)(3.1) and (3.2).

(5) *Secondary Air System Monitoring*

(5.1) Requirement: The OBD II system on vehicles equipped with any form of secondary air delivery system shall monitor the proper functioning of the secondary air delivery system including all air switching valve(s). The individual electronic components (e.g., actuators, valves, sensors, etc.) in the secondary air system shall be monitored in accordance with the comprehensive component requirements in section (e)(15).

(5.2) Malfunction Criteria:

(5.2.1) For purposes of section (e)(5), "air flow" is defined as the air flow delivered by the secondary air system to the exhaust system. For vehicles using secondary air systems with multiple air flow paths/distribution points, the air flow to each bank (i.e., a group of cylinders that share a common exhaust manifold, catalyst, and control sensor) shall be monitored in accordance with the malfunction criteria in sections (e)(5.2.3) and (5.2.4) unless complete blocking of air delivery to one bank does not cause a measurable increase in emissions.

(5.2.2) For all Low Emission Vehicle I applications:

(A) Except as provided in sections (e)(5.2.2)(B) and (e)(5.2.4), the OBD II system shall detect a secondary air system malfunction prior to a decrease from the manufacturer's specified air flow that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards.

(B) Manufacturers may request Executive Officer approval to detect a malfunction when no detectable amount of air flow is delivered in lieu of the malfunction criteria in section (e)(5.2.2)(A). The Executive Office shall grant approval upon determining that deterioration of the secondary air system is unlikely based on data and/or engineering evaluation submitted by the manufacturer demonstrating that the materials used for the secondary air system (e.g., air hoses, tubing, valves, connectors, etc.) are inherently resistant to disconnection, corrosion, or other deterioration.

(5.2.3) For all Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles:

(A) For 2004 and 2005 model year vehicles, manufacturers shall use the malfunction criteria specified for Low Emission Vehicle I applications in section (e)(5.2.2).

(B) For 2006 and subsequent model year vehicles, except as provided in sections (e)(5.2.3)(C) and (e)(5.2.4), the OBD II system shall detect a secondary air system malfunction prior to a decrease from the manufacturer's specified air flow during normal operation that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards. For purposes of sections (e)(5.2) and (5.3), "normal operation" shall be defined as the condition when the secondary air system is activated during catalyst and/or engine warm-up following engine start and may not include the condition when the secondary air system is intrusively turned on solely for the purpose of monitoring.

(C) For 2006 and 2007 model year vehicles only, a manufacturer may request Executive Officer approval to detect a malfunction when no detectable amount of air flow is delivered during normal operation in lieu of the malfunction criteria in section (e)(5.2.3)(B) (e.g., 1.5 times the standard) during normal operation. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or engineering

analysis that demonstrate that the monitoring system is capable of detecting malfunctions prior to a decrease from the manufacturer's specified air flow that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards during an intrusive operation of the secondary air system later in the same driving cycle.

(5.2.4) For vehicles in which no deterioration or failure of the secondary air system would result in a vehicle's emissions exceeding 1.5 times any of the applicable standards, the OBD II system shall detect a malfunction when no detectable amount of air flow is delivered. For vehicles subject to the malfunction criteria in section (e)(5.2.3)(B), this monitoring for no detectable amount of air flow shall occur during normal operation of the secondary air system.

(5.3) Monitoring Conditions:

(5.3.1) For all Low Emission Vehicle I applications: Manufacturers shall define the monitoring conditions in accordance with section (d)(3.1).

(5.3.2) For all Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles:

(A) For 2004 and 2005 model year vehicles, manufacturers shall define the monitoring conditions in accordance with section (d)(3.1).

(B) For 2006 and subsequent model year vehicles, manufacturers shall define the monitoring conditions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (e)(5.2) during normal operation of the secondary air system shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(5.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(6) *Fuel System Monitoring*

(6.1) Requirement:

(6.1.1) The OBD II system shall monitor the fuel delivery system to determine its ability to provide compliance with applicable standards.

(6.2) Malfunction Criteria:

(6.2.1) The OBD II system shall detect a malfunction of the fuel delivery system when:

(A) The fuel delivery system is unable to maintain a vehicle's emissions at or below 1.5 times any of the applicable FTP standards; or

(B) If equipped, the feedback control based on a secondary oxygen or exhaust gas sensor is unable to maintain a vehicle's emissions (except as a result of a malfunction specified in section (e)(6.2.1)(C)) at or below 1.5 times any of the applicable FTP standards; or

(C) Except as required in section (e)(6.2.6), for 25 percent of all 2011 model year vehicles, 50 percent of all 2012 model year vehicles, 75 percent of all 2013 model year vehicles, and 100 percent of all 2014 model year vehicles, an air-fuel ratio cylinder imbalance (e.g., the air-fuel ratio in one or more cylinders is different than the other cylinders due to a cylinder specific malfunction such as an intake manifold leak at a particular cylinder, fuel injector problem, an individual cylinder EGR runner flow delivery problem, an individual variable cam lift malfunction such that an individual cylinder is operating on the wrong cam lift profile, or other similar problems) occurs in one or more cylinders such that the fuel delivery system is unable to maintain a vehicle's emissions at or below: 4.0 times the applicable FTP standards for PC/LDT SULEV II vehicles and 3.0 times the applicable FTP standards for all other vehicles for the 2011 through 2013 model years; and 1.5 times the applicable FTP standards for all 2014 and subsequent model year vehicles. In lieu of using 1.5 times the applicable FTP standards for all 2014 model year applications, for the 2014 model year only, a manufacturer may continue to use 4.0 times the applicable FTP standards for PC/LDT SULEV II vehicles and 3.0 times the applicable FTP standards for other applications previously certified in the 2011, 2012, or 2013 model year to 4.0 times or 3.0 times the applicable FTP standards and carried over to the 2014 model year.

(6.2.2) Except as provided for in section (e)(6.2.3) below, if the vehicle is equipped with adaptive feedback control, the OBD II system shall detect a malfunction when the adaptive feedback control has used up all of the adjustment allowed by the manufacturer.

(6.2.3) If the vehicle is equipped with feedback control that is based on a secondary oxygen (or equivalent) sensor, the OBD II system is not required to detect a malfunction of the fuel system solely when the feedback control based on a secondary oxygen sensor has used up all of the adjustment allowed by the manufacturer. However, if a failure or deterioration results in vehicle emissions that exceed the malfunction criteria in section (e)(6.2.1), the OBD II system is required to detect a malfunction.

(6.2.4) The OBD II system shall detect a malfunction whenever the fuel control system fails to enter closed-loop operation (if employed) within a manufacturer specified time interval.

(6.2.5) Manufacturers may adjust the criteria and/or limit(s) to compensate for changes in altitude, for temporary introduction of large amounts of purge vapor, or for other similar identifiable operating conditions when they occur.

(6.2.6) Notwithstanding the phase-in specified in section (e)(6.2.1)(C), if a vehicle is equipped with separate EGR flow delivery passageways (internal or external) that deliver EGR flow to individual cylinders (e.g., an EGR system with individual delivery pipes to each cylinder), the OBD II system shall monitor the fuel delivery system for malfunctions specified in section (e)(6.2.1)(C) on all 2011 and subsequent model year vehicles so equipped.

(6.3) Monitoring Conditions:

(6.3.1) Except as provided in section (e)(6.3.2), the fuel system shall be monitored continuously for the presence of a malfunction.

(6.3.2) Manufacturers shall define monitoring conditions for malfunctions identified in section (e)(6.2.1)(C) (i.e., air-fuel ratio cylinder imbalance malfunctions) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(6.4) MIL Illumination and Fault Code Storage: For malfunctions described under section (6.2.1)(C) (i.e., air-fuel ratio cylinder imbalance malfunctions), general requirements for MIL illumination and fault code storage are set forth in section (d)(2). For all other fuel system malfunctions, the MIL illumination and fault code storage requirements are set forth in sections (e)(6.4.1) through (6.4.6) below.

(6.4.1) A pending fault code shall be stored immediately upon the fuel system exceeding the malfunction criteria established pursuant to section (e)(6.2).

(6.4.2) Except as provided below, if a pending fault code is stored, the OBD II system shall immediately illuminate the MIL and store a confirmed fault code if a malfunction is again detected during either of the following two events: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to those that occurred when the pending fault code was stored are encountered.

(6.4.3) The pending fault code may be erased at the end of the next driving cycle in which similar conditions have been encountered without an exceedance of the specified fuel system malfunction criteria. The pending code may also be erased if similar conditions are not encountered during the 80 driving cycles immediately after the initial detection of a malfunction for which the pending code was set.

(6.4.4) Storage of freeze frame conditions.

(A) The OBD II system shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing and erasing a confirmed fault code.

(B) If freeze frame conditions are stored for a malfunction other than misfire (see section (e)(3)) or fuel system malfunction when a fault code is stored

as specified in section (e)(6.4) above, the stored freeze frame information shall be replaced with freeze frame information regarding the fuel system malfunction.

(6.4.5) Storage of fuel system conditions for determining similar conditions of operation.

(A) Upon detection of a fuel system malfunction under section (e)(6.2), the OBD II system shall store the engine speed, load, and warm-up status of the first fuel system malfunction that resulted in the storage of the pending fault code.

(B) For fuel system faults detected using feedback control that is based on a secondary oxygen (or equivalent) sensor, the manufacturer may request Executive Officer approval to use an alternate definition of similar conditions in lieu of the definition specified in section (c). The Executive Officer shall approve the alternate definition upon the manufacturer providing data or analysis demonstrating that the alternate definition provides for equivalent robustness in detection of fuel system faults that vary in severity depending on engine speed, load, and/or warm-up status.

(6.4.6) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without a malfunction of the fuel system.

(7) *Exhaust Gas Sensor Monitoring*

(7.1) Requirement:

(7.1.1) The OBD II system shall monitor the output voltage, response rate, and any other parameter which can affect emissions of all primary (fuel control) oxygen sensors (conventional switching sensors and wide range or universal sensors) for malfunction.

(7.1.2) The OBD II system shall also monitor all secondary oxygen sensors (those used for fuel trim control or as a monitoring device) for proper output voltage, activity, and/or response rate.

(7.1.3) For vehicles equipped with heated oxygen sensors, the OBD II system shall monitor the heater for proper performance.

(7.1.4) For other types of sensors (e.g., hydrocarbon sensors, NOx sensors), the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for conventional sensors under section (e)(7).

(7.2) Malfunction Criteria:

(7.2.1) Primary Sensors:

(A) The OBD II system shall detect a malfunction prior to any failure or deterioration of the oxygen sensor voltage, response rate, amplitude, or other characteristic(s) (including drift or bias corrected for by secondary sensors) that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards. For response rate (see section (c)), the OBD II system shall detect asymmetric malfunctions (i.e., malfunctions that primarily affect only the lean-to-rich response rate or only the rich-to-lean response rate) and symmetric malfunctions (i.e., malfunctions that affect both the lean-to-rich and rich-to-lean response rates). As defined in section (c), response rate includes delays in the sensor to initially react to a change in exhaust gas composition as well as delays during the transition from a rich-to-lean (or lean-to-rich) sensor output. For 25 percent of 2011, 50 percent of 2012, and 100 percent of 2013 and subsequent model year vehicles, the manufacturer shall submit data and/or engineering analysis to demonstrate that the calibration method used ensures proper detection of all symmetric and asymmetric response rate malfunctions as part of the certification application.

(B) The OBD II system shall detect malfunctions of the oxygen sensor caused by either a lack of circuit continuity or out-of-range values.

(C) The OBD II system shall detect a malfunction of the oxygen sensor when a sensor failure or deterioration causes the fuel system to stop using that sensor as a feedback input (e.g., causes default or open loop operation) or causes the fuel system to fail to enter closed-loop operation within a manufacturer-specified time interval.

(D) The OBD II system shall detect a malfunction of the oxygen sensor when the sensor output voltage, amplitude, activity, or other characteristics are no longer sufficient for use as an OBD II system monitoring device (e.g., for catalyst monitoring).

(7.2.2) Secondary Sensors:

(A) The OBD II system shall detect a malfunction prior to any failure or deterioration of the oxygen sensor voltage, response rate, amplitude, or other characteristic(s) that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards.

(B) The OBD II system shall detect malfunctions of the oxygen sensor caused by a lack of circuit continuity.

(C) Sufficient sensor performance for other monitors.

(i) The OBD II system shall detect a malfunction of the oxygen sensor when the sensor output voltage, amplitude, activity, or other characteristics are no longer sufficient for use as an OBD II system monitoring device (e.g., for catalyst monitoring). For this requirement, "sufficient" is defined as the capability of the worst performing

acceptable sensor to detect the best performing unacceptable other monitored system or component (e.g., catalyst).

(ii) For systems where it is not technically feasible to satisfy the criteria of section (e)(7.2.2)(C)(i) completely, the OBD II system shall, at a minimum, detect a slow rich-to-lean response malfunction during a fuel shut-off event (e.g., deceleration fuel cut event). The rich-to-lean response check shall monitor both the sensor response time from a rich condition (e.g., 0.7 Volts) prior to the start of fuel shut-off to a lean condition (e.g., 0.1 Volts) expected during fuel shut-off conditions and the sensor transition time in the intermediate sensor range (e.g., from 0.55 Volts to 0.3 Volts). Monitoring of the rich-to-lean response shall be phased in on at least 25 percent of the 2009, 50 percent of the 2010, and 100 percent of the 2011 model year vehicles. For purposes of this phase-in, vehicles meeting the criteria of section (e)(7.2.2)(C)(i) shall be counted as vehicles meeting the rich-to-lean response rate monitoring requirement of section (e)(7.2.2)(C)(ii).

(iii) Additionally, for systems where it is not technically feasible to satisfy the criteria in section (e)(7.2.2)(C)(i), prior to certification of 2009 model year vehicles, the manufacturer must submit a comprehensive plan to the Executive Officer demonstrating the manufacturer's efforts to minimize any gap remaining between the worst performing acceptable sensor and a sufficient sensor. The plan should include quantification of the gap and supporting documentation for efforts to close the gap including sensor monitoring improvements, other system component monitor improvements (e.g., changes to make the catalyst monitor less sensitive to oxygen sensor response), and sensor specification changes, if any. The Executive Officer shall approve the plan upon determining the submitted information supports the necessity of the gap and the plan demonstrates that the manufacturer is taking reasonable efforts to minimize or eliminate the gap in a timely manner.

(D) The OBD II system shall detect malfunctions of the oxygen sensor caused by out-of-range values.

(7.2.3) Sensor Heaters:

(A) The OBD II system shall detect a malfunction of the heater performance when the current or voltage drop in the heater circuit is no longer within the manufacturer's specified limits for normal operation (i.e., within the criteria required to be met by the component vendor for heater circuit performance at high mileage). Subject to Executive Officer approval, other malfunction criteria for heater performance malfunctions may be used upon the Executive Officer determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate the monitoring reliability and timeliness to be equivalent to the stated criteria in section (e)(7.2.3)(A).

(B) The OBD II system shall detect malfunctions of the heater circuit including open or short circuits that conflict with the commanded state of the heater (e.g., shorted to 12 Volts when commanded to 0 Volts (ground), etc.).

(7.3) Monitoring Conditions:

(7.3.1) Primary Sensors

(A) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(7.2.1)(A) and (D) (e.g., proper response rate) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (e)(7.2.1)(A) and (D) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(B) Except as provided in section (e)(7.3.1)(C), monitoring for malfunctions identified in sections (e)(7.2.1)(B) and (C) (i.e., circuit continuity, out-of-range, and open-loop malfunctions) shall be:

(i) Conducted in accordance with title 13, CCR section 1968.1 for Low Emission Vehicle I applications and 2004 and 2005 model year Low Emission Vehicle II applications;

(ii) Conducted continuously for all 2006 through 2008 model year Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles.

(C) A manufacturer may request Executive Officer approval to disable continuous oxygen sensor monitoring when an oxygen sensor malfunction cannot be distinguished from other effects (e.g., disable out-of-range low monitoring during fuel cut conditions). The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(7.3.2) Secondary Sensors

(A) Manufacturers shall define monitoring conditions for malfunctions identified in sections (e)(7.2.2)(A) and (C) (e.g., proper sensor activity) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For all 2010 and subsequent model year vehicles meeting the monitoring requirements of section (e)(7.2.2)(C)(i) or (ii), for purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (e)(7.2.2)(A) and (C) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(B) Except as provided in section (e)(7.3.2)(C), monitoring for malfunctions identified in sections (e)(7.2.2)(B) and (D) (i.e., open circuit, out-of-range malfunctions) shall be:

(i) Conducted in accordance with title 13, CCR section 1968.1 for Low Emission Vehicle I applications and 2004 and 2005 model year Low Emission Vehicle II applications;

(ii) Conducted continuously for all 2006 through 2008 model year Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles.

(C) A manufacturer may request Executive Officer approval to disable continuous oxygen sensor monitoring when an oxygen sensor malfunction cannot be distinguished from other effects (e.g., disable out-of-range low monitoring during fuel cut conditions). The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(7.3.3) Sensor Heaters

(A) Manufacturers shall define monitoring conditions for malfunctions identified in section (e) (7.2.3)(A) (e.g., sensor heater performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(B) Monitoring for malfunctions identified in section (e)(7.2.3)(B) (e.g., circuit malfunctions) shall be:

(i) Conducted in accordance with title 13, CCR section 1968.1 for 2004 and 2005 model year vehicles;

(ii) Conducted continuously for all 2006 and subsequent model year vehicles.

(7.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(8) *Exhaust Gas Recirculation (EGR) System Monitoring*

(8.1) Requirement: The OBD II system shall monitor the EGR system on vehicles so-equipped for low and high flow rate malfunctions. The individual electronic components (e.g., actuators, valves, sensors, etc.) that are used in the EGR system shall be monitored in accordance with the comprehensive component requirements in section (e)(15).

(8.2) Malfunction Criteria:

(8.2.1) The OBD II system shall detect a malfunction of the EGR system prior to an increase or decrease from the manufacturer's specified EGR flow rate

that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards.

(8.2.2) For vehicles in which no failure or deterioration of the EGR system could result in a vehicle's emissions exceeding 1.5 times any of the applicable standards, the OBD II system shall detect a malfunction when the system has no detectable amount of EGR flow.

(8.3) Monitoring Conditions:

(8.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(8.2) (e.g., flow rate) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (e)(8.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(8.3.2) Manufacturers may request Executive Officer approval to temporarily disable the EGR system check under specific conditions (e.g., when freezing may affect performance of the system). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a reliable check cannot be made when these conditions exist.

(8.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(9) *Positive Crankcase Ventilation (PCV) System Monitoring*

(9.1) Requirement:

(9.1.1) On all 2004 and subsequent model year vehicles, manufacturers shall monitor the PCV system on vehicles so-equipped for system integrity. A manufacturer may use an alternate phase-in schedule in lieu of meeting the requirements of section (e)(9) on all 2004 model year vehicles if the alternate phase-in schedule provides for equivalent compliance volume (as defined in section (c)) to the phase-in schedule specified in title 13, CCR section 1968.1(b)(10.1). Vehicles not required to be equipped with PCV systems shall be exempt from monitoring of the PCV system.

(9.2) Malfunction Criteria:

(9.2.1) For the purposes of section (e)(9), "PCV system" is defined as any form of crankcase ventilation system, regardless of whether it utilizes positive pressure. "PCV valve" is defined as any form of valve or orifice used to restrict or control crankcase vapor flow. Further, any additional external PCV system tubing or hoses used to equalize crankcase pressure or to provide a ventilation path between various areas of the engine (e.g., crankcase and valve cover) are considered part of the PCV system "between the crankcase and the PCV valve" and subject to the malfunction criteria in section (e)(9.2.2) below.

(9.2.2) Except as provided below, the OBD II system shall detect a malfunction of the PCV system when a disconnection of the system occurs between either the crankcase and the PCV valve, or between the PCV valve and the intake manifold.

(9.2.3) If the PCV system is designed such that the PCV valve is fastened directly to the crankcase in a manner which makes it significantly more difficult to remove the valve from the crankcase rather than disconnect the line between the valve and the intake manifold (taking aging effects into consideration), the Executive Officer shall exempt the manufacturer from detection of disconnection between the crankcase and the PCV valve.

(9.2.4) Subject to Executive Officer approval, system designs that utilize tubing between the valve and the crankcase shall also be exempted from the portion of the monitoring requirement for detection of disconnection between the crankcase and the PCV valve. The manufacturer shall file a request and submit data and/or engineering evaluation in support of the request. The Executive Officer shall approve the request upon determining that the connections between the valve and the crankcase are: (i) resistant to deterioration or accidental disconnection, (ii) significantly more difficult to disconnect than the line between the valve and the intake manifold, and (iii) not subject to disconnection per manufacturer's repair procedures for non-PCV system repair work.

(9.2.5) Manufacturers are not required to detect disconnections between the PCV valve and the intake manifold if said disconnection (1) causes the vehicle to stall immediately during idle operation; or (2) is unlikely to occur due to a PCV system design that is integral to the induction system (e.g., machined passages rather than tubing or hoses).

(9.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(9.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(9.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2). The stored fault code need not specifically identify the PCV system (e.g., a fault code for idle speed control or fuel system monitoring can be stored) if the manufacturer demonstrates that additional monitoring hardware would be necessary to make this identification, and provided the manufacturer's diagnostic and repair procedures for the detected malfunction include directions to check the integrity of the PCV system.

(10) *Engine Cooling System Monitoring*

(10.1) Requirement:

(10.1.1) The OBD II system shall monitor the thermostat on vehicles so-equipped for proper operation.

(10.1.2) The OBD II system shall monitor the engine coolant temperature (ECT) sensor for circuit continuity, out-of-range values, and rationality faults.

(10.2) Malfunction Criteria:

(10.2.1) Thermostat

(A) The OBD II system shall detect a thermostat malfunction if, within an Executive Officer approved time interval after starting the engine, either of the following two conditions occur:

(i) The coolant temperature does not reach the highest temperature required by the OBD II system to enable other diagnostics;

(ii) The coolant temperature does not reach a warmed-up temperature within 20 degrees Fahrenheit of the manufacturer's nominal thermostat regulating temperature. Subject to Executive Officer approval, a manufacturer may utilize lower temperatures for this criterion upon the Executive Officer determining that the manufacturer has demonstrated that the fuel, spark timing, and/or other coolant temperature-based modifications to the engine control strategies would not cause an emission increase of 50 or more percent of any of the applicable standards (e.g., 50 degree Fahrenheit emission test, etc.).

(B) Executive Officer approval of the time interval after engine start shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times.

(C) With Executive Officer approval, a manufacturer may use alternate malfunction criteria and/or monitoring conditions (see section (e)(10.3)) that are a function of temperature at engine start on vehicles that do not reach the temperatures specified in the malfunction criteria when the thermostat is functioning properly. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data that demonstrate that a properly operating system does not reach the specified temperatures, that the monitor is capable of meeting the specified malfunction criteria at engine start temperatures greater than 50°F, and that the overall effectiveness of the monitor is comparable to a monitor meeting these thermostat monitoring requirements at lower temperatures.

(D) With Executive Officer approval, manufacturers may omit this monitor. Executive Officer approval shall be granted upon determining that the manufacturer has demonstrated that a malfunctioning thermostat cannot cause a measurable increase in emissions during any reasonable driving condition nor cause any disablement of other monitors.

(10.2.2) ECT Sensor

(A) Circuit Continuity. The OBD II system shall detect a malfunction when a lack of circuit continuity or out-of-range value occurs.

(B) Time to Reach Closed-Loop Enable Temperature.

(i) The OBD II system shall detect a malfunction if the ECT sensor does not achieve the stabilized minimum temperature which is needed for the fuel control system to begin closed-loop operation (closed-loop enable temperature) within an Executive Officer approved time interval after starting the engine.

(ii) The time interval shall be a function of starting ECT and/or a function of intake air temperature and, except as provided below in section (e)(10.2.2)(B)(iii), may not exceed:

a. two minutes for engine start temperatures at or above 50 degrees Fahrenheit and five minutes for engine start temperatures at or above 20 degrees Fahrenheit and below 50 degrees Fahrenheit for Low Emission Vehicle I applications and 2004 and 2005 model year Low Emission Vehicle II applications;

b. two minutes for engine start temperatures up to 15 degrees Fahrenheit below the closed-loop enable temperature and five minutes for engine start temperatures between 15 and 35 degrees Fahrenheit below the closed-loop enable temperature for all 2006 through 2008 model year Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles.

(iii) Executive Officer approval of the time interval shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times. The Executive Officer shall allow longer time intervals upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that the vehicle requires a longer time to warm up under normal conditions.

(iv) The Executive Officer shall exempt manufacturers from the requirement of section (e)(10.2.2)(B) if the manufacturer does not utilize ECT to enable closed loop fuel control.

(C) Stuck in Range Below the Highest Minimum Enable Temperature. To the extent feasible when using all available information, the OBD II system shall detect a malfunction if the ECT sensor inappropriately indicates a temperature below the highest minimum enable temperature required by the OBD II system to enable other diagnostics (e.g., an OBD II system that requires ECT to be greater than 140 degrees Fahrenheit to enable a diagnostic must detect malfunctions that cause the ECT sensor to inappropriately indicate a temperature below 140 degrees Fahrenheit). Manufacturers are exempted from this requirement for temperature regions in which the monitors required under sections (e)(10.2.1) or (e)(10.2.2)(B) will detect ECT sensor malfunctions as defined in section (e)(10.2.2)(C).

(D) Stuck in Range Above the Lowest Maximum Enable Temperature.

(i) To the extent feasible when using all available information, the OBD II system shall detect a malfunction if the ECT sensor inappropriately indicates a temperature above the lowest maximum enable temperature required by the OBD II system to enable other diagnostics (e.g., an OBD II system that requires ECT to be less than 90 degrees Fahrenheit at engine start to enable a diagnostic must detect malfunctions that cause the ECT sensor to inappropriately indicate a temperature above 90 degrees Fahrenheit).

(ii) Manufacturers are exempted from this requirement for temperature regions in which the monitors required under sections (e)(10.2.1), (e)(10.2.2)(B), or (e)(10.2.2)(C) (i.e., ECT sensor or thermostat malfunctions) will detect ECT sensor malfunctions as defined in section (e)(10.2.2)(D) or in which the MIL will be illuminated under the requirements of section (d)(2.2.3) for default mode operation (e.g., overtemperature protection strategies).

(iii) For Low Emission Vehicle I applications and 2004 and 2005 model year Low Emission Vehicle II applications only, manufacturers are also exempted from the requirements of section (e)(10.2.2)(D) for vehicles that have a temperature gauge (not a warning light) on the instrument panel and utilize the same ECT sensor for input to the OBD II system and the temperature gauge.

(iv) For 2006 through 2008 model year Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles, manufacturers are also exempted from the requirements of section (e)(10.2.2)(D) for temperature regions where the temperature gauge indicates a temperature in the red zone (engine overheating zone) for vehicles that have a temperature gauge (not a warning light) on the instrument panel and utilize the same ECT sensor for input to the OBD II system and the temperature gauge.

(10.3) Monitoring Conditions:

(10.3.1) Thermostat

(A) Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(10.2.1)(A) in accordance with section (d)(3.1) except as provided for in section (e)(10.3.1)(D). Additionally, except as provided for in sections (e)(10.3.1)(B) and (C), monitoring for malfunctions identified in section (e)(10.2.1)(A) shall be conducted once per driving cycle on every driving cycle in which the ECT sensor indicates, at engine start, a temperature lower than the temperature established as the malfunction criteria in section (e)(10.2.1)(A).

(B) Manufacturers may disable thermostat monitoring at ambient temperatures below 20 degrees Fahrenheit.

(C) Manufacturers may request Executive Officer approval to suspend or disable thermostat monitoring if the vehicle is subjected to conditions which could lead to false diagnosis (e.g., vehicle operation at idle for more than 50 percent of the warm-up time, hot restart conditions, etc.). In general, the Executive Officer shall not approve disablement of the monitor on engine starts where the ECT at engine start is more than 35 degrees Fahrenheit lower than the thermostat malfunction threshold temperature determined under section (e)(10.2.1)(A). The Executive Officer shall approve the request upon determining that the manufacturer has provided data and/or engineering analysis that demonstrate the need for the request.

(D) With respect to defining enable conditions that are encountered during the FTP or Unified cycle as required in (d)(3.1.1) for malfunctions identified in section (e)(10.2.1)(A), the FTP cycle or Unified cycle shall refer to on-road driving following the FTP or Unified cycle in lieu of testing on a chassis dynamometer.

(10.3.2) ECT Sensor

(A) Except as provided below in section (e)(10.3.2)(E), monitoring for malfunctions identified in section (e)(10.2.2)(A) (i.e., circuit continuity and out-of-range) shall be conducted continuously.

(B) Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(10.2.2)(B) in accordance with section (d)(3.1). Additionally, except as provided for in section (e)(10.3.2)(D), monitoring for malfunctions identified in section (e)(10.2.2)(B) shall be conducted once per driving cycle on every driving cycle in which the ECT sensor indicates a temperature lower than the closed loop enable temperature at engine start (i.e., all engine start temperatures greater than the ECT sensor out of range low temperature and less than the closed loop enable temperature).

(C) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(10.2.2)(C) and (D) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(D) Manufacturers may suspend or delay the time to reach closed loop enable temperature diagnostic if the vehicle is subjected to conditions which could lead to false diagnosis (e.g., vehicle operation at idle for more than 50 to 75 percent of the warm-up time).

(E) A manufacturer may request Executive Officer approval to disable continuous ECT sensor monitoring when an ECT sensor malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or engineering evaluation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning

sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(10.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(11) *Cold Start Emission Reduction Strategy Monitoring*

(11.1) Requirement:

(11.1.1) For all 2006 through 2008 model year Low Emission Vehicle II applications and all 2009 and subsequent model year applications, if a vehicle incorporates a specific engine control strategy to reduce cold start emissions, the OBD II system shall monitor the commanded elements for proper function (e.g., increased engine idle speed, commanded ignition timing retard, etc.), other than secondary air, while the control strategy is active to ensure proper operation of the control strategy. Secondary air systems shall be monitored under the provisions of section (e)(5).

(11.1.2) In lieu of meeting the requirements of section (e)(11) on all 2006 through 2008 model year Low Emission Vehicle II applications, a manufacturer may phase in the requirements on a portion of its Low Emission Vehicle II applications as long as that portion of Low Emission Vehicle II applications comprises at least 30 percent of all 2006 model year vehicles, 60 percent of all 2007 model year vehicles, and 100 percent of all 2008 and subsequent model year vehicles.

(11.2) Malfunction Criteria:

(11.2.1) For vehicles not included in the phase-in specified in section (e)(11.2.2):

(A) The OBD II system shall detect a malfunction prior to any failure or deterioration of the individual components associated with the cold start emission reduction control strategy that would cause a vehicle's emissions to exceed 1.5 times the applicable FTP standards. Manufacturers shall:

(i) Establish the malfunction criteria based on data from one or more representative vehicle(s).

(ii) Provide an engineering evaluation for establishing the malfunction criteria for the remainder of the manufacturer's product line. The Executive Officer shall waive the evaluation requirement each year if, in the judgment of the Executive Officer, technological changes do not affect the previously determined malfunction criteria.

(B) For components where no failure or deterioration of the component used for the cold start emission reduction strategy could result in a vehicle's emissions exceeding 1.5 times the applicable standards, the individual component shall be monitored for proper functional response in accordance with the malfunction criteria in section (e)(15.2) while the control strategy is active.

(11.2.2) For 25 percent of 2010, 50 percent of 2011, and 100 percent of 2012 and subsequent model year vehicles, the OBD II system shall, to the extent feasible, detect a malfunction if either of the following occurs:

(A) Any single commanded element does not properly respond to the commanded action while the cold start strategy is active. For elements involving spark timing (e.g., retarded spark timing), the monitor may verify final commanded spark timing in lieu of verifying actual delivered spark timing. For purposes of this section, "properly respond" is defined as when the element responds:

(i) by a robustly detectable amount; and

(ii) in the direction of the desired command; and

(iii) above and beyond what the element would achieve on start-up without the cold start strategy active (e.g., if the cold start strategy commands a higher idle engine speed, a fault must be detected if there is no detectable amount of engine speed increase above what the system would achieve without the cold start strategy active);

(B) Any failure or deterioration of the cold start emission reduction control strategy that would cause a vehicle's emissions to be equal to or above 1.5 times the applicable FTP standards. For this requirement, the OBD II system shall either monitor elements of the system as a whole (e.g., measuring air flow and modeling overall heat into the exhaust) or the individual elements (e.g., increased engine speed, commanded final spark timing) for failures that cause vehicle emissions to exceed 1.5 times the applicable FTP standards.

(11.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(11.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(11.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(12) *Air Conditioning (A/C) System Component Monitoring*

(12.1) Requirement: If a vehicle incorporates an engine control strategy that alters off-idle fuel and/or spark control when the A/C system is on, the OBD II system shall monitor all electronic air conditioning system components for malfunctions that cause the system to fail to invoke the alternate control while the A/C system is on or cause the system to invoke the alternate control while the A/C system is off. Additionally, the OBD II system shall monitor for malfunction all electronic air conditioning system components that are used as part of the diagnostic strategy for any other monitored system or component. The requirements of section (e)(12) shall be phased in as follows: 30 percent of all 2006 model year vehicles, 60 percent of all 2007 model year vehicles, and 100 percent of all 2008 and subsequent model year vehicles.

(12.2) Malfunction Criteria:

(12.2.1) The OBD II system shall detect a malfunction prior to any failure or deterioration of an electronic component of the air conditioning system that would cause a vehicle's emissions to exceed 1.5 times any of the appropriate applicable emission standards or would, through software, effectively disable any other monitored system or component covered by this regulation. For malfunctions that result in the alternate control being erroneously invoked while the A/C system is off, the appropriate emission standards shall be the FTP standards. For malfunctions that result in the alternate control failing to be invoked while the A/C system is on, the appropriate emission standards shall be the SC03 emission standards.

(12.2.2) If no single electronic component failure or deterioration causes emissions to exceed 1.5 times any of the appropriate applicable emission standards as defined above in section (e)(12.2.1) nor is used as part of the diagnostic strategy for any other monitored system or component, manufacturers are not required to monitor any air conditioning system component for purposes of section (e)(12).

(12.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(12.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(12.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(13) *Variable Valve Timing and/or Control (VVT) System Monitoring*

(13.1) Requirement: On all 2006 through 2008 model year Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles, the OBD II system shall monitor the VVT system on vehicles so-equipped for target error and slow response malfunctions. The individual electronic components (e.g., actuators, valves, sensors, etc.) that are used in the VVT system shall be monitored in accordance with the comprehensive components requirements in section (e)(15). VVT systems on Low Emission Vehicle I applications and 2004 and 2005 model year Low Emission Vehicle II applications shall be monitored in accordance with the comprehensive components requirements in section (e)(15).

(13.2) Malfunction Criteria:

(13.2.1) Target Error. The OBD II system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve the commanded valve timing and/or control within a crank angle and/or lift tolerance that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards.

(13.2.2) Slow Response. The OBD II system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve

the commanded valve timing and/or control within a time that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards.

(13.2.3) For vehicles in which no failure or deterioration of the VVT system could result in a vehicle's emissions exceeding 1.5 times any of the applicable standards, the VVT system shall be monitored for proper functional response in accordance with the malfunction criteria in section (e)(15.2).

(13.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for VVT system malfunctions identified in section (e)(13.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). Additionally, manufacturers shall track and report VVT system monitor performance under section (d)(3.2.2). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (e)(13.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(13.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(14) *Direct Ozone Reduction (DOR) System Monitoring*

(14.1) Requirement:

(14.1.1) The OBD II system shall monitor the DOR system on vehicles so-equipped for malfunctions that reduce the ozone reduction performance of the system.

(14.1.2) For 2003, 2004, and 2005 model year vehicles subject to the malfunction criteria of section (e)(14.2.1) below, manufacturers may request to be exempted from DOR system monitoring. The Executive Officer shall approve the exemption upon the manufacturer:

(A) Agreeing that the DOR system receive only 50 percent of the NMOG credit assigned to the DOR system as calculated under Air Resources Board (ARB) Manufacturers Advisory Correspondence (MAC) No. 99-06, December 20, 1999, which is hereby incorporated by reference herein.

(B) Identifying the DOR system component(s) as an emission control device on both the underhood emission control label and a separate label as specified below. The DOR system shall be included in the list of emission control devices on the underhood emission control label and be identified as a "DOR system" or other equivalent term from SAE J1930 "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms – Equivalent to ISO/TR 15031-2:April 30, 2002 (SAE 1930)", incorporated by reference. A separate label shall be located on or near the DOR system component(s) in a location that is

visible to repair technicians prior to the removal of any parts necessary to replace the DOR system component(s) and shall identify the components as a "DOR system" or other equivalent SAE J1930 term.

(14.2) Malfunction Criteria:

(14.2.1) For vehicles in which the NMOG credit assigned to the DOR system, as calculated in accordance with ARB MAC No. 99-06, is less than or equal to 50 percent of the applicable FTP NMOG standard, the OBD II system shall detect a malfunction when the DOR system has no detectable amount of ozone reduction.

(14.2.2) For vehicles in which the NMOG credit assigned to the DOR system, as calculated in accordance with ARB MAC No. 99-06, is greater than 50 percent of the applicable FTP NMOG standard, the OBD II system shall detect a malfunction when the ozone reduction performance of the DOR system deteriorates to a point where the difference between the NMOG credit assigned to the properly operating DOR system and the NMOG credit calculated for a DOR system performing at the level of the malfunctioning system exceeds 50 percent of the applicable FTP NMOG standard.

(14.2.3) For vehicles equipped with a DOR system, the manufacturer may modify any of the applicable NMOG malfunction criteria in sections (e)(1)-(3), (e)(5)-(8), (e)(11)-(e)(13), and (e)(16) by adding the NMOG credit received by the DOR system to the required NMOG malfunction criteria (e.g., a malfunction criteria of 1.5 x NMOG standard would be modified to (1.5 x NMOG standard) + DOR system NMOG credit).

(14.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(14.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(14.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(15) *Comprehensive Component Monitoring*

(15.1) Requirement:

(15.1.1) Except as provided in sections (e)(15.1.3), (e)(15.1.4), and (e)(16), the OBD II system shall monitor for malfunction any electronic powertrain component/system not otherwise described in sections (e)(1) through (e)(14) that either provides input to (directly or indirectly) or receives commands from the on-board computer(s), and: (1) can affect emissions during any reasonable in-use driving condition, or (2) is used as part of the diagnostic strategy for any other monitored system or component.

(A) Input Components: Input components required to be monitored may include the vehicle speed sensor, crank angle sensor, knock sensor, throttle position sensor, cam position sensor, fuel composition sensor (e.g.

flexible fuel vehicles), and transmission electronic components such as sensors, modules, and solenoids which provide signals to the powertrain control system.

(B) Output Components/Systems: Output components/systems required to be monitored may include the idle speed control system, automatic transmission solenoids or controls, variable length intake manifold runner systems, supercharger or turbocharger electronic components, heated fuel preparation systems, and a warm-up catalyst bypass valve.

(15.1.2) For purposes of criteria (1) in section (e)(15.1.1) above, the manufacturer shall determine whether a powertrain input or output component/system can affect emissions. If the Executive Officer reasonably believes that a manufacturer has incorrectly determined that a component/system cannot affect emissions, the Executive Officer shall require the manufacturer to provide emission data showing that the component/system, when malfunctioning and installed in a suitable test vehicle, does not have an emission effect. The Executive Officer may request emission data for any reasonable driving condition.

(15.1.3) Manufacturers shall monitor for malfunction electronic powertrain input or output components/systems associated with an electronic transfer case, electronic power steering system, or other components that are driven by the engine and not related to the control of fueling, air handling, or emissions only if the component or system is used as part of the diagnostic strategy for any other monitored system or component.

(15.1.4) Except as specified for hybrids in section (e)(15.1.5), manufacturers shall monitor for malfunction electronic powertrain input or output components/systems associated with components that only affect emissions by causing additional electrical load to the engine and are not related to the control of fueling, air handling, or emissions only if the component or system is used as part of the diagnostic strategy for any other monitored system or component.

(15.1.5) For hybrids, manufacturers shall submit a plan to the Executive Officer for approval of the hybrid components determined by the manufacturer to be subject to monitoring in section (e)(15.1.1). In general, the Executive Officer shall approve the plan if it includes monitoring of all components/systems used as part of the diagnostic strategy for any other monitored system or component, monitoring of all energy input devices to the electrical propulsion system, monitoring of battery and charging system performance, monitoring of electric motor performance, and monitoring of regenerative braking performance.

(15.2) Malfunction Criteria:

(15.2.1) Input Components:

(A) The OBD II system shall detect malfunctions of input components caused

by a lack of circuit continuity, out of range values, and, where feasible, rationality faults. To the extent feasible, the rationality fault diagnostics shall verify that a sensor output is neither inappropriately high nor inappropriately low (e.g., "two-sided" diagnostics).

(B) To the extent feasible on all 2005 and subsequent model year vehicles, rationality faults shall be separately detected and store different fault codes than the respective lack of circuit continuity and out of range diagnostics. Additionally, input component lack of circuit continuity and out of range faults shall be separately detected and store different fault codes for each distinct malfunction (e.g., out-of-range low, out-of-range high, open circuit, etc.). Manufacturers are not required to store separate fault codes for lack of circuit continuity faults that cannot be distinguished from other out-of-range circuit faults.

(C) For vehicles that require precise alignment between the camshaft and the crankshaft, the OBD II system shall monitor the crankshaft position sensor(s) and camshaft position sensor(s) to verify proper alignment between the camshaft and crankshaft in addition to monitoring the sensors for circuit continuity and rationality malfunctions. Proper alignment monitoring between a camshaft and a crankshaft shall only be required in cases where both are equipped with position sensors. For 2006 through 2008 model year Low Emission Vehicle II applications and all 2009 and subsequent model year vehicles equipped with VVT systems and a timing belt or chain, the OBD II system shall detect a malfunction if the alignment between the camshaft and crankshaft is off by one or more cam/crank sprocket cogs (e.g., the timing belt/chain has slipped by one or more teeth/cogs). If a manufacturer demonstrates that a single tooth/cog misalignment cannot cause a measurable increase in emissions during any reasonable driving condition, the manufacturer shall detect a malfunction when the minimum number of teeth/cogs misalignment needed to cause a measurable emission increase has occurred. For the 2006 through 2009 model years only, a manufacturer may also request Executive Officer approval to use a larger threshold than one tooth/cog. The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated that hardware modifications are necessary to meet the one tooth/cog threshold and that further software modifications are not able to reduce the larger threshold.

(15.2.2) Output Components/Systems:

(A) The OBD II system shall detect a malfunction of an output component/system when proper functional response of the component and system to computer commands does not occur. If a functional check is not feasible, the OBD II system shall detect malfunctions of output components/systems caused by a lack of circuit continuity or circuit fault (e.g., short to ground or high voltage). For output component lack of circuit continuity faults and circuit faults, manufacturers are not required to store

different fault codes for each distinct malfunction (e.g., open circuit, shorted low, etc.). Manufacturers are not required to activate an output component/system when it would not normally be active for the purposes of performing functional monitoring of output components/systems as required in section (e)(15).

(B) The idle speed control system shall be monitored for proper functional response to computer commands. For strategies based on deviation from target idle speed, a malfunction shall be detected when either of the following conditions occur:

(i) The idle speed control system cannot achieve the target idle speed within 200 revolutions per minute (rpm) above the target speed or 100 rpm below the target speed. The Executive Officer shall allow larger engine speed tolerances upon determining that a manufacturer has submitted data and/or an engineering evaluation which demonstrate that the tolerances can be exceeded without a malfunction being present.

(ii) The idle speed control system cannot achieve the target idle speed within the smallest engine speed tolerance range required by the OBD II system to enable any other monitor.

(15.3) Monitoring Conditions:

(15.3.1) Input Components:

(A) Except as provided in section (e)(15.3.1)(C), input components shall be monitored continuously for proper range of values and circuit continuity.

(B) For rationality monitoring (where applicable):

(i) For 2004 model year vehicles, manufacturers shall define the monitoring conditions for detecting malfunctions in accordance with section (d)(3.1).

(ii) For 2005 and subsequent model year vehicles, manufacturers shall define the monitoring conditions for detecting malfunctions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that rationality monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).

(C) A manufacturer may request Executive Officer approval to disable continuous input component proper range of values or circuit continuity monitoring when a malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning input component cannot be distinguished from a malfunctioning input component and that the

disablement interval is limited only to that necessary for avoiding false detection.

(15.3.2) Output Components/Systems:

(A) Except as provided in section (e)(15.3.2)(D), monitoring for circuit continuity and circuit faults shall be conducted continuously.

(B) Except as provided in section (e)(15.3.2)(C), for functional monitoring, manufacturers shall define the monitoring conditions for detecting malfunctions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(C) For the idle speed control system on all 2005 and subsequent model year vehicles, manufacturers shall define the monitoring conditions for functional monitoring in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that functional monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).

(D) A manufacturer may request Executive Officer approval to disable continuous output component circuit continuity or circuit fault monitoring when a malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning output component cannot be distinguished from a malfunctioning output component and that the disablement interval is limited only to that necessary for avoiding false detection.

(15.4) MIL Illumination and Fault Code Storage:

(15.4.1) Except as provided in section (e)(15.4.2) below, general requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(15.4.2) Exceptions to general requirements for MIL illumination. MIL illumination is not required in conjunction with storing a confirmed fault code for any comprehensive component if:

(A) the component or system, when malfunctioning, could not cause vehicle emissions to increase by:

(i) 25 percent or more for PC/LDT SULEV II vehicles, or

(ii) 15 percent or more for all other vehicles, and

(B) the component or system is not used as part of the diagnostic strategy for any other monitored system or component.

(15.4.3) For purposes of determining the emission increase in section (e)(15.4.2)(A), the manufacturer shall request Executive Officer approval of the test cycle/vehicle operating conditions for which the emission increase

will be determined. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or engineering evaluation that demonstrate that the testing conditions represent in-use driving conditions where emissions are likely to be most affected by the malfunctioning component. For purposes of determining whether the specified percentages in section (e)(15.4.2)(A) are exceeded, if the approved testing conditions are comprised of an emission test cycle with an exhaust emission standard, the measured increase shall be compared to a percentage of the exhaust emission standard (e.g., if the increase is equal to or more than 15 percent of the exhaust emission standard for that test cycle). If the approved testing conditions are comprised of a test cycle or vehicle operating condition that does not have an exhaust emission standard, the measured increase shall be calculated as a percentage of the baseline test (e.g., if the increase from a back-to-back test sequence between normal and malfunctioning condition is equal to or more than 15 percent of the baseline test results from the normal condition).

(16) *Other Emission Control or Source System Monitoring*

(16.1) Requirement: For other emission control or source systems that are: (1) not identified or addressed in sections (e)(1) through (e)(15) (e.g., hydrocarbon traps, homogeneous charge compression ignition (HCCI) controls, NOx storage devices, fuel-fired passenger compartment heaters, etc.), or (2) identified or addressed in section (e)(15) but not corrected or compensated for by the adaptive fuel control system (e.g., swirl control valves), manufacturers shall submit a plan for Executive Officer approval of the monitoring strategy, malfunction criteria, and monitoring conditions prior to introduction on a production vehicle intended for sale in California. Executive Officer approval shall be based on the effectiveness of the monitoring strategy, the malfunction criteria utilized, the monitoring conditions required by the diagnostic, and, if applicable, the determination that the requirements of section (e)(16.3) below are satisfied.

(16.2) For purposes of section (e)(16), emission source systems are components or devices that emit pollutants subject to vehicle evaporative and exhaust emission standards (e.g., NMOG, CO, NOx, PM, etc.) and include non-electronic components and non-powertrain components (e.g., fuel-fired passenger compartment heaters, on-board reformers, etc.).

(16.3) Except as provided below in this paragraph, for 2005 and subsequent model year vehicles that utilize emission control systems that alter intake air flow or cylinder charge characteristics by actuating valve(s), flap(s), etc. in the intake air delivery system (e.g., swirl control valve systems), the manufacturers, in addition to meeting the requirements of section (e)(16.1) above, may elect to have the OBD II system monitor the shaft to which all valves in one intake bank are physically attached in lieu of monitoring the intake air flow, cylinder charge, or individual valve(s)/flap(s) for proper functional response. For non-metal shafts or segmented shafts, the monitor shall verify all shaft segments

for proper functional response (e.g., by verifying the segment or portion of the shaft furthest from the actuator properly functions). For systems that have more than one shaft to operate valves in multiple intake banks, manufacturers are not required to add more than one set of detection hardware (e.g., sensor, switch, etc.) per intake bank to meet this requirement. Vehicles utilizing these emission control systems designed and certified for 2004 or earlier model year vehicles and carried over to the 2005 through 2009 model year shall not be required to meet the provisions of section (e)(16.3) until the engine or intake air delivery system is redesigned.

(17) *Exceptions to Monitoring Requirements*

(17.1) Except as provided in sections (e)(17.1.1) through (17.1.3) below, upon request of a manufacturer or upon the best engineering judgment of the ARB, the Executive Officer may revise the emission threshold for a malfunction on any diagnostic required in section (e) the most reliable monitoring method developed requires a higher threshold to prevent significant errors of commission in detecting a malfunction.

(17.1.1) For PC/LDT SULEV II vehicles, the Executive Officer shall approve a malfunction criteria of 2.5 times the applicable FTP standards in lieu of 1.5 wherever required in section (e).

(17.1.2) For 2004 model year PC/LDT SULEV II vehicles only, the Executive Officer shall approve monitors with thresholds that exceed 2.5 times the applicable FTP standard if the manufacturer demonstrates that a higher threshold is needed given the state of development of the vehicle and that the malfunction criteria and monitoring approach and technology (e.g., fuel system limits, percent misfire, monitored catalyst volume, etc.) are at least as stringent as comparable ULEV (not ULEV II) vehicles.

(17.1.3) For vehicles certified to Federal Bin 3 or Bin 4 emission standards, manufacturers shall utilize the ULEV II vehicle NMOG and CO malfunction criteria (e.g., 1.5 times the Bin 3 or Bin 4 NMOG and CO standards) and the PC/LDT SULEV II vehicle NOx malfunction criteria (e.g., 2.5 times the Bin 3 or Bin 4 NOx standards).

(17.1.4) For medium-duty vehicles certified to an engine dynamometer tailpipe emission standard, the manufacturer shall request Executive Officer approval of a malfunction criterion that is equivalent to that proposed for each monitor in section (e). The Executive Officer shall approve the request upon finding that the manufacturer has used good engineering judgment in determining the equivalent malfunction criterion and that the criterion will provide for similar timeliness in detection of malfunctioning components.

(17.2) Whenever the requirements in section (e) of this regulation require a manufacturer to meet a specific phase-in schedule (e.g., (e)(11) cold start

emission reduction strategy monitoring requires 30 percent in 2006 model year, 60 percent in 2007 model year, and 100 percent in 2008 model year):

(17.2.1) The phase-in percentages shall be based on the manufacturer's projected sales volume for all vehicles subject to the requirements of title 13, CCR section 1968.2.1 unless specifically stated otherwise in section (e).

(17.2.2) Manufacturers may use an alternate phase-in schedule in lieu of the required phase-in schedule if the alternate phase-in schedule provides for equivalent compliance volume as defined in section (c) except as specifically noted for the phase in of in-use monitor performance ratio monitoring conditions in section (d)(3.2).

(17.2.3) Small volume manufacturers may use an alternate phase-in schedule in accordance with section (e)(17.2.2) in lieu of the required phase-in schedule or may meet the requirement on all vehicles by the final year of the phase-in in lieu of meeting the specific phase-in requirements for each model year (e.g., in the example in section (e)(17.2), small volume manufacturers are required to meet 100 percent in the 2008 model year for cold start emission reduction strategy monitoring, but not 30 percent in the 2006 model year or 60 percent in the 2007 model year).

(17.3) Manufacturers may request Executive Officer approval to disable an OBD II system monitor at ambient temperatures below twenty degrees Fahrenheit (20°F) (low ambient temperature conditions may be determined based on intake air or engine coolant temperature) or at elevations above 8000 feet above sea level. The Executive Officer shall approve the request upon determining that the manufacturer has provided data and/or an engineering evaluation that demonstrate that monitoring during the conditions would be unreliable. A manufacturer may further request, and the Executive Officer shall approve, that an OBD II system monitor be disabled at other ambient temperatures upon determining that the manufacturer has demonstrated with data and/or an engineering evaluation that misdiagnosis would occur at the ambient temperatures because of its effect on the component itself (e.g., component freezing).

(17.4) Manufacturers may request Executive Officer approval to disable monitoring systems that can be affected by low fuel level or running out of fuel (e.g., misfire detection) when the fuel level is 15 percent or less of the nominal capacity of the fuel tank. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring at the fuel levels would be unreliable.

(17.5) Manufacturers may disable monitoring systems that can be affected by vehicle battery or system voltage levels.

(17.5.1) For monitoring systems affected by low vehicle battery or system voltages, manufacturers may disable monitoring systems when the battery or system voltage is below 11.0 Volts. Manufacturers may request Executive Officer approval to utilize a voltage threshold higher than 11.0 Volts to disable system monitoring. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring at the voltages would be unreliable and that either operation of a vehicle below the disablement criteria for extended periods of time is unlikely or the OBD II system monitors the battery or system voltage and will detect a malfunction at the voltage used to disable other monitors.

(17.5.2) For monitoring systems affected by high vehicle battery or system voltages, manufacturers may request Executive Officer approval to disable monitoring systems when the battery or system voltage exceeds a manufacturer-defined voltage. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring above the manufacturer-defined voltage would be unreliable and that either the electrical charging system/alternator warning light is illuminated (or voltage gauge is in the "red zone") or that the OBD II system monitors the battery or system voltage and will detect a malfunction at the voltage used to disable other monitors.

(17.6) A manufacturer may disable affected monitoring systems in vehicles designed to accommodate the installation of Power Take-Off (PTO) units (as defined in section (c)), provided disablement occurs only while the PTO unit is active, and the OBD II readiness status is cleared by the on-board computer (i.e., all monitors set to indicate "not complete") while the PTO unit is activated (see section (g)(4.1)). If the disablement occurs, the readiness status may be restored to its state prior to PTO activation when the disablement ends.

(17.7) A manufacturer may request Executive Officer approval to disable affected monitoring systems in vehicles equipped with tire pressure monitoring systems that cause a vehicle to enter a default mode of operation (e.g., reduced top speed) when a tire pressure problem is detected. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that the default mode can affect monitoring system performance, that the tire pressure monitoring system will likely result in action by the consumer to correct the problem, and that the disablement will not prevent or hinder effective testing in an Inspection and Maintenance program.

(17.8) Whenever the requirements in section (e) of this regulation require monitoring "to the extent feasible", the manufacturer shall submit its proposed monitor(s) for Executive Officer approval. The Executive Officer shall approve the proposal upon determining that the proposed monitor(s) meets the criteria of "to the extent feasible" by considering the best available monitoring technology

to the extent that it is known or should have been known to the manufacturer and given the limitations of the manufacturer's existing hardware, the extent and degree to which the monitoring requirements are met in full, the limitations of monitoring necessary to prevent significant errors of commission and omission, and the extent to which the manufacturer has considered and pursued alternative monitoring concepts to meet the requirements in full. The manufacturer's consideration and pursuit of alternative monitoring concepts shall include evaluation of other modifications to the proposed monitor(s), the monitored components themselves, and other monitors that use the monitored components (e.g., altering other monitors to lessen the sensitivity and reliance on the component or characteristic of the component subject to the proposed monitor(s)).

(17.9) For 2004 model year vehicles certified to run on alternate fuels, manufacturers may request the Executive Officer to waive specific monitoring requirements in section (e) for which monitoring may not be reliable with respect to the use of alternate fuels. The Executive Officer shall grant the request upon determining that the manufacturer has demonstrated that the use of the alternate fuel could cause false illumination of the MIL even when using the best available monitoring technologies.

(17.10) For 2004 model year vehicles only, wherever the requirements of section (e) reflect a substantive change from the requirements of title 13, CCR section 1968.1(b) for 2003 model year vehicles, the manufacturer may request Executive Officer approval to continue to use the requirements of section 1968.1 in lieu of the requirements of section (e). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or engineering evaluation that demonstrate that software or hardware changes would be required to comply with the requirements of section (e) and that the system complies with the requirements of section 1968.1(b).

(f) *Monitoring Requirements for Diesel/Compression-Ignition Engines.*

(1) *Non-Methane Hydrocarbon (NMHC) Converting Catalyst Monitoring*

(1.1) Requirement: The OBD II system shall monitor the NMHC converting catalyst(s) for proper NMHC conversion capability. For vehicles equipped with catalyzed PM filters that convert NMHC emissions, the catalyst function of the PM filter shall be monitored in accordance with the PM filter requirements in section (f)(9).

(1.2) Malfunction Criteria:

(1.2.1) For purposes of section (f)(1), each catalyst in a series configuration that converts NMHC shall be monitored either individually or in combination with others.

(1.2.2) Conversion Efficiency:

(A) The OBD II system shall detect an NMHC catalyst malfunction when the catalyst conversion capability decreases to the point that emissions exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 5.0 times the applicable FTP NMHC standards for 2004 through 2009 model year vehicles;

b. 3.0 times the applicable FTP NMHC standards for 2010 through 2012 model year vehicles; and

c. 1.75 times the applicable FTP NMHC standards for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. 2.5 times the applicable NMHC standards for 2007 through 2012 model year vehicles; and

b. 2.0 times the applicable NMHC standards or the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) for 2013 and subsequent model year vehicles.

(B) Except as provided below in section (f)(1.2.2)(C), if no failure or deterioration of the catalyst conversion capability could result in NMHC or NOx emissions exceeding the applicable malfunction criteria of section (f)(1.2.2)(A), the OBD II system shall detect a malfunction when the catalyst has no detectable amount of NMHC or NOx conversion capability.

(C) For 2004 through 2009 model year vehicles, a manufacturer may request to be exempted from the requirements for NMHC catalyst conversion efficiency monitoring. The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated, through data and/or engineering evaluation, that the average FTP test NMHC conversion efficiency of the system is less than 30 percent (i.e., the cumulative NMHC emissions measured at the outlet of the catalyst are more than 70 percent of the cumulative engine-out NMHC emissions measured at the inlet of the catalyst(s)).

(1.2.3) Other Aftertreatment Assistance Functions. Additionally, for 2010 and subsequent model year vehicles, the catalyst(s) shall be monitored for other aftertreatment assistance functions:

(A) For catalysts used to generate an exotherm to assist PM filter regeneration, the OBD II system shall detect a malfunction when the catalyst is unable to generate a sufficient exotherm to achieve regeneration of the PM filter.

(B) For 2015 and subsequent model year passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard and 2015 and subsequent model year medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, for catalysts used to generate a feedgas constituency to assist SCR systems (e.g., to increase NO_2 concentration upstream of an SCR system), the OBD II system shall detect a malfunction when the catalyst is unable to generate the necessary feedgas constituents for proper SCR system operation. Catalysts are exempt from this monitoring if both of the following criteria are satisfied: (1) no malfunction of the catalyst's feedgas generation ability can cause emissions to increase by 15 percent or more of the applicable full useful life standard as measured from an applicable emission test cycle; and (2) no malfunction of the catalyst's feedgas generation ability can cause emissions to exceed the applicable full useful life standard as measured from an applicable emission test cycle.

(C) For catalysts located downstream of a PM filter and used to convert NMHC emissions during PM filter regeneration, the OBD II system shall detect a malfunction when the catalyst has no detectable amount of NMHC conversion capability.

(D) For catalysts located downstream of an SCR system (e.g., prevent ammonia slip), the OBD II system shall detect a malfunction when the catalyst has no detectable amount of NMHC, CO, NOx, or PM conversion capability. Monitoring of the catalyst shall not be required if there is no measurable emission impact on the criteria pollutants (i.e., NMHC, CO, NOx, and PM) during any reasonable driving condition where the catalyst is most likely to affect criteria pollutants (e.g., during conditions most likely to result in ammonia generation or excessive reductant delivery).

(1.2.4) Catalyst System Aging and Monitoring

(A) For purposes of determining the catalyst malfunction criteria in sections (f)(1.2.2) and (1.2.3) for individually monitored catalysts, the manufacturer shall use a catalyst(s) deteriorated to the malfunction criteria using methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning engine operating conditions. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated.

(B) For purposes of determining the catalyst malfunction criteria in sections (f)(1.2.2) and (1.2.3) for catalysts monitored in combination with others, the manufacturer shall submit a catalyst system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description, emission control purpose, and location of each component, the monitoring strategy for each component and/or combination of components, and the method for determining the malfunction criteria of

sections (f)(1.2.2) and (1.2.3) including the deterioration/aging process. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world catalyst system component deterioration under normal and malfunctioning engine operating conditions, the effectiveness of the method used to determine the malfunction criteria of section (f)(1.2), the ability of the component monitor(s) to pinpoint the likely area of malfunction and ensure the correct components are repaired/replaced in-use, and the ability of the component monitor(s) to accurately verify that each catalyst component is functioning as designed and as required in sections (f)(1.2.2) and (1.2.3).

(1.3) Monitoring Conditions:

(1.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(1.2.2) and (1.2.3) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (f)(1.2.2) and (1.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(1.4) MIL Illumination and Fault Code Storage:

(1.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(1.4.2) The monitoring method for the catalyst(s) shall be capable of detecting all instances, except diagnostic self-clearing, when a catalyst fault code has been cleared but the catalyst has not been replaced (e.g., catalyst overtemperature histogram approaches are not acceptable).

(2) *Oxides of Nitrogen (NOx) Converting Catalyst Monitoring*

(2.1) Requirement: The OBD II system shall monitor the NOx converting catalyst(s) for proper conversion capability. For vehicles equipped with selective catalytic reduction (SCR) systems or other catalyst systems that utilize an active/intrusive reductant injection (e.g., active lean NOx catalysts utilizing diesel fuel injection), the OBD II system shall monitor the SCR or active/intrusive reductant injection system for proper performance. The individual electronic components (e.g., actuators, valves, sensors, heaters, pumps) in the SCR or active/intrusive reductant injection system shall be monitored in accordance with the comprehensive component requirements in section (f)(15).

(2.2) Malfunction Criteria:

(2.2.1) For purposes of section (f)(2), each catalyst in a series configuration that converts NOx shall be monitored either individually or in combination with others.

(2.2.2) Conversion Efficiency:

(A) The OBD II system shall detect a NOx catalyst malfunction when the catalyst conversion capability decreases to the point that NOx or NMHC emissions exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 3.0 times the applicable FTP standards for 2004 through 2009 model year vehicles;

b. 2.5 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

c. 1.75 times the applicable FTP standards for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. the applicable NOx standard by more than 0.5 g/bhp-hr (e.g., cause NOx emissions to exceed 0.7 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 3.5 times the applicable NMHC standard for 2007 through 2009 model year vehicles;

b. the applicable NOx standard by more than 0.4 g/bhp-hr (e.g., cause NOx emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.5 times the applicable NMHC standard for 2010 through 2012 model year vehicles;

c. the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard for 2013 through 2015 model year vehicles; and

d. the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard for 2016 and subsequent model year vehicles.

(B) Except as provided below in section (f)(2.2.2)(C), if no failure or deterioration of the catalyst NOx or NMHC conversion capability could result in NOx or NMHC emissions exceeding the applicable malfunction

criteria of section (f)(2.2.2), the OBD II system shall detect a malfunction when the catalyst has no detectable amount of NOx or NMHC conversion capability.

(C) For 2004 through 2009 model year vehicles, a manufacturer may request to be exempted from the requirements for NOx catalyst conversion efficiency monitoring. The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated, through data and/or engineering evaluation, that the average FTP test NOx conversion efficiency of the system is less than 30 percent (i.e., the cumulative NOx emissions measured at the outlet of the catalyst are more than 70 percent of the cumulative engine-out NOx emissions measured at the inlet of the catalyst(s)).

(2.2.3) Selective Catalytic Reduction (SCR) or Other Active/Intrusive Reductant Injection System Performance:

(A) Reductant Delivery Performance:

(i) For 2007 and subsequent model year vehicles, the OBD II system shall detect a system malfunction prior to any failure or deterioration of the system to properly regulate reductant delivery (e.g., urea injection, separate injector fuel injection, post injection of fuel, air assisted injection/mixing) that would cause a vehicle's NOx or NMHC emissions to exceed the applicable emission levels specified in sections (f)(2.2.2)(A).

(ii) If no failure or deterioration of the reductant delivery system could result in a vehicle's NOx or NMHC emissions exceeding the applicable malfunction criteria specified in section (f)(2.2.3)(A)(i), the OBD II system shall detect a malfunction when the system has reached its control limits such that it is no longer able to deliver the desired quantity of reductant.

(B) If the catalyst system uses a reductant other than the fuel used for the engine or uses a reservoir/tank for the reductant that is separate from the fuel tank used for the engine, the OBD II system shall detect a malfunction when there is no longer sufficient reductant available to properly operate the reductant system (e.g., the reductant tank is empty).

(C) If the catalyst system uses a reservoir/tank for the reductant that is separate from the fuel tank used for the vehicle, the OBD II system shall detect a malfunction when an improper reductant is used in the reductant reservoir/tank (e.g., the reductant tank is filled with something other than the reductant).

(D) Feedback control: Except as provided for in section (f)(2.2.3)(E), if the vehicle is equipped with feedback or feed-forward control of the reductant injection, the OBD II system shall detect a malfunction:

(i) If the system fails to begin control within a manufacturer specified time interval;

(ii) If a failure or deterioration causes open loop or default operation; or

(iii) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(E) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (f)(2.2.3)(D)(iii) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on a vehicle with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(F) In lieu of detecting the malfunctions specified in sections (f)(2.2.3)(D)(i) and (ii) with a reductant injection system-specific monitor, the OBD II system may monitor the individual parameters or components that are used as inputs for reductant injection feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (f)(2.2.3)(D)(i) and (ii).

(2.2.4) Catalyst System Aging and Monitoring

(A) For purposes of determining the catalyst malfunction criteria in section (f)(2.2.2) for individually monitored catalysts, the manufacturer shall use a catalyst deteriorated to the malfunction criteria using methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning engine operating conditions. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated.

(B) For purposes of determining the catalyst malfunction criteria in section (f)(2.2.2) for catalysts monitored in combination with others, the manufacturer shall submit a catalyst system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description, emission control purpose, and location of each component, the monitoring strategy for each component and/or combination of components, and the method for determining the malfunction criteria of section (f)(2.2.2) including the deterioration/aging process. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated. Executive Officer approval of the plan shall be based on the representativeness of the

aging to real world catalyst system component deterioration under normal and malfunctioning engine operating conditions, the effectiveness of the method used to determine the malfunction criteria of section (f)(2.2.2), the ability of the component monitor(s) to pinpoint the likely area of malfunction and ensure the correct components are repaired/replaced in-use, and the ability of the component monitor(s) to accurately verify that each catalyst component is functioning as designed and as required in section (f)(2.2.2).

(2.3) Monitoring Conditions:

(2.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(2.2.2), (f)(2.2.3)(A), and (f)(2.2.3)(C) (i.e., catalyst efficiency, reductant delivery performance, and improper reductant) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (f)(2.2.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(2.3.2) Except as provided for in section (f)(2.3.3), the OBD II system shall monitor continuously for malfunctions identified in sections (f)(2.2.3)(B) and (D) (i.e., insufficient reductant, feedback control).

(2.3.3) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(2.4) MIL Illumination and Fault Code Storage:

(2.4.1) Except as provided below for reductant faults, general requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(2.4.2) If the OBD II system is capable of discerning that a system fault is being caused by a empty reductant tank:

(A) The manufacturer may request Executive Officer approval to delay illumination of the MIL if the vehicle is equipped with an alternative indicator for notifying the vehicle operator of the malfunction. The Executive Officer shall approve the request upon determining the alternative indicator is of sufficient illumination and location to be readily visible under all lighting conditions and provides equivalent assurance that a vehicle operator will be promptly notified and that corrective action will be undertaken.

(B) If the vehicle is not equipped with an alternative indicator and the MIL illuminates, the MIL may be immediately extinguished and the

corresponding fault codes erased once the OBD II system has verified that the reductant tank has been properly refilled and the MIL has not been illuminated for any other type of malfunction.

(C) The Executive Officer may approve other strategies that provide equivalent assurance that a vehicle operator will be promptly notified and that corrective action will be undertaken.

(2.4.3) The monitoring method for the catalyst(s) shall be capable of detecting all instances, except diagnostic self-clearing, when a catalyst fault code has been cleared but the catalyst has not been replaced (e.g., catalyst overtemperature histogram approaches are not acceptable).

(3) *Misfire Monitoring*

(3.1) Requirement:

(3.1.1) The OBD II system shall monitor the engine for misfire. The OBD II system shall be capable of detecting misfire occurring in one or more cylinders. To the extent possible without adding hardware for this specific purpose, the OBD II system shall also identify the specific misfiring cylinder.

(3.1.2) If more than one cylinder is misfiring, a separate fault code shall be stored indicating that multiple cylinders are misfiring. When identifying multiple cylinder misfire, the OBD II system is not required to also identify each of the misfiring cylinders individually through separate fault codes.

(3.2) Malfunction Criteria:

(3.2.1) The OBD II system shall detect a misfire malfunction when one or more cylinders are continuously misfiring.

(3.2.2) Additionally, for all combustion sensor or combustion quality sensor-equipped (e.g., for use in homogeneous charge compression ignition control systems) 2010 and subsequent model year passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard, for all combustion sensor or combustion quality sensor-equipped 2010 through 2015 model year medium-duty vehicles, and for 20 percent of 2016 model year, 50 percent of 2017 model year, and 100 percent of 2018 model year medium-duty vehicles (percentage based on the manufacturer's projected California sales volume for all medium-duty diesel vehicles):

(A) The OBD II system shall detect a misfire malfunction as follows:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard, the OBD II system shall detect a misfire malfunction that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed1.5 times any of the applicable FTP standards.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, the OBD II system shall detect a misfire malfunction when the percentage of misfire is equal to or exceeds five percent.

(B) The manufacturers shall evaluate the percentage of misfire as follows:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard, manufacturers shall determine the percentage of misfire evaluated in 1000 revolution increments that would cause NMHC, CO, NOx, or PM emissions from an emission durability demonstration vehicle to exceed the levels specified in section (f)(3.2.2)(A) if the percentage of misfire were present from the beginning of the test. To establish this percentage of misfire, the manufacturer shall utilize misfire events occurring at equally spaced, complete engine cycle intervals, across randomly selected cylinders throughout each 1000-revolution increment. If this percentage of misfire is determined to be lower than one percent, the manufacturer may set the malfunction criteria at one percent.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, the manufacturer shall evaluate the percentage of misfire in 1000 revolution increments.

(C) Subject to Executive Officer approval, a manufacturer may employ other revolution increments. The Executive Officer shall grant approval upon determining that the manufacturer has demonstrated that the strategy would be equally effective and timely in detecting misfire.

(3.2.3) A malfunction shall be detected if the percentage of misfire established in section (f)(3.2.2) is exceeded regardless of the pattern of misfire events (e.g., random, equally spaced, continuous).

(3.2.4) For multiple cylinder misfire situations that result in a misfire rate greater than or equal to 50 percent of all engine firings, the OBD II system shall only be required to detect a misfire malfunction for situations that are caused by a single component failure.

(3.2.5) Upon request by the manufacturer and upon determining that the manufacturer has submitted data and/or engineering evaluation which support the request, the Executive Officer shall revise the percentage of misfire malfunction criteria in section (f)(3.2.2)(A)(ii) upward to exclude detection of misfire that cannot cause the vehicle's NMHC, CO, and NOx emissions to exceed 2.0 times the applicable standards and the vehicle's PM emissions to exceed 0.03 g/bhp-hr as measured from an applicable cycle emission test.

(3.3) Monitoring Conditions:

(3.3.1) Except as provided in section (f)(3.3.2), the OBD II system shall monitor for misfires identified in section (f)(3.2.1) during engine idle conditions at least once per driving cycle in which the monitoring conditions for misfire are met. A manufacturer shall submit monitoring conditions to the Executive Officer for approval. The Executive Officer shall approve manufacturer-defined monitoring conditions that are determined (based on manufacturer-submitted data and/or other engineering documentation) to: (i) be technically necessary to ensure robust detection of malfunctions (e.g., avoid false passes and false detection of malfunctions), (ii) require no more than 1000 cumulative engine revolutions, and (iii) do not require any single continuous idle operation of more than 15 seconds to make a determination that a malfunction is present (e.g., a decision can be made with data gathered during several idle operations of 15 seconds or less); or satisfy the requirements of (d)(3.1) with alternative engine operating conditions.

(3.3.2) Manufacturers may request Executive Officer approval to use alternate monitoring conditions (e.g., off-idle) in lieu of the monitoring conditions specified in section (f)(3.3.1). The Executive Officer shall approve alternate monitoring conditions that are determined (based on manufacturer-submitted data and/or other engineering documentation) to ensure equivalent robust detection of malfunctions and equivalent timeliness in detection of malfunctions.

(3.3.3) For misfires identified in section (f)(3.2.2), the OBD II system shall monitor for misfire as follows:

(A) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard, the OBD II system shall continuously monitor for misfire under all positive torque engine speeds and load conditions.

(B) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, the OBD II system shall continuously monitor for misfire under the following conditions:

(i) For 2010 through 2018 model year vehicles and 2019 and subsequent model year vehicles that are not included in the phase-in specified in section (f)(3.3.3)(B)(ii), under positive torque conditions up to75 percent of peak torque with engine speed up to 75 percent of the maximum engine speed except within the following range: the engine operating region bound by the positive torque line (i.e., engine torque with transmission in neutral) and the two following points: engine speed of 50 percent of maximum engine speed with the engine torque at the positive torque line, and 75 percent of the maximum engine speed with the engine torque at 5 percent of peak torque above the positive torque line.

(ii) For 20 percent of 2019 model year, 50 percent of 2020 model year, and 100 percent of 2021 model year medium-duty vehicles (percentage based on the manufacturer's projected California sales volume for all medium-duty diesel vehicles), under all positive torque engine speed conditions except within the following range: the engine operating region bound by the positive torque line (i.e., engine load with transmission in neutral) and the two following points: engine speed of 50 percent of maximum engine speed with the engine torque at the positive torque line, and 100 percent of the maximum engine speed with the engine torque at 10 percent of peak torque above the positive torque line.

(C) If a monitoring system cannot detect all misfire patterns under all required engine speed and load conditions as required in section (f)(3.3.3)(A) and (B), the manufacturer may request Executive Officer approval to accept the monitoring system. In evaluating the manufacturer's request, the Executive Officer shall consider the following factors: the magnitude of the region(s) in which misfire detection is limited, the degree to which misfire detection is limited in the region(s) (i.e., the probability of detection of misfire events), the frequency with which said region(s) are expected to be encountered in-use, the type of misfire patterns for which misfire detection is troublesome, demonstration that the monitoring technology employed is not inherently incapable of detecting misfire under required conditions (i.e., compliance can be achieved on other engines), and the extent to which the most reliable monitoring method developed is unable to ensure robust detection of misfire in the region(s). The evaluation shall be based on the following misfire patterns: equally spaced misfire occurring on randomly selected cylinders, single cylinder continuous misfire, and paired cylinder (cylinders firing at the same crank angle) continuous misfire.

(D) A manufacturer may request Executive Officer approval to disable misfire monitoring or employ an alternate malfunction criterion when misfire cannot be distinguished from other effects. Upon determining that the manufacturer has presented documentation that demonstrates the disablement interval or period of use of an alternate malfunction criterion is limited only to that necessary for avoiding false detection, the Executive Officer shall approve the disablement or use of the alternate malfunction criterion. Such disablements may include but are not limited to events involving:

(i) rough road,

(ii) fuel cut,

(iii) gear changes for manual transmission vehicles,

(iv) traction control or other vehicle stability control activation such as anti-lock braking or other engine torque modifications to enhance vehicle stability,

(v) off-board control or intrusive activation of vehicle components or diagnostics during service or assembly plant testing,

(vi) intrusive diagnostics during portions that can significantly affect engine stability, or

(vii) infrequent regeneration events during portions that can significantly affect engine stability.

(3.4) MIL Illumination and Fault Code Storage:

(3.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(3.4.2) Additionally, for 2010 and subsequent model year vehicles subject to (f)(3.2.2):

(A) Upon detection of the percentage of misfire specified in section (f)(3.2.2), the following criteria shall apply for MIL illumination and fault code storage:

(i) A pending fault code shall be stored no later than after the fourth exceedance of the percentage of misfire specified in section (f)(3.2.2) during a single driving cycle.

(ii) If a pending fault code is stored, the OBD II system shall illuminate the MIL and store a confirmed fault code within 10 seconds if the percentage of misfire specified in section (f)(3.2.2) is again exceeded four times during: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to the engine conditions that occurred when the pending fault code was stored are encountered.

(iii) The pending fault code may be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without an exceedance of the specified percentage of misfire. The pending code may also be erased if similar conditions are not encountered during the next 80 driving cycles immediately following initial detection of the malfunction.

(B) Storage of freeze frame conditions.

(i) The OBD II system shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing a confirmed fault code and erasing a confirmed fault code.

(ii) If freeze frame conditions are stored for a malfunction other than a misfire malfunction when a fault code is stored as specified in section (f)(3.4.2), the stored freeze frame information shall be replaced with freeze frame information regarding the misfire malfunction.

(C) Storage of misfire conditions for similar conditions determination. Upon detection of misfire under section (f)(3.4.2), the OBD II system shall store the following engine conditions: engine speed, load, and warm-up status of the first misfire event that resulted in the storage of the pending fault code.

(D) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without an exceedance of the specified percentage of misfire.

(4) *Fuel System Monitoring*

(4.1) Requirement:

The OBD II system shall monitor the fuel delivery system to determine its ability to comply with applicable standards. The individual electronic components (e.g., actuators, valves, sensors, pumps) that are used in the fuel system and not specifically addressed in this section shall be monitored in accordance with the comprehensive component requirements in section (f)(15).

(4.2) Malfunction Criteria:

(4.2.1) Fuel system pressure control:

(A) The OBD II system shall detect a malfunction of the fuel system pressure control system (e.g., fuel, hydraulic fluid) prior to any failure or deterioration that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 3.0 times the applicable FTP standards for 2004 through 2009 model year vehicles;

b. 2.0 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

c. 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. 1.5 times any of the applicable NMHC, CO, and NOx standards or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of greater than 0.50 g/bhp-hr NOx;

b. 2.5 times any of the applicable NMHC or CO standards, the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause

NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 through 2012 model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx; and

c. 2.0 times any of the applicable NMHC or CO standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx;

(B) For vehicles in which no failure or deterioration of the fuel system pressure control could result in a vehicle's emissions exceeding the applicable malfunction criteria specified in section (f)(4.2.1)(A), the OBD II system shall detect a malfunction when the system has reached its control limits such that the commanded fuel system pressure cannot be delivered.

(4.2.2) Injection quantity. Additionally, for all 2010 and subsequent model year vehicles, the fuel system shall be monitored for injection quantity:

(A) The OBD II system shall detect a malfunction of the fuel injection system when the system is unable to deliver the commanded quantity of fuel necessary to maintain a vehicle's NMHC, CO, NOx and PM emissions at or below:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 3.0 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

b. 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, the applicable emission levels specified in sections (f)(4.2.1)(A)(ii).

(B) For vehicles in which no failure or deterioration of the fuel injection quantity could result in a vehicle's emissions exceeding the applicable malfunction criteria specified in section (f)(4.2.2)(A), the OBD II system shall detect a malfunction when the system has reached its control limits such that the commanded fuel quantity cannot be delivered.

(4.2.3) Injection Timing. Additionally, for all 2010 and subsequent model year vehicles, the fuel system shall be monitored for injection timing:

(A) The OBD II system shall detect a malfunction of the fuel injection system when the system is unable to deliver fuel at the proper crank angle/timing (e.g., injection timing too advanced or too retarded) necessary to maintain a vehicle's NMHC, CO, NOx, and PM emissions at or below the applicable emission levels specified in sections (f)(4.2.2)(A).

(B) For vehicles in which no failure or deterioration of the fuel injection timing could result in a vehicle's emissions exceeding the applicable malfunction criteria specified in section (f)(4.2.3)(A), the OBD II system shall detect a malfunction when the system has reached its control limits such that the commanded fuel injection timing cannot be achieved.

(4.2.4) Feedback control:

(A) Except as provided for in section (f)(4.2.4)(B), if the vehicle is equipped with feedback or feed-forward control of the fuel system (e.g., feedback control of pressure or pilot injection quantity), the OBD II system shall detect a malfunction:

(i) If the system fails to begin control within a manufacturer specified time interval;

(ii) If a failure or deterioration causes open loop or default operation; or

(iii) If control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(B) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (f)(4.2.4)(A)(iii) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on a vehicle with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(C) In lieu of detecting the malfunctions specified in sections (f)(4.2.4)(A)(i) and (ii) with a fuel system-specific monitor, the OBD II system may monitor the individual parameters or components that are used as inputs for fuel system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (f)(4.2.4)(A)(i) and (ii).

(4.2.5) For purposes of determining the fuel system malfunction criteria in sections (f)(4.2.1) through (4.2.3) for medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, the manufacturer shall do the following:

(A) For 2004 through 2012 model year vehicles, the malfunction criteria shall be established by using a fault that affects either a single injector or all injectors equally.

(B) For 2013 and subsequent model year vehicles, for section (f)(4.2.1), the malfunction criteria shall be established by using a fault that affects all injectors equally. Additionally, for systems that have single component failures which could affect a single injector (e.g., systems that build injection pressure within the injector that could have a single component pressure fault caused by the injector itself), the malfunction criteria shall also be established by using a fault that affects a single injector.

(C) For 2013 and subsequent model year vehicles, for sections (f)(4.2.2) through (4.2.3), the malfunction criteria shall be established by both (1) a fault that affects all the injectors equally and (2) a fault that affects only one injector.

(4.3) Monitoring Conditions:

(4.3.1) Except as provided in sections (f)(4.3.2) and (f)(4.3.4), the OBD II system shall monitor continuously for malfunctions identified in sections (f)(4.2.1) and (f)(4.2.4) (i.e., fuel pressure control and feedback operation).

(4.3.2) For fuel systems that achieve injection fuel pressure within the injector or increase pressure within the injector (e.g. in the injector of an amplified common rail system), manufacturers may request Executive Officer approval to define the monitoring conditions for malfunctions identified in sections (f)(4.2.1) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). The Executive Officer shall approve the monitoring conditions upon the manufacturer submitting data and/or analysis identifying all possible failure modes and the effect each has (e.g., failure modes and effects analysis) on fuel pressure across the entire range of engine operating conditions, and upon the Executive Officer determining based on the data and/or analysis that the monitoring conditions allow for robust detection of all causes of fuel pressure malfunctions.

(4.3.3) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(4.2.2) and (f)(4.2.3) (i.e., injection quantity and timing) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For all 2013 and subsequent model year vehicles, for purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (f)(4.2.2) and (f)(4.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(4.3.4) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the

request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(4.4) MIL Illumination and Fault Code Storage:

(4.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(4.4.2) Additionally, for malfunctions identified in section (f)(4.2.1) (i.e., fuel pressure control) on all 2010 and subsequent model year vehicles:

(A) A pending fault code shall be stored immediately upon the fuel system exceeding the malfunction criteria established pursuant to section (f)(4.2.1).

(B) Except as provided below, if a pending fault code is stored, the OBD II system shall immediately illuminate the MIL and store a confirmed fault code if a malfunction is again detected during either of the following two events: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to those that occurred when the pending fault code was stored are encountered.

(C) The pending fault code may be erased at the end of the next driving cycle in which similar conditions have been encountered without an exceedance of the specified fuel system malfunction criteria. The pending code may also be erased if similar conditions are not encountered during the 80 driving cycles immediately after the initial detection of a malfunction for which the pending code was set.

(D) Storage of freeze frame conditions.

(i) A manufacturer shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing and erasing a confirmed fault code.

(ii) If freeze frame conditions are stored for a malfunction other than misfire (see section (f)(3)) or fuel system malfunction when a fault code is stored as specified in section (f)(4.4.2) above, the stored freeze frame information shall be replaced with freeze frame information regarding the fuel system malfunction.

(E) Storage of fuel system conditions for determining similar conditions of operation.

(i) Upon detection of a fuel system malfunction under section (f)(4.4.2), the OBD II system shall store the engine speed, load, and warm-up status of the first fuel system malfunction that resulted in the storage of the pending fault code.

(ii) The manufacturer may request Executive Officer approval to use an alternate definition of similar conditions in lieu of the definition specified in section (c). The Executive Officer shall approve the alternate definition upon the manufacturer providing data or analysis demonstrating that the alternate definition provides for equivalent robustness in detection of fuel system faults that vary in severity depending on engine speed, load, and/or warm-up status.

(F) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without a malfunction of the fuel system.

(5) *Exhaust Gas Sensor Monitoring*

(5.1) Requirement:

(5.1.1) The OBD II system shall monitor all exhaust gas sensors (e.g., oxygen, air-fuel ratio, NOx) used for emission control system feedback (e.g., EGR control/feedback, SCR control/feedback, NOx adsorber control/feedback) or as a monitoring device for proper output signal, activity, response rate, and any other parameter that can affect emissions.

(5.1.2) For vehicles equipped with heated exhaust gas sensors, the OBD II system shall monitor the heater for proper performance.

(5.2) Malfunction Criteria:

(5.2.1) Air-Fuel Ratio Sensors:

(A) For sensors located upstream of the exhaust aftertreatment:

(i) Sensor performance faults: The OBD II system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

a. For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

1. 2.5 times the applicable FTP standards for 2004 through 2009 model year vehicles;

2. 2.0 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

3. 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

b. For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

1. 1.5 times the applicable NMHC, CO, and NOx standards or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of greater than 0.50 g/bhp-hr NOx;

2. 2.5 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 through 2012 model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx; and

3. 2.0 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx.

(ii) Circuit faults: The OBD II system shall detect malfunctions of the sensor caused by either a lack of circuit continuity or out-of-range values.

(iii) Feedback faults: The OBD II system shall detect a malfunction of the sensor when a sensor failure or deterioration causes an emission control system (e.g., EGR, SCR, or NOx adsorber) to stop using that sensor as a feedback or feed-forward input (e.g., causes default or open-loop operation).

(iv) Monitoring capability: To the extent feasible, the OBD II system shall detect a malfunction of the sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD II system monitoring device (e.g., for catalyst, EGR, SCR, or NOx adsorber monitoring).

(B) For sensors located downstream of the exhaust aftertreatment:

(i) Sensor performance faults: The OBD II system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

a. For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

1. 3.5 times the applicable FTP NMHC, CO, or NOx standards or 5.0 times the applicable FTP PM standard for 2004 through 2009 model year vehicles;

2. 2.5 times the applicable FTP NMHC, CO, or NOx standards or 4.0 times the applicable FTP PM standard for 2010 through 2012 model year vehicles;

3. 1.5 times the applicable FTP NMHC or CO standards, 1.75 times the applicable FTP NOx standard, or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

b. For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

1. 2.5 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.5 g/bhp-hr (e.g., cause NOx emissions to exceed 0.7 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.05 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 through 2009 model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of greater than 0.50 g/bhp-hr NOx;

2. 2.5 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.05 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 through 2012 model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx; and

3. 2.0 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx.

(ii) Circuit faults: The OBD II system shall detect malfunctions of the sensor caused by either a lack of circuit continuity or out-of-range values.

(iii) Feedback faults: The OBD II system shall detect a malfunction of the sensor when a sensor failure or deterioration causes an emission control system (e.g., EGR, SCR, or NOx adsorber) to stop using that sensor as a feedback or feed-forward input (e.g., causes default or open-loop operation).

(iv) Monitoring capability: To the extent feasible, the OBD II system shall detect a malfunction of the sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD II system monitoring device (e.g., for catalyst, EGR, SCR, or NOx adsorber monitoring).

(5.2.2) NOx and PM sensors:

(A) Sensor performance faults: The OBD II system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause a vehicle's emissions to exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

1. 3.5 times the applicable FTP NMHC, CO, or NOx standards or 5.0 times the applicable FTP PM standard for 2004 through 2009 model year vehicles;

2. 2.5 times the applicable FTP NMHC, CO, or NOx standards, or 4.0 times the applicable FTP PM standard for 2010 through 2012 model year vehicles;

3. 1.5 times the applicable FTP NMHC or CO standards, 1.75 times the applicable FTP NOx standard, or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. 2.5 times the applicable NMHC standards, the applicable NOx standard by more than 0.5 g/bhp-hr (e.g., cause NOx emissions to exceed 0.7 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 0.05 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 through 2009 model year vehicles;

b. 2.5 times the applicable NMHC standards, the applicable NOx standard by more than 0.4 g/bhp-hr (e.g., cause NOx emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 0.05 g/bhp-hr PM as measured from an applicable cycle emission test for 2010 through 2012 model year vehicles;

c. 2.0 times the applicable NMHC standard, the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 through 2015 model year vehicles; and

d. 2.0 times the applicable NMHC standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2016 and subsequent model year vehicles.

(B) Circuit faults: The OBD II system shall detect malfunctions of the sensor caused by either a lack of circuit continuity or out-of-range values.

(C) Feedback faults: The OBD II system shall detect a malfunction of the sensor when a sensor failure or deterioration causes an emission control system (e.g., EGR, SCR, or NOx adsorber) to stop using that sensor as a feedback or feed-forward input (e.g., causes default or open-loop operation).

(D) Monitoring capability: To the extent feasible, the OBD II system shall detect a malfunction of the sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD II system monitoring device (e.g., for catalyst, EGR, PM filter, SCR, or NOx adsorber monitoring).

(5.2.3) Other exhaust gas sensors:

(A) For other exhaust gas sensors, the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for air-fuel ratio sensors, NOx sensors, and PM sensors under sections (f)(5.2.1) and (f)(5.2.2).

(5.2.4) Sensor Heaters:

(A) The OBD II system shall detect a malfunction of the heater performance when the current or voltage drop in the heater circuit is no longer within the manufacturer's specified limits for normal operation (i.e., within the criteria required to be met by the component vendor for heater circuit performance at high mileage). Subject to Executive Officer approval, other malfunction criteria for heater performance malfunctions may be used upon the Executive Officer determining that the manufacturer has submitted data

and/or an engineering evaluation that demonstrate the monitoring reliability and timeliness to be equivalent to the stated criteria in section (f)(5.2.4)(A).

(B) The OBD II system shall detect malfunctions of the heater circuit including open or short circuits that conflict with the commanded state of the heater (e.g., shorted to 12 Volts when commanded to 0 Volts (ground)).

(5.3) Monitoring Conditions:

(5.3.1) Exhaust Gas Sensors

(A) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(5.2.1)(A)(i), (5.2.1)(B)(i), (5.2.2)(A), and (5.2.2)(D) (e.g., sensor performance faults) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For all 2010 and subsequent model year vehicles, for purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (f)(5.2.1)(A)(i), (5.2.1)(B)(i), (5.2.2)(A), and for 2016 and subsequent model year medium-duty vehicles, section (f)(5.2.2)(D) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(B) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(5.2.1)(A)(iv) and (5.2.1)(B)(iv) (e.g., monitoring capability) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements) with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).

(C) Except as provided in section (f)(5.3.1)(D), monitoring for malfunctions identified in sections (f)(5.2.1)(A)(ii), (5.2.1)(A)(iii), (5.2.1)(B)(ii), (5.2.1)(B)(iii), (5.2.2)(B), and (5.2.2)(C) (i.e., circuit continuity, out-of-range, and open-loop malfunctions) shall be conducted continuously.

(D) A manufacturer may request Executive Officer approval to disable continuous exhaust gas sensor monitoring when an exhaust gas sensor malfunction cannot be distinguished from other effects (e.g., disable out-of-range low monitoring during fuel cut conditions). The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(5.3.2) Sensor Heaters

(A) Manufacturers shall define monitoring conditions for malfunctions identified in section (f)(5.2.4)(A) (i.e., sensor heater performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(B) Monitoring for malfunctions identified in section (f)(5.2.4)(B) (i.e., circuit malfunctions) shall be conducted continuously.

(5.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(6) *Exhaust Gas Recirculation (EGR) System Monitoring*

(6.1) Requirement:

(6.1.1) The OBD II system shall monitor the EGR system on vehicles so-equipped for low flow rate, high flow rate, and slow response malfunctions. For vehicles equipped with EGR coolers (e.g., heat exchangers), the OBD II system shall monitor the cooler system for insufficient cooling malfunctions. The individual electronic components (e.g., actuators, valves, sensors) that are used in the EGR system shall be monitored in accordance with the comprehensive component requirements in section (f)(15).

(6.1.2) For vehicles with other charge control strategies that affect EGR flow (e.g., systems that modify EGR flow to achieve a desired fresh air flow rate instead of a desired EGR flow rate), the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for EGR systems under section (f)(6).

(6.2) Malfunction Criteria:

(6.2.1) Low Flow:

(A) The OBD II system shall detect a malfunction of the EGR system at or prior to a decrease from the manufacturer's specified EGR flow rate that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 3.0 times the applicable FTP standards for 2004 through 2009 model year vehicles;

b. 2.5 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

c. 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. 1.5 times the applicable FTP standards for 2004 through 2006 model year vehicles;

b. 1.5 times the applicable NMHC, CO, and NOx standards or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of greater than 0.50 g/bhp-hr NOx;

c. 2.5 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2007 through 2012 model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx; and

d. 2.0 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx.

(B) For vehicles in which no failure or deterioration of the EGR system that causes a decrease in flow could result in a vehicle's emissions exceeding the malfunction criteria specified in section (f)(6.2.1)(A), the OBD II system shall detect a malfunction when either the EGR system has reached its control limits such that it cannot increase EGR flow to achieve the commanded flow rate or, for non-feedback controlled EGR systems, the EGR system has no detectable amount of EGR flow when EGR flow is expected.

(6.2.2) High Flow:

(A) The OBD II system shall detect a malfunction of the EGR system, including a leaking EGR valve (i.e., exhaust gas flowing through the valve when the valve is commanded closed), at or prior to an increase from the manufacturer's specified EGR flow rate that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed the applicable emission levels specified in sections (f)(6.2.1)(A):

(B) For vehicles in which no failure or deterioration of the EGR system that causes an increase in flow could result in a vehicle's emissions exceeding the malfunction criteria specified in section (f)(6.2.2)(A), the OBD II system shall detect a malfunction when either the EGR system has reached its

control limits such that it cannot reduce EGR flow to achieve the commanded flow rate or, for non-feedback controlled EGR systems, the EGR system has maximum detectable EGR flow when little or no EGR flow is expected.

(6.2.3) Slow Response. Additionally, for 2010 and subsequent model year vehicles, the EGR system shall be monitored for slow response:

(A) The OBD II system shall detect a malfunction of the EGR system at or prior to any failure or deterioration in the EGR system response (e.g., capability to achieve the specified flow rate within a manufacturer-specified time) that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed the applicable emission levels specified in sections (f)(6.2.1)(A).

(B) The OBD II system shall monitor the EGR system response under both increasing and decreasing EGR flow rates. For vehicles in which no failure or deterioration of the EGR system response could result in an engine's emissions exceeding the levels specified in section (f)(6.2.1)(A), the OBD II system shall detect a malfunction of the EGR system when no detectable response to a change in commanded or expected flow rate occurs

(6.2.4) Feedback control:

(A) Except as provided for in section (f)(6.2.4)(B), if the vehicle is equipped with feedback or feed-forward control of the EGR system (e.g., feedback control of flow, valve position, pressure differential across the valve via intake throttle or exhaust backpressure), the OBD II system shall detect a malfunction:

(i) If the system fails to begin control within a manufacturer specified time interval;

(ii) If a failure or deterioration causes open loop or default operation; or

(iii) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(B) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (f)(6.2.4)(A)(iii) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on a vehicle with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(C) In lieu of detecting the malfunctions specified in sections (f)(6.2.4)(A)(i) and (ii) with an EGR system-specific monitor, the OBD II system may monitor the individual parameters or components that are used as inputs for EGR

system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (f)(6.2.4)(A)(i) and (ii).

(6.2.5) EGR Cooler Performance:

(A) The OBD II system shall detect a malfunction of the EGR cooler system at or prior to a reduction from the manufacturer's specified cooling performance that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed the applicable emission levels specified in sections (f)(6.2.1)(A).

(B) For vehicles in which no failure or deterioration of the EGR cooler system could result in a vehicle's emissions exceeding the malfunction criteria specified in section (f)(6.2.5)(A), the OBD II system shall detect a malfunction when the system has no detectable amount of EGR cooling.

(C) For purposes of determining the EGR cooler performance malfunction criteria in section (f)(6.2.5)(A) for EGR cooler systems that consist of more than one cooler (e.g., a pre-cooler and a main cooler, two or more coolers in series), the manufacturer shall submit an EGR cooler system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description and location of each component, the monitoring strategy for each component and combination of components, and the method for determining the malfunction criteria of section (f)(6.2.5)(A) including the deterioration/aging process. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world EGR cooler system component deterioration under normal and malfunctioning engine operating conditions and the effectiveness of the method used to determine the malfunction criteria of section (f)(6.2.5)(A).

(6.2.6) EGR Catalyst Performance: For catalysts located in the EGR system and used to convert constituents to reduce emissions or protect or extend the durability of other emission-related components (e.g., to reduce fouling of an EGR cooler or valve):

(A) For 2004 through 2012 model year vehicles, the catalyst shall be monitored in accordance with the other emission control or source system monitoring requirements under section (f)(16).

(B) For 2013 and subsequent model year vehicles, except as provided for in section (f)(6.2.6)(C) below, the OBD II system shall detect a malfunction when the catalyst has no detectable amount of constituent (e.g., hydrocarbons, soluble organic fractions) oxidation.

(C) Monitoring of the catalyst is not required if there is no measurable emission impact on the criteria pollutants (i.e., NMHC, CO, NOx, and PM) during any reasonable driving condition in which the catalyst is most likely to affect criteria pollutants.

(6.3) Monitoring Conditions:

(6.3.1) For malfunctions identified in sections (f)(6.2.1) and (f)(6.2.2) (i.e., EGR low and high flow) manufacturers shall:

(A) Define monitoring conditions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements) for 2004 through 2009 model year vehicles. For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (f)(6.2.1) and (f)(6.2.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2);

(B) Except as provided in section (f)(6.3.5), ensure that monitoring is conducted continuously for all 2010 and subsequent model year vehicles.

(6.3.2) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(6.2.3) (i.e., slow response) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (f)(6.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(6.3.3) The OBD II system shall monitor continuously for malfunctions identified in section (f)(6.2.4) (i.e., EGR feedback control).

(6.3.4) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(6.2.5) and (f)(6.2.6) (i.e., cooler performance and EGR catalyst performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (f)(6.2.5) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(6.3.5) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under specific conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions (e.g., disable EGR low flow monitoring when no or very little flow is commanded, disable EGR high and low flow monitoring when freezing may affect performance of the system). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating EGR system cannot be distinguished from a malfunctioning EGR system and that the disablement interval is limited only to that which is technically necessary.

(6.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(7) *Boost Pressure Control System Monitoring*

(7.1) Requirement:

(7.1.1) For 2010 and subsequent model year vehicles, the OBD II system shall monitor the boost pressure control system (e.g., turbocharger) on vehicles so-equipped for under and over boost malfunctions and slow response malfunctions. For vehicles equipped with charge air cooler systems, the OBD II system shall monitor the charge air cooler system for cooling system performance malfunctions. For 2004 and subsequent model year vehicles, the individual electronic components (e.g., actuators, valves, sensors) that are used in the boost pressure control system shall be monitored in accordance with the comprehensive component requirements in section (f)(15).

(7.1.2) For vehicles with other charge control strategies that affect boost pressure (e.g., systems that modify boost pressure to achieve a desired air-fuel ratio instead of a desired boost pressure), the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for boost pressure control systems under section (f)(7).

(7.2) Malfunction Criteria:

(7.2.1) Underboost:

(A) The OBD II system shall detect a malfunction of the boost pressure control system at or prior to a decrease from the manufacturer's commanded or expected boost pressure that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 2.0 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

b. 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. 2.5 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03

g/bhp-hr PM as measured from an applicable cycle emission test for 2010 through 2012 model year vehicles; and

b. 2.0 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles.

(B) For vehicles in which no failure or deterioration of the boost pressure control system that causes a decrease in boost could result in a vehicle's emissions exceeding the malfunction criteria specified in section (f)(7.2.1)(A), the OBD II system shall detect a malfunction when either the boost system has reached its control limits such that it cannot increase boost to achieve the commanded boost pressure or, for non-feedback controlled boost systems, the boost system has no detectable amount of boost when boost is expected.

(7.2.2) Overboost:

(A) The OBD II system shall detect a malfunction of the boost pressure control system at or prior to an increase from the manufacturer's commanded or expected boost pressure that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed the applicable emission levels specified in sections (f)(7.2.1)(A).

(B) For vehicles in which no failure or deterioration of the boost pressure control system that causes an increase in boost could result in a vehicle's emissions exceeding the malfunction criteria specified in section (f)(7.2.2)(A), the OBD II system shall detect a malfunction when either the boost system has reached its control limits such that it cannot decrease boost to achieve the commanded boost pressure or, for non-feedback controlled boost systems, the boost system has maximum detectable boost when little or no boost is expected.

(7.2.3) Slow response:

(A) For 2010 through 2012 model year vehicles equipped with variable geometry turbochargers (VGT), the OBD II system shall detect a malfunction at or prior to any failure or deterioration in the capability of the VGT system to achieve the commanded turbocharger geometry within a manufacturer-specified time that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed the applicable emission levels specified in section (f)(7.2.1)(A). For vehicles in which no failure or deterioration of the VGT system response could result in a vehicle's emissions exceeding these levels, the OBD II system shall detect a malfunction of the VGT system when no detectable response to a change in commanded turbocharger geometry occurs.

(B) For 2013 and subsequent model year vehicles, the OBD II system shall detect a malfunction prior to any failure or deterioration in the boost pressure control system response (e.g., capability to achieve the commanded or expected boost pressure within a manufacturer-specified time) that would cause vehicle's NMHC, CO, NOx, or PM emissions to exceed the applicable emission levels specified in section (f)(7.2.1)(A). For vehicles in which no failure or deterioration of the boost system response could result in an engine's emissions exceeding these levels, the OBD II system shall detect a malfunction of the boost system when no detectable response to a commanded or expected change in boost pressure occurs.

(7.2.4) Charge Air Undercooling:

(A) The OBD II system shall detect a malfunction of the charge air cooling system at or prior to a decrease from the manufacturer's specified cooling rate that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed the applicable emission levels specified in sections (f)(7.2.1)(A).

(B) For vehicles in which no failure or deterioration of the charge air cooling system that causes a decrease in cooling performance could result in a vehicle's emissions exceeding the malfunction criteria specified in section (f)(7.2.4)(A), the OBD II system shall detect a malfunction when the system has no detectable amount of charge air cooling.

(C) For purposes of determining the charge air cooling performance malfunction criteria in section (f)(7.2.4)(A) for charge air cooling systems that consist of more than one cooler (e.g., a pre-cooler and a main cooler, two or more coolers in series), the manufacturer shall submit a charge air cooling system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description and location of each component, the monitoring strategy for each component and combination of components, and the method for determining the malfunction criteria of section (f)(7.2.4)(A) including the deterioration/aging process. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world charge air cooling system component deterioration under normal and malfunctioning engine operating conditions and the effectiveness of the method used to determine the malfunction criteria of section (f)(7.2.4)(A).

(7.2.5) Feedback control:

(A) Except as provided for in section (f)(7.2.5)(B), if the vehicle is equipped with feedback or feed-forward control of the boost pressure system (e.g., control of VGT position, turbine speed, manifold pressure) the OBD II system shall detect a malfunction:

(i) If the system fails to begin control within a manufacturer specified time interval;

(ii) If a failure or deterioration causes open loop or default operation; or

(iii) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(B) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (f)(7.2.5)(A)(iii) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on a vehicle with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(C) In lieu of detecting the malfunctions specified in sections (f)(7.2.5)(A)(i) and (ii) with a boost pressure system-specific monitor, the OBD II system may monitor the individual parameters or components that are used as inputs for boost pressure system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (f)(7.2.5)(A)(i) and (ii).

(7.3) Monitoring Conditions:

(7.3.1) Except as provided in section (f)(7.3.4), the OBD II system shall monitor continuously for malfunctions identified in sections (f)(7.2.1), (7.2.2), and (7.2.5) (i.e., over and under boost, feedback control).

(7.3.2) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(7.2.3) (i.e., slow response) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). For all 2010 and subsequent model year vehicles, for purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (f)(7.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(7.3.3) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(7.2.4) (i.e., charge air cooler performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (f)(7.2.4) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(7.3.4) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false

indications of malfunctions (e.g., disable monitoring of underboost when commanded or expected boost pressure is very low). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that technically necessary.

(7.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(8) *NOx Adsorber Monitoring*

(8.1) Requirement: The OBD II system shall monitor the NOx adsorber(s) on vehicles so-equipped for proper performance. For vehicles equipped with active/intrusive injection (e.g., in-exhaust fuel and/or air injection) to achieve desorption of the NOx adsorber(s), the OBD II system shall monitor the active/intrusive injection system for proper performance. The individual electronic components (e.g., injectors, valves, sensors) that are used in the active/intrusive injection system shall be monitored in accordance with the comprehensive component requirements in section (f)(15).

(8.2) Malfunction Criteria:

(8.2.1) NOx adsorber capability:

(A) The OBD II system shall detect a NOx adsorber system malfunction when the NOx adsorber system capability decreases to the point that would cause a vehicle's NOx or NMHC emissions to exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 3.0 times the applicable FTP standards for 2004 through 2009 model year vehicles;

b. 2.5 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

c. 1.75 times the applicable FTP standards for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. the applicable NOx standard by more than 0.5 g/bhp-hr (e.g., cause NOx emissions to exceed 0.7 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 3.5 times the applicable NMHC standard for 2007 through 2009 model year vehicles;

b. the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.5 times the applicable NMHC standard for 2010 through 2012 model year vehicles; and

c. the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard for 2013 and subsequent model year vehicles.

(B) If no failure or deterioration of the NOx adsorber system capability could result in a vehicle's NOx or NMHC emissions exceeding the applicable malfunction criteria specified in section (f)(8.2.1)(A), the OBD II system shall detect a malfunction when the system has no detectable amount of NOx adsorber capability.

(8.2.2) For systems that utilize active/intrusive injection (e.g., in-cylinder post fuel injection, in-exhaust air-assisted fuel injection) to achieve desorption of the NOx adsorber, the OBD II system shall detect a malfunction if any failure or deterioration of the injection system's ability to properly regulate injection causes the system to be unable to achieve desorption of the NOx adsorber.

(8.2.3) Feedback control:

(A) Except as provided for in section (f)(8.2.3)(B), if the vehicle is equipped with feedback or feed-forward control of the NOx adsorber or active/intrusive injection system (e.g., feedback control of injection quantity, time), the OBD II system shall detect a malfunction:

(i) If the system fails to begin control within a manufacturer specified time interval;

(ii) If a failure or deterioration causes open loop or default operation; or

(iii) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(B) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (f)(8.2.3)(A)(iii) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on a vehicle with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(C) In lieu of detecting the malfunctions specified in sections (f)(8.2.3)(A)(i) and (ii) with a NOx adsorber-specific monitor, the OBD II system may monitor the individual parameters or components that are used as inputs for NOx adsorber or active/intrusive injection system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (f)(8.2.3)(A)(i) and (ii).

(8.2.4) For purposes of determining the NOx adsorber system malfunction criteria in section (f)(8.2.1) for NOx adsorber systems that consist of more than one NOx adsorber (e.g., two or more adsorbers in series), the manufacturer shall submit a system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description and location of each component, the monitoring strategy for each component and/or combination of components, and the method for determining the malfunction criteria of section (f)(8.2.1) including the deterioration/aging process. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world NOx adsorber system component deterioration under normal and malfunctioning engine operating conditions, the effectiveness of the method used to determine the malfunction criteria of section (f)(8.2.1), the ability of the component monitor(s) to pinpoint the likely area of malfunction and ensure the correct components are repaired/replaced in-use, and the ability of the component monitor(s) to accurately verify that each NOx adsorber system component is functioning as designed and as required in section (f)(8.2.1).

(8.3) Monitoring Conditions:

(8.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(8.2.1) (i.e., adsorber capability) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (f)(8.2.1) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(8.3.2) Except as provided in section (f)(8.3.3), the OBD II system shall monitor continuously for malfunctions identified in sections (f)(8.2.2) and (8.2.3) (e.g., injection function, feedback control).

(8.3.3) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(8.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(9) *Particulate Matter (PM) Filter Monitoring*

(9.1) Requirement: The OBD II system shall monitor the PM filter on vehicles so-equipped for proper performance. For vehicles equipped with active regeneration systems that utilize an active/intrusive injection (e.g., in-exhaust fuel injection, in-exhaust fuel/air burner), the OBD II system shall monitor the active/intrusive injection system for proper performance. The individual electronic components (e.g., injectors, valves, sensors) that are used in the active/intrusive injection system shall be monitored in accordance with the comprehensive component requirements in section (f)(15).

(9.2) Malfunction Criteria:

(9.2.1) Filtering Performance:

(A) The OBD II system shall detect a malfunction prior to a decrease in the filtering capability of the PM filter that would cause a vehicle's PM emissions to exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 5.0 times the applicable FTP standard for 2004 through 2009 model year vehicles;

b. 4.0 times the applicable FTP standard for 2010 through 2012 model year vehicles; and

c. 1.75 times the applicable FTP standard for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. 0.09 g/bhp-hr PM as measured from an applicable cycle emission test for 2004 through 2009 model year vehicles;

b. 0.07 g/bhp-hr PM as measured from an applicable cycle emission test for 2010 through 2012 model year vehicles; and

c. 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles.

(iii) For 2014 through 2015 model year medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, the manufacturer shall use the malfunction criteria in section (f)(9.2.1)(A)(ii)c. above without using the provisions of section (f)(17.1) to exclude specific failure modes on vehicles under one of the following two options below:

a. At least 20 percent of 2014 model year vehicles and at least 20 percent of 2015 model year vehicles (percentage based on the manufacturer's projected California sales volume for all medium-duty diesel vehicles), or

b. At least 50 percent of 2015 model year vehicles (percentage based on the manufacturer's projected California sales volume for all medium-duty diesel vehicles).

(iv) For the phase-in schedules described in section (f)(9.2.1)(A)(iii) above, the manufacturer may not use an alternate phase-in schedule as defined in section (c) in lieu of the required phase-in schedules.

(B) If no failure or deterioration of the PM filtering performance could result in a vehicle's PM emissions exceeding the applicable malfunction criteria specified in section (f)(9.2.1)(A), the OBD II system shall detect a malfunction when no detectable amount of PM filtering occurs.

(9.2.2) Frequent Regeneration:

(A) For 2010 and subsequent model year vehicles, the OBD II system shall detect a malfunction when PM filter regeneration occurs more frequently than (i.e., occurs more often than) the manufacturer's specified regeneration frequency such that it would cause a vehicle's emissions to exceed:

(i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

a. 3.0 times the applicable FTP NMHC, CO, or NOx standards for 2010 through 2012 model year vehicles; and

b. 1.5 times the applicable FTP NMHC, CO, or NOx standards for 2013 and subsequent model year vehicles.

(ii) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

a. 2.5 times the applicable NMHC standards or the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test for 2010 through 2012 model year vehicles; and

b. 2.0 times the applicable NMHC standards or the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles.

(B) If no failure or deterioration causes an increase in the PM filter regeneration frequency that could result in a vehicle's NMHC, CO, or NOx

emissions exceeding the applicable malfunction criteria specified in section (f)(9.2.2)(A), the OBD II system shall detect a malfunction when the PM filter regeneration frequency exceeds the manufacturer's specified design limits for allowable regeneration frequency.

(9.2.3) Incomplete regeneration: For 2010 and subsequent model year vehicles, the OBD II system shall detect a regeneration malfunction when the PM filter does not properly regenerate under manufacturer-defined conditions where regeneration is designed to occur.

(9.2.4) Catalyzed PM Filter:

(A) NMHC conversion: For 2015 and subsequent model year passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard and 2015 and subsequent model year medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard with catalyzed PM filters that convert NMHC emissions, the OBD II system shall monitor the catalyst function of the PM filter and detect a malfunction when the NMHC conversion capability decreases to the point that NMHC emissions exceed the applicable emission levels specified in section (f)(9.2.2)(A). If no failure or deterioration of the NMHC conversion capability could result in a vehicle's NMHC emissions exceeding these emission levels, the OBD II system shall detect a malfunction when the system has no detectable amount of NMHC conversion capability. PM filters are exempt from this monitoring if both of the following criteria are satisfied: (1) no malfunction of the PM filter's NMHC conversion capability can cause emissions to increase by 15 percent or more of the applicable full useful life standard as measured from an applicable emission test cycle; and (2) no malfunction of the PM filter's NMHC conversion capability can cause emissions to exceed the applicable full useful life standard as measured from an applicable emission test cycle.

(B) Feedgas generation: For 2016 and subsequent model year medium-duty vehicles with catalyzed PM filters used to generate a feedgas constituency to assist SCR systems (e.g., to increase NO_2 concentration upstream of an SCR system), the OBD II system shall detect a malfunction when the system is unable to generate the necessary feedgas constituents for proper SCR system operation. Catalyzed PM filters are exempt from this monitoring if both of the following criteria are satisfied: (1) no malfunction of the catalyzed PM filter's feedgas generation ability can cause emissions to increase by 15 percent or more of the applicable full useful life standard as measured from an applicable emission test cycle; and (2) no malfunction of the catalyzed PM filter's feedgas generation ability can cause emissions to exceed the applicable full useful life standard as measured from an applicable emission test cycle.

(9.2.5) Missing substrate: The OBD II system shall detect a malfunction if either the PM filter substrate is completely destroyed, removed, or missing, or if the PM filter assembly is replaced with a muffler or straight pipe.

(9.2.6) Active/Intrusive Injection: For systems that utilize active/intrusive injection (e.g., in-cylinder post fuel injection, in-exhaust air-assisted fuel injection) to achieve regeneration of the PM filter, the OBD II system shall detect a malfunction if any failure or deterioration of the injection system's ability to properly regulate injection causes the system to be unable to achieve regeneration of the PM filter.

(9.2.7) Feedback Control:

(A) Except as provided for in section (f)(9.2.7)(B), if the vehicle is equipped with feedback or feed-forward control of the PM filter regeneration (e.g., feedback control of oxidation catalyst inlet temperature, PM filter inlet or outlet temperature, in-cylinder or in-exhaust fuel injection), the OBD II system shall detect a malfunction:

(i) If the system fails to begin control within a manufacturer specified time interval;

(ii) If a failure or deterioration causes open loop or default operation; or

(iii) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(B) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (f)(9.2.7)(A)(iii) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on a vehicle with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(C) In lieu of detecting the malfunctions specified in sections (f)(9.2.7)(A)(i) and (ii) with a PM filter-specific monitor, the OBD II system may monitor the individual parameters or components that are used as inputs for PM filter regeneration feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (f)(9.2.7)(A)(i) and (ii).

(9.3) Monitoring Conditions:

(9.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(9.2.1) through (9.2.6) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in

section (d)(3.1.2). For all 2010 and subsequent model year vehicles, for purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (f)(9.2.1) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(9.3.2) Except as provided in section (f)(9.3.3), the OBD II system shall monitor continuously for malfunctions identified in section (f)(9.2.7) (i.e., PM filter feedback control).

(9.3.3) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(9.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(10) *Crankcase Ventilation (CV) System Monitoring*

(10.1) Requirement: Manufacturers shall monitor the CV system on vehicles so-equipped for system integrity. Vehicles not subject to crankcase emission control requirements shall be exempt from monitoring of the CV system.

(10.2) Malfunction Criteria:

(10.2.1) For the purposes of section (f)(10), "CV system" is defined as any form of crankcase ventilation system, regardless of whether it utilizes positive pressure or whether it vents to the atmosphere, the intake, or the exhaust. "CV valve" is defined as any form of valve, orifice, or filter/separator used to restrict, control, or alter the composition (e.g., remove oil vapor or particulate matter) of the crankcase vapor flow. Further, any additional external CV system tubing or hoses used to equalize crankcase pressure or to provide a ventilation path between various areas of the engine (e.g., crankcase and valve cover) are considered part of the CV system "between the crankcase and the CV valve" and subject to the malfunction criteria in section (f)(10.2.2) below.

(10.2.2) Except as provided below, the OBD II system shall detect a malfunction of the CV system when a disconnection of the system occurs between either the crankcase and the CV valve, or between the CV valve and the intake ducting.

(10.2.3) If disconnection in the system results in a rapid loss of oil or other overt indication of a CV system malfunction such that the vehicle operator is

certain to respond and have the vehicle repaired, the Executive Officer shall exempt the manufacturer from detection of that disconnection.

(10.2.4) Detection of a disconnection is not required if the disconnection cannot be made without first disconnecting a monitored portion of the system (e.g., the CV system is designed such that the CV valve is fastened directly to the crankcase in a manner which makes it significantly more difficult to remove the valve from the crankcase before disconnecting the line between the valve and the intake ducting (taking aging effects into consideration) and the line between the valve and the intake ducting is monitored for disconnection).

(10.2.5) Subject to Executive Officer approval, system designs that utilize tubing between the valve and the crankcase shall also be exempted from the monitoring requirement for detection of disconnection between the crankcase and the CV valve. The manufacturer shall file a request and submit data and/or engineering evaluation in support of the request. The Executive Officer shall approve the request upon determining that the connections between the valve and the crankcase are: (i) resistant to deterioration or accidental disconnection, (ii) significantly more difficult to disconnect than the line between the valve and the intake ducting, and (iii) not subject to disconnection per manufacturer's maintenance, service, and/or repair procedures for non-CV system repair work.

(10.2.6) Manufacturers are not required to detect disconnections that are unlikely to occur due to a CV system design that is integral to the induction system (e.g., internal machined passages rather than tubing or hoses).

(10.2.7) For medium-duty vehicles with engines certified on an engine dynamometer having an open CV system (i.e., a system that releases crankcase emissions to the atmosphere without routing them to the intake ducting or to the exhaust upstream of the aftertreatment), the manufacturer shall submit a plan for Executive Officer approval of the monitoring strategy, malfunction criteria, and monitoring conditions prior to OBD certification. Executive Officer approval shall be based on the effectiveness of the monitoring strategy to (i) monitor the performance of the CV system to the extent feasible with respect to the malfunction criteria in section (f)(10.2.1) through (f)(10.2.4) and the monitoring conditions required by the diagnostic, and (ii) monitor the ability of the CV system to control crankcase vapor emitted to the atmosphere relative to the manufacturer's design and performance specifications for a properly functioning system (e.g., if the system is equipped with a filter and/or separator to reduce crankcase emissions to the atmosphere, the OBD II system shall monitor the integrity of the filter and/or function of the separator).

(10.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(10.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(10.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2). The stored fault code need not specifically identify the CV system (e.g., a fault code for EGR or intake air mass flow rationality monitoring can be stored) if the manufacturer demonstrates that additional monitoring hardware would be necessary to make this identification and provided that the manufacturer's diagnostic and repair procedures for the detected malfunction include directions to check the integrity of the CV system.

(11) *Engine Cooling System Monitoring*

(11.1) Requirement:

(11.1.1) The OBD II system shall monitor the thermostat on vehicles so-equipped for proper operation.

(11.1.2) The OBD II system shall monitor the engine coolant temperature (ECT) sensor for circuit continuity, out-of-range values, and rationality faults.

(11.2) Malfunction Criteria:

(11.2.1) Thermostat

(A) The OBD II system shall detect a thermostat malfunction (e.g., leaking or early-to-open thermostat) if, within an Executive Officer approved time interval after starting the engine, either of the following two conditions occur:

(i) The coolant temperature does not reach the highest temperature required by the OBD II system to enable other diagnostics;

(ii) The coolant temperature does not reach a warmed-up temperature within 20 degrees Fahrenheit of the manufacturer's nominal thermostat regulating temperature. Subject to Executive Officer approval, a manufacturer may utilize lower temperatures for this criterion upon the Executive Officer determining that the manufacturer has demonstrated that the fuel, injection timing, and/or other coolant temperature-based modifications to the engine control strategies would not cause an emission increase of 50 or more percent of any of the applicable standards.

(B) For 2013 and subsequent model year vehicles, the OBD II system shall detect a thermostat fault if, after the coolant temperature has reached the temperatures indicated in sections (f)(11.2.1)(A)(i) and (ii), the coolant temperature drops below the temperature indicated in section (f)(11.2.1)(A)(i).

(C) Executive Officer approval of the time interval after engine start under section (f)(11.2.1)(A) above shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times.

(D) For monitoring of malfunctions under section (f)(11.2.1)(A), with Executive Officer approval, a manufacturer may use alternate malfunction criteria and/or monitoring conditions (see section (f)(11.3)) that are a function of temperature at engine start on vehicles that do not reach the temperatures specified in the malfunction criteria when the thermostat is functioning properly. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data that demonstrate that a properly operating system does not reach the specified temperatures, that the monitor is capable of meeting the specified malfunction criteria at engine start temperatures greater than 50 degrees Fahrenheit, and that the overall effectiveness of the monitor is comparable to a monitor meeting these thermostat monitoring requirements at lower temperatures.

(E) With Executive Officer approval, manufacturers may omit this monitor. Executive Officer approval shall be granted upon determining that the manufacturer has demonstrated that a malfunctioning thermostat cannot cause a measurable increase in emissions during any reasonable driving condition nor cause any disablement of other monitors.

(11.2.2) ECT Sensor

(A) Circuit Continuity. The OBD II system shall detect a malfunction when a lack of circuit continuity or out-of-range value occurs.

(B) Time to Reach Closed-Loop Enable Temperature.

(i) The OBD II system shall detect a malfunction if the ECT sensor does not achieve the stabilized minimum temperature which is needed to begin closed-loop or feedback operation of emission-related engine controls (e.g., feedback control of fuel pressure, EGR flow, boost pressure) within an Executive Officer approved time interval after starting the engine. The time interval shall be a function of starting ECT and/or a function of intake or ambient temperature.

(ii) Executive Officer approval of the time interval shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times.

(iii) The Executive Officer shall exempt manufacturers from the requirement of section (f)(11.2.2)(B) if the manufacturer does not utilize ECT to enable closed loop or feedback operation of emission-related engine controls.

(C) Stuck in Range Below the Highest Minimum Enable Temperature. To the extent feasible when using all available information, the OBD II system shall detect a malfunction if the ECT sensor inappropriately indicates a temperature below the highest minimum enable temperature required by the OBD II system to enable other diagnostics (e.g., an OBD II system that requires ECT to be greater than 140 degrees Fahrenheit to enable a diagnostic must detect malfunctions that cause the ECT sensor to

inappropriately indicate a temperature below 140 degrees Fahrenheit). Manufacturers are exempted from this requirement for temperature regions in which the monitors required under sections (f)(11.2.1) or (f)(11.2.2)(B) will detect ECT sensor malfunctions as defined in section (f)(11.2.2)(C).

(D) Stuck in Range Above the Lowest Maximum Enable Temperature.

(i) To the extent feasible when using all available information, the OBD II system shall detect a malfunction if the ECT sensor inappropriately indicates a temperature above the lowest maximum enable temperature required by the OBD II system to enable other diagnostics (e.g., an OBD II system that requires ECT to be less than 90 degrees Fahrenheit at engine start to enable a diagnostic must detect malfunctions that cause the ECT sensor to inappropriately indicate a temperature above 90 degrees Fahrenheit).

(ii) Manufacturers are exempted from this requirement for temperature regions in which the monitors required under sections (f)(11.2.1), (f)(11.2.2)(B), or (f)(11.2.2)(C) (i.e., ECT sensor or thermostat malfunctions) will detect ECT sensor malfunctions as defined in section (f)(11.2.2)(D) or in which the MIL will be illuminated under the requirements of section (d)(2.2.3) for default mode operation (e.g., overtemperature protection strategies).

(iii) For 2006 and subsequent model year applications, manufacturers are also exempted from the requirements of section (f)(11.2.2)(D) for temperature regions where the temperature gauge indicates a temperature in the red zone (engine overheating zone) or an overtemperature warning light is illuminated for vehicles that have a temperature gauge or warning light on the instrument panel and utilize the same ECT sensor for input to the OBD II system and the temperature gauge/warning light.

(11.3) Monitoring Conditions:

(11.3.1) Thermostat

(A) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(11.2.1)(A) in accordance with section (d)(3.1) except as provided for in section (f)(11.3.1)(E). Additionally, except as provided for in sections (f)(11.3.1)(B) and (C), monitoring for malfunctions identified in section (f)(11.2.1)(A) shall be conducted once per driving cycle on every driving cycle in which the ECT sensor indicates, at engine start, a temperature lower than the temperature established as the malfunction criteria in section (f)(11.2.1)(A).

(B) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(11.2.1)(B) in accordance with section (d)(3.1) with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle.

(C) Manufacturers may disable thermostat monitoring at ambient temperatures below 20 degrees Fahrenheit.

(D) Manufacturers may request Executive Officer approval to suspend or disable thermostat monitoring if the vehicle is subjected to conditions which could lead to false diagnosis (e.g., vehicle operation at idle for more than 50 percent of the warm-up time, hot restart conditions, etc.). In general, the Executive Officer shall not approve disablement of the monitor on engine starts where the ECT at engine start is more than 35 degrees Fahrenheit lower than the thermostat malfunction threshold temperature determined under section (f)(11.2.1)(A). The Executive Officer shall approve the request upon determining that the manufacturer has provided data and/or engineering analysis that demonstrate the need for the request.

(E) With respect to defining enable conditions that are encountered during the FTP or Unified cycle as required in (d)(3.1.1) for malfunctions identified in section (f)(11.2.1)(A), the FTP cycle shall refer to on-road driving following the FTP cycle in lieu of testing on a chassis or engine dynamometer.

(11.3.2) ECT Sensor

(A) Except as provided below in section (f)(11.3.2)(E), monitoring for malfunctions identified in section (f)(11.2.2)(A) (i.e., circuit continuity and out-of-range) shall be conducted continuously.

(B) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(11.2.2)(B) in accordance with section (d)(3.1). Additionally, except as provided for in section (f)(11.3.2)(D), monitoring for malfunctions identified in section (f)(11.2.2)(B) shall be conducted once per driving cycle on every driving cycle in which the ECT sensor indicates a temperature lower than the closed-loop enable temperature at engine start (i.e., all engine start temperatures greater than the ECT sensor out-of-range low temperature and less than the closed-loop enable temperature).

(C) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(11.2.2)(C) and (D) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(D) Manufacturers may suspend or delay the time to reach closed-loop enable temperature diagnostic if the vehicle is subjected to conditions which could lead to false diagnosis (e.g., vehicle operation at idle for more than 50 to 75 percent of the warm-up time).

(E) A manufacturer may request Executive Officer approval to disable continuous ECT sensor monitoring when an ECT sensor malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or engineering evaluation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning

sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(11.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(12) *Cold Start Emission Reduction Strategy Monitoring*

(12.1) Requirement:

(12.1.1) For all 2010 and subsequent model year vehicles, if a vehicle incorporates a specific engine control strategy to reduce cold start emissions, the OBD II system shall monitor the system to verify the strategy achieves the desired effect (e.g., to achieve accelerated catalyst light-off temperature) and monitor the commanded elements/components for proper function (e.g., injection timing, increased engine idle speed, increased engine load via intake or exhaust throttle activation) while the control strategy is active to ensure proper operation of the control strategy.

(12.2) Malfunction Criteria: The OBD II system shall, to the extent feasible, detect a malfunction if either of the following occurs:

(12.2.1) Any single commanded element/component does not properly respond to the commanded action while the cold start strategy is active. For purposes of this section, "properly respond" is defined as when the element responds:

(A) by a robustly detectable amount by the monitor; and

(B) in the direction of the desired command; and

(C) above and beyond what the element/component would achieve on start-up without the cold start strategy active (e.g., if the cold start strategy commands a higher idle engine speed, a fault must be detected if there is no detectable amount of engine speed increase above what the system would achieve without the cold start strategy active);

(12.2.2) Any failure or deterioration of the cold start emission reduction control strategy that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

(A) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

(i) 2.5 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

(ii) 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

(B) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

(i) 2.0 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles.

(12.2.3) For section (f)(12.2.2):

(A) For 2010 through 2012 model year vehicles, the OBD II system shall either monitor the combined effect of the elements of the system as a whole or the individual elements (e.g., increased engine speed, increased engine load from restricting an exhaust throttle) for failures that cause emissions to exceed the applicable emission levels specified in section (f)(12.2.2).

(B) For 2013 and subsequent model year vehicles, to the extent feasible (without adding hardware for this purpose), the OBD II system shall monitor the ability of the system to achieve the desired effect (e.g., strategies used to accelerate catalyst light-off by increasing catalyst inlet temperature shall verify the catalyst inlet temperature actually achieves the desired temperatures within an Executive Officer approved time interval after starting the engine) for failures that cause emissions to exceed the applicable emission levels specified in section (f)(12.2.2). For strategies where it is not feasible to be monitored as a system, the OBD II system shall monitor the individual elements/components (e.g., increased engine speed, increased engine load from restricting an exhaust throttle) for failures that cause emissions to exceed the applicable emission levels specified in section (f)(12.2.2).

(12.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(12.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(12.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(13) *Variable Valve Timing And/Or Control (VVT) System Monitoring*

(13.1) Requirement: On all 2006 and subsequent model year applications, the OBD II system shall monitor the VVT system on vehicles so-equipped for target error and slow response malfunctions. The individual electronic components (e.g., actuators, valves, sensors, etc.) that are used in the VVT system shall be monitored in accordance with the comprehensive components requirements in section (f)(15).

(13.2) Malfunction Criteria:

(13.2.1) Target Error: The OBD II system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve the commanded valve timing and/or control within a crank angle or lift tolerance that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

(A) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

(i) 3.0 times the applicable FTP standards for 2006 through 2009 model year vehicles;

(ii) 2.5 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

(iii) 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 and subsequent model year vehicles.

(B) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

(i) 1.5 times the applicable NMHC, CO, and NOx standards or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2006 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of greater than 0.50 g/bhp-hr NOx;

(ii) 2.5 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause NOx emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2006 through 2012 model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx; and

(iii) 2.0 times the applicable NMHC or CO standards, the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test, or 0.03 g/bhp-hr PM as measured from an applicable cycle emission test for 2013 and subsequent model year vehicles certified to an engine dynamometer tailpipe NOx emission standard of less than or equal to 0.50 g/bhp-hr NOx.

(13.2.2) Slow Response: The OBD II system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve the commanded valve timing and/or control within a time that would cause a vehicle's emissions to exceed the applicable emission levels specified in sections (f)(13.2.1).

(13.2.3) For vehicles in which no failure or deterioration of the VVT system could result in a vehicle's emissions exceeding the levels specified in sections (f)(13.2.1), the VVT system shall be monitored for proper functional response in accordance with the malfunction criteria in section (f)(15.2).

(13.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for VVT system malfunctions identified in section (f)(13.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). Additionally, manufacturers shall track and report VVT system monitor performance under section (d)(3.2.2). For purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in section (f)(13.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(13.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(14) [RESERVED]

(15) *Comprehensive Component Monitoring*

(15.1) Requirement:

(15.1.1) Except as provided in sections (f)(15.1.3), (f)(15.1.4), and (f)(16), the OBD II system shall monitor for malfunction any electronic powertrain component/system not otherwise described in sections (f)(1) through (f)(14) that either provides input to (directly or indirectly) or receives commands from the on-board computer(s), and: (1) can affect emissions during any reasonable in-use driving condition, or (2) is used as part of the diagnostic strategy for any other monitored system or component.

(A) Input Components: Input components required to be monitored may include the vehicle speed sensor, crank angle sensor, pedal position sensor, mass air flow sensor, cam position sensor, fuel pressure sensor, intake air temperature sensor, exhaust temperature sensor, and transmission electronic components such as sensors, modules, and solenoids which provide signals to the powertrain control system.

(B) Output Components/Systems: Output components/systems required to be monitored may include the idle governor, fuel injectors, automatic transmission solenoids or controls, turbocharger electronic components, the wait-to-start lamp, and cold start aids (e.g., glow plugs, intake air heaters).

(15.1.2) For purposes of criteria (1) in section (f)(15.1.1) above, the manufacturer shall determine whether a powertrain input or output component/system can affect emissions. If the Executive Officer reasonably believes that a manufacturer has incorrectly determined that a component/system cannot

affect emissions, the Executive Officer shall require the manufacturer to provide emission data showing that the component/system, when malfunctioning and installed in a suitable test vehicle, does not have an emission effect. The Executive Officer may request emission data for any reasonable driving condition.

(15.1.3) Manufacturers shall monitor for malfunction electronic powertrain input or output components/systems associated with an electronic transfer case, electronic power steering system, two speed axle, or other components that are driven by the engine and not related to the control of fueling, air handling, or emissions only if the component or system is used as part of the diagnostic strategy for any other monitored system or component.

(15.1.4) Except as specified for hybrids in section (f)(15.1.5), manufacturers shall monitor for malfunction electronic powertrain input or output components/systems associated with components that only affect emissions by causing additional electrical load to the engine and are not related to the control of fueling, air handling, or emissions only if the component or system is used as part of the diagnostic strategy for any other monitored system or component.

(15.1.5) For hybrids, manufacturers shall submit a plan to the Executive Officer for approval of the hybrid components determined by the manufacturer to be subject to monitoring in section (f)(15.1.1). In general, the Executive Officer shall approve the plan if it includes monitoring of all components/systems used as part of the diagnostic strategy for any other monitored system or component, monitoring of all energy input devices to the electrical propulsion system, monitoring of battery and charging system performance, monitoring of electric motor performance, and monitoring of regenerative braking performance.

(15.2) Malfunction Criteria:

(15.2.1) Input Components:

(A) The OBD II system shall detect malfunctions of input components caused by a lack of circuit continuity, out-of-range values, and, where feasible, rationality faults. To the extent feasible, the rationality fault diagnostics shall verify that a sensor output is neither inappropriately high nor inappropriately low (e.g., "two-sided" diagnostics).

(B) To the extent feasible, rationality faults shall be separately detected and store different fault codes than the respective lack of circuit continuity and out of range diagnostics. Additionally, input component lack of circuit continuity and out of range faults shall be separately detected and store different fault codes for each distinct malfunction (e.g., out-of-range low, out-of-range high, open circuit, etc.). Manufacturers are not required to store separate fault codes for lack of circuit continuity faults that cannot be distinguished from other out-of-range circuit faults.

(C) For input components that are directly or indirectly used for any emission control strategies that are not covered under sections (f)(1) through (f)(13) (e.g., exhaust temperature sensors used for a control strategy that regulates SCR catalyst inlet temperature within a target window), the OBD II system shall detect rationality malfunctions that prevent the component from correctly sensing any condition necessary for the strategy to operate in its intended manner. These malfunctions include faults that inappropriately prevent or delay the activation of the emission control strategy, cause the system to erroneously exit the emission control strategy, or where the control strategy has used up all of the adjustments or authority allowed by the manufacturer and is still unable to achieve the desired condition. The Executive Officer may waive detection of specific malfunctions upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that reliable detection of the malfunction is technically infeasible or would require additional hardware.

(15.2.2) Output Components/Systems:

(A) The OBD II system shall detect a malfunction of an output component/system when proper functional response of the component and system to computer commands does not occur. If a functional check is not feasible, the OBD II system shall detect malfunctions of output components/systems caused by a lack of circuit continuity or circuit fault (e.g., short to ground or high voltage). For output component lack of circuit continuity faults and circuit faults, manufacturers are not required to store different fault codes for each distinct malfunction (e.g., open circuit, shorted low, etc.). Manufacturers are not required to activate an output component/system when it would not normally be active for the purposes of performing functional monitoring of output components/systems as required in section (f)(15).

(B) The idle fuel control system shall be monitored for proper functional response to computer commands. A malfunction shall be detected when any of the following conditions occur:

(i) The idle control system cannot achieve or maintain the idle speed within +/- 30 percent of the manufacturer-specified target or desired engine speed.

(ii) The idle control system cannot achieve the target idle speed within the smallest engine speed tolerance range required by the OBD II system to enable any other monitor.

(iii) For 2013 and subsequent model year vehicles, the idle control system cannot achieve the fuel injection quantity within the smallest fueling quantity tolerance range required by the OBD II system to enable any other monitor.

(iv) For 2013 and subsequent model year vehicles, the idle control system cannot achieve the target idle speed with a fuel injection quantity within +/-50 percent of the fuel quantity necessary to achieve the target idle speed for a properly functioning vehicle and the given operating conditions.

(C) Glow plugs/intake air heaters shall be monitored for proper functional response to computer commands. The glow plug/intake air heater circuit(s) shall be monitored for proper current and voltage drop. The Executive Officer shall approve other monitoring strategies based on manufacturer's data and/or engineering analysis demonstrating equally reliable and timely detection of malfunctions. If a manufacturer demonstrates that a single glow plug failure cannot cause a measurable increase in emissions during any reasonable driving condition, the manufacturer shall detect a malfunction for the minimum number of glow plugs needed to cause an emission increase. Further, to the extent feasible on existing engine designs (without adding additional hardware for this purpose) and on all new design engines, the stored fault code shall identify the specific malfunctioning glow plug(s). For 2010 and subsequent model year vehicles, manufacturers shall detect a malfunction when a single glow plug/intake air heater no longer operates within the manufacturer's specified limits for normal operation (e.g., within specifications established by the manufacturer with the part supplier for acceptable part performance at high mileage).

(D) The wait-to-start lamp circuit shall be monitored for malfunctions that cause the lamp to fail to illuminate when commanded on (e.g., burned out bulb).

(E) For output components/systems that are directly or indirectly used for any emission control strategies that are not covered under sections (f)(1) through (f)(13) (e.g., an intake throttle used for a control strategy that adjusts intake throttle position to regulate SCR catalyst inlet temperature within a target window), the OBD II system shall detect functional malfunctions that prevent the component/system from achieving the desired functional response necessary for the strategy to operate in its intended manner. These malfunctions include faults that inappropriately prevent or delay the activation of the emission control strategy, cause the system to erroneously exit the emission control strategy, or where the control strategy has used up all of the adjustments or authority allowed by the manufacturer and is still unable to achieve the desired condition. The Executive Officer may waive detection of specific malfunctions upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that reliable detection of the malfunction is technically infeasible or would require additional hardware.

(F) For 2015 and subsequent model year vehicles that utilize fuel control system components (e.g., injectors, fuel pump) that have tolerance

compensation features implemented in hardware or software during production or repair procedures (e.g., individually coded injectors for flow characteristics that are programmed into an electronic control unit to compensate for injector to injector tolerances, fuel pumps that use in-line resistors to correct for differences in fuel pump volume output), the components shall be monitored to ensure the proper compensation is being used.

(i) The system shall detect a fault if the compensation being used by the control system does not match the compensation designated for the installed component (e.g., the flow characteristic coding designated on a specific injector does not match the compensation being used by the fuel control system for that injector). If a manufacturer demonstrates that a single component (e.g., injector) using the wrong compensation cannot cause a measurable increase in emissions during any reasonable driving condition, the manufacturer shall detect a malfunction for the minimum number of components using the wrong compensation needed to cause an emission increase. Further, the stored fault code shall identify the specific component that does not match the compensation.

(ii) Monitoring of the fuel control system components under section (f)(15.2.2)(F)(i) is not required if the manufacturer demonstrates that both of the following criteria are satisfied: (1) no fault of the components' tolerance compensation features (e.g., wrong compensation being used) could cause emissions to increase by 15 percent or more of the applicable full useful life standard as measured from an applicable emission test cycle; and (2) no fault of the components' tolerance compensation features could cause emissions to exceed the applicable full useful life standard as measured from an applicable emission test cycle. For purposes of determining if the emission criteria above are met, the manufacturers shall request Executive Officer approval of the test plan for which the emission impact will be determined. The test plan shall include the combination of failed components and the degree of mismatch (e.g., wrong compensation) used as well as the test procedure and emission test cycles used to demonstrate the emission impact, including the necessary preconditioning cycles used by the system to correct or adapt for any mismatch and mitigate the emission impact. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or engineering analysis that demonstrate that the conditions necessary for the system to correct or adapt will readily occur in a timely manner during in-use operation and that the test conditions represent worst case emissions from typical in-use service actions when considering the distribution and variance of the compensation values and parts (e.g., replacement of one or more

plus-one-sigma injectors with minus-one-sigma injectors without updating of the compensation value).

(15.3) Monitoring Conditions:

(15.3.1) Input Components:

(A) Except as provided in section (f)(15.3.1)(C), input components shall be monitored continuously for proper range of values and circuit continuity.

(B) For rationality monitoring (where applicable), manufacturers shall define the monitoring conditions for detecting malfunctions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that rationality monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).:

(C) A manufacturer may request Executive Officer approval to disable continuous input component proper range of values or circuit continuity monitoring when a malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning input component cannot be distinguished from a malfunctioning input component and that the disablement interval is limited only to that necessary for avoiding false detection.

(15.3.2) Output Components/Systems:

(A) Except as provided in section (f)(15.3.2)(D), monitoring for circuit continuity and circuit faults shall be conducted continuously.

(B) Except as provided in section (f)(15.3.2)(C), for functional monitoring, manufacturers shall define the monitoring conditions for detecting malfunctions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(C) For the idle fuel control system, manufacturers shall define the monitoring conditions for functional monitoring in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that functional monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).

(D) A manufacturer may request Executive Officer approval to disable continuous output component circuit continuity or circuit fault monitoring when a malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning output component cannot be distinguished from a malfunctioning output component and that the

disablement interval is limited only to that necessary for avoiding false detection.

(15.4) MIL Illumination and Fault Code Storage:

(15.4.1) Except as provided in sections (f)(15.4.2) and (f)(15.4.4) below, general requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(15.4.2) Exceptions to general requirements for MIL illumination. MIL illumination is not required in conjunction with storing a confirmed fault code for any comprehensive component if:

(A) the component or system, when malfunctioning, could not cause vehicle emissions to increase by:

(i) 25 percent or more for PC/LDT SULEV II vehicles, or

(ii) 15 percent or more for all other vehicles, and

(B) the component or system is not used as part of the diagnostic strategy for any other monitored system or component.

(15.4.3) For purposes of determining the emission increase in section (f)(15.4.2)(A), the manufacturer shall request Executive Officer approval of the test cycle/vehicle operating conditions for which the emission increase will be determined. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or engineering evaluation that demonstrate that the testing conditions represent in-use driving conditions where emissions are likely to be most affected by the malfunctioning component. For purposes of determining whether the specified percentages in section (f)(15.4.2)(A) are exceeded, if the approved testing conditions are comprised of an emission test cycle with an exhaust emission standard, the measured increase shall be compared to a percentage of the exhaust emission standard (e.g., if the increase is equal to or more than 15 percent of the exhaust emission standard for that test cycle). If the approved testing conditions are comprised of a test cycle or vehicle operating condition that does not have an exhaust emission standard, the measured increase shall be calculated as a percentage of the baseline test (e.g., if the increase from a back-to-back test sequence between normal and malfunctioning condition is equal to or more than 15 percent of the baseline test results from the normal condition).

(15.4.4) For malfunctions required to be detected by section (f)(15.2.2)(B)(iii) (idle control fuel injection quantity faults), the stored fault code is not required to specifically identify the idle control system (e.g., a fault code for cylinder fuel injection quantity imbalance or combustion quality monitoring can be stored).

(16) *Other Emission Control or Source System Monitoring*

(16.1) Requirement: For other emission control or source systems that are not identified or addressed in sections (f)(1) through (f)(15) (e.g., homogeneous charge compression ignition (HCCI) controls, hydrocarbon traps, fuel-fired passenger compartment heaters), manufacturers shall submit a plan for Executive Officer approval of the monitoring strategy, malfunction criteria, and monitoring conditions prior to introduction on a production vehicle intended for sale in California. Executive Officer approval shall be based on the effectiveness of the monitoring strategy, the malfunction criteria utilized, and the monitoring conditions required by the diagnostic and, if applicable, the determination that the requirements of section (f)(16.3) and (f)(16.4) below are satisfied.

(16.2) For purposes of section (f)(16), emission source systems are components or devices that emit pollutants subject to vehicle evaporative and exhaust emission standards (e.g., NMOG, CO, NOx, PM) and include non-electronic components and non-powertrain components (e.g., fuel-fired passenger compartment heaters, on-board reformers).

(16.3) Except as provided below in this paragraph, for 2005 and subsequent model year vehicles that utilize emission control systems that alter intake air flow or cylinder charge characteristics by actuating valve(s), flap(s), etc. in the intake air delivery system (e.g., swirl control valve systems), the manufacturers, in addition to meeting the requirements of section (f)(16.1) above, may elect to have the OBD II system monitor the shaft to which all valves in one intake bank are physically attached in lieu of monitoring the intake air flow, cylinder charge, or individual valve(s)/flap(s) for proper functional response. For non-metal shafts or segmented shafts, the monitor shall verify all shaft segments for proper functional response (e.g., by verifying the segment or portion of the shaft furthest from the actuator properly functions). For systems that have more than one shaft to operate valves in multiple intake banks, manufacturers are not required to add more than one set of detection hardware (e.g., sensor, switch, etc.) per intake bank to meet this requirement. Vehicles utilizing these emission control systems designed and certified for 2004 or earlier model year vehicles and carried over to the 2005 through 2009 model year shall not be required to meet the provisions of section (f)(16.3) until the engine or intake air delivery system is redesigned.

(16.4) For emission control strategies that are not covered under sections (f)(1) through (f)(13) (e.g., a control strategy that regulates SCR catalyst inlet temperatures within a target window), Executive Officer approval shall be based on the effectiveness of the plan in detecting malfunctions that prevent the strategy from operating in its intended manner. These malfunctions include faults that inappropriately prevent or delay the activation of the emission control strategy, faults that cause the system to erroneously exit the emission control strategy, and faults where the control strategy has used up all of the adjustments or authority allowed by the manufacturer and is still unable

to achieve the desired condition. The Executive Officer may waive detection of specific malfunctions upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that reliable detection of the malfunction is technically infeasible or would require additional hardware.

(17) *Exceptions to Monitoring Requirements*

(17.1) Except as provided in sections (f)(17.1.1) through (17.1.4) below, upon request of a manufacturer or upon the best engineering judgment of the ARB, the Executive Officer may revise the emission threshold for a malfunction on any diagnostic required in section (f) for medium-duty vehicles if the most reliable monitoring method developed requires a higher threshold to prevent false indications of a malfunction. Additionally, except as specified in section (f)(9.2.1)(A)(iii), for 2007 through 2013 model year light-duty vehicles and 2007 through 2015 model year medium-duty vehicles, the Executive Officer may revise the PM filter malfunction criteria of section (f)(9.2.1) to exclude detection of specific failure modes (e.g., combined failure of partially melted and partially cracked substrates) if the most reliable monitoring method developed requires the exclusion of specific failure modes to prevent false indications of a malfunction.

(17.1.1) For PC/LDT SULEV II vehicles, the Executive Officer shall approve a malfunction criterion of 2.5 times the applicable FTP standards in lieu of 1.5 or 1.75 wherever required in section (f).

(17.1.2) For vehicles certified to Federal Bin 3 or Bin 4 emission standards, manufacturers shall utilize the ULEV II vehicle NMOG and CO malfunction criteria (e.g., 1.5 times the Bin 3 or Bin 4 NMOG and CO standards) and the PC/LDT SULEV II vehicle NOx malfunction criteria (e.g., 2.5 times the Bin 3 or Bin 4 NOx standards).

(17.1.3) For medium-duty diesel vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard, the Executive Officer shall approve a malfunction criteria of "the applicable PM standard plus 0.02 g/bhp-hr PM (e.g., unable to maintain PM emissions at or below 0.03 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr) as measured from an applicable cycle emission test" in lieu of "0.03 g/bhp-hr PM as measured from an applicable cycle emission test" wherever required in section (f). The Executive Officer shall also approve a malfunction criteria of "the applicable PM standard plus 0.04 g/bhp-hr PM (e.g., unable to maintain PM emissions at or below 0.05 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr) as measured from an applicable cycle emission test" in lieu of "0.05 g/bhp-hr PM as measured from an applicable cycle emission test" wherever required in section (f).

(17.1.4) For 2007 through 2009 medium-duty diesel vehicles (including MDPVs) certified to an engine dynamometer FTP tailpipe PM emission standard of greater than or equal 0.08 g/bhp-hr, the Executive Officer shall approve a

malfunction of criteria of 1.5 times the applicable PM standard in lieu of the applicable PM malfunction criteria required for any monitor in section (f).

(17.1.5) For 2004 through 2015 model year medium-duty diesel vehicles (except MDPVs) certified to a chassis dynamometer tailpipe emission standard, the monitoring requirements and malfunction criteria in section (f) applicable to medium-duty diesel vehicles certified to an engine dynamometer tailpipe emission standard shall apply. However, the manufacturer shall request Executive Officer approval of manufacturer-proposed medium-duty chassis dynamometer-based malfunction criteria in lieu of the engine dynamometer-based malfunction criteria required for each monitor in section (f). The Executive Officer shall approve the request upon finding that:

(A) the manufacturer has used good engineering judgment in determining the malfunction criteria,

(B) the malfunction criteria will provide for similar timeliness in detection of malfunctioning components with respect to detection of malfunctions on medium-duty diesel vehicles certified to an engine dynamometer tailpipe emission standard,

(C) the malfunction criteria are set as stringently as technologically feasible with respect to indicating a malfunction at the lowest possible tailpipe emission levels (but not lower than 1.5 times the chassis dynamometer tailpipe emission standard the vehicle is certified to), considering the best available monitoring technology to the extent that it is known or should have been known to the manufacturer,

(D) the malfunction criteria will prevent detection of a malfunction when the monitored component is within the performance specifications for components aged to the end of the full useful life, and

(E) the manufacturer has provided emission data showing the emission levels at which the malfunctions are detected.

(17.1.6) For 2016 and subsequent model year medium-duty diesel vehicles (except MDPVs) certified to a chassis dynamometer tailpipe emission standard, the following monitoring requirements and malfunction criteria shall apply:

(A) Except as provided for in sections (f)(17.1.6)(B) and (C) below, the monitoring requirements and malfunction criteria in section (f) applicable to passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard shall apply.

(B) For NMHC catalyst conversion efficiency monitoring (section (f)(1.2.2)), the manufacturer shall detect an NMHC catalyst malfunction when the catalyst conversion capability decreases to the point that emissions exceed 1.75 times the applicable FTP NMHC or NOx standards.

(C) For misfire monitoring (section (f)(3)), the manufacturer shall use the monitoring requirements and malfunction criteria applicable to medium-duty vehicles certified to an engine dynamometer tailpipe emission standard.

(17.2) Whenever the requirements in section (f) of this regulation require a manufacturer to meet a specific phase-in schedule:

(17.2.1) The phase-in percentages shall be based on the manufacturer's projected sales volume for all vehicles subject to the requirements of title 13, CCR section 1968.2.1 unless specifically stated otherwise in section (f).

(17.2.2) Manufacturers may use an alternate phase-in schedule in lieu of the required phase-in schedule if the alternate phase-in schedule provides for equivalent compliance volume as defined in section (c) except as specifically noted for the phase-in for in-use monitor performance ratio monitoring conditions in section (d)(3.2) and the PM filter monitor in section (f)(9.2.1)(A).

(17.2.3) Small volume manufacturers may use an alternate phase-in schedule in accordance with section (f)(17.2.2) in lieu of the required phase-in schedule or may use a different schedule as follows:

(A) For the diesel PM filter monitor phase-in schedule in section (f)(9.2.1)(A)(iii), the manufacturer may use the malfunction criteria in section (f)(9.2.1)(A)(ii)c. for all 2014 and 2015 model year medium-duty vehicles in lieu of the malfunction criteria and required phase-in schedule in section (f)(9.2.1)(A)(iii).

(B) For phase-in schedules not listed in section (f)(17.2.3)(A) above, the manufacturer may meet the requirement on all vehicles by the final year of the phase-in in lieu of meeting the specific phase-in requirements for each model year.

(17.3) Manufacturers may request Executive Officer approval to disable an OBD II system monitor at ambient temperatures below twenty degrees Fahrenheit (20°F) (low ambient temperature conditions may be determined based on intake air or engine coolant temperature) or at elevations above 8000 feet above sea level. The Executive Officer shall approve the request upon determining that the manufacturer has provided data and/or an engineering evaluation that demonstrate that monitoring during the conditions would be unreliable. A manufacturer may further request, and the Executive Officer shall approve, that an OBD II system monitor be disabled at other ambient temperatures upon determining that the manufacturer has demonstrated with data and/or an engineering evaluation that misdiagnosis would occur at the ambient temperatures because of its effect on the component itself (e.g., component freezing).

(17.4) Manufacturers may request Executive Officer approval to disable monitoring systems that can be affected by low fuel level or running out of fuel (e.g., misfire detection) when the fuel level is 15 percent or less of the nominal

capacity of the fuel tank. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring at the fuel levels would be unreliable.

(17.5) Manufacturers may disable monitoring systems that can be affected by vehicle battery or system voltage levels.

(17.5.1) For monitoring systems affected by low vehicle battery or system voltages, manufacturers may disable monitoring systems when the battery or system voltage is below 11.0 Volts. Manufacturers may request Executive Officer approval to utilize a voltage threshold higher than 11.0 Volts to disable system monitoring. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring at the voltages would be unreliable and that either operation of a vehicle below the disablement criteria for extended periods of time is unlikely or the OBD II system monitors the battery or system voltage and will detect a malfunction at the voltage used to disable other monitors.

(17.5.2) For monitoring systems affected by high vehicle battery or system voltages, manufacturers may request Executive Officer approval to disable monitoring systems when the battery or system voltage exceeds a manufacturer-defined voltage. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring above the manufacturer-defined voltage would be unreliable and that either the electrical charging system/alternator warning light is illuminated (or voltage gauge is in the "red zone") or that the OBD II system monitors the battery or system voltage and will detect a malfunction at the voltage used to disable other monitors.

(17.6) A manufacturer may request Executive Officer approval to disable monitors that can be affected by PTO activation on vehicles designed to accommodate the installation of PTO units (as defined in section (c)).

(17.6.1) Except as allowed in section (g)(17.6.2) below, a manufacturer may request Executive Officer approval to disable an affected monitor provided disablement occurs only while the PTO unit is active and the OBD II readiness status (specified under section (g)(4.1)) and PTO activation time are appropriately tracked and erased as described in this section. The Executive Officer shall approve the request for disablement based on the manufacturer's demonstration that the affected monitor cannot robustly detect malfunctions (e.g., cannot avoid false passes or false indications of malfunctions) while the PTO unit is active. The OBD II system shall track the cumulative engine runtime with PTO active and clear OBD II readiness status (i.e., set all monitors to indicate "not complete") no later than the start of the next ignition cycle if 750 minutes of cumulative engine runtime with PTO active has occurred since the last time the affected monitor has

determined the component or system monitored by the affected monitor is or is not malfunctioning (i.e., has completed). The PTO timer shall pause whenever PTO changes from active to not active and resume counting when PTO is re-activated. The timer shall be reset to zero after the affected monitor has completed and no later than the start of the next ignition cycle. Once the PTO timer has reached 750 minutes and the OBD II readiness status has been cleared, the PTO timer may not cause the OBD system to clear the readiness status again until after the PTO timer has reset to zero (after the monitor has completed) and again reached 750 minutes.

(17.6.2) In lieu of requesting Executive Officer approval for disabling an affected monitor according to section (f)(17.6.1) above, a manufacturer may disable affected monitors, provided disablement occurs only while the PTO unit is active, and the OBD II readiness status is cleared by the on-board computer (i.e., all monitors set to indicate "not complete") while the PTO unit is activated. If the disablement occurs, the readiness status may be restored to its state prior to PTO activation when the disablement ends.

(17.7) Whenever the requirements in section (f) of this regulation require monitoring "to the extent feasible", the manufacturer shall submit its proposed monitor(s) for Executive Officer approval. The Executive Officer shall approve the proposal upon determining that the proposed monitor(s) meets the criteria of "to the extent feasible" by considering the best available monitoring technology to the extent that it is known or should have been known to the manufacturer and given the limitations of the manufacturer's existing hardware, the extent and degree to which the monitoring requirements are met in full, the limitations of the monitoring necessary to prevent significant errors of commission and omission, and the extent to which the manufacturer has considered and pursued alternative monitoring concepts to meet the requirements in full. The manufacturer's consideration and pursuit of alternative monitoring concepts shall include evaluation of other modifications to the proposed monitor(s), the monitored components themselves, and other monitors that use the monitored components (e.g., altering other monitors to lessen the sensitivity and reliance on the component or characteristic of the component subject to the proposed monitor(s)).

(g) *Standardization Requirements*

(1) *Reference Documents*:

The following Society of Automotive Engineers (SAE) and International Organization for Standardization (ISO) documents are incorporated by reference into this regulation:

(1.1) SAE J1930 "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms – Equivalent to ISO/TR 15031-2", October 2008 (SAE J1930).

(1.2) SAE J1962 "Diagnostic Connector – Equivalent to ISO/DIS 15031-3:December 14, 2001", April 2002 (SAE J1962).

(1.3) SAE J1978 "OBD II Scan Tool – Equivalent to ISO/DIS 15031-4:December 14, 2001", April 2002 (SAE J1978).

(1.4) SAE J1979 "E/E Diagnostic Test Modes", May 2007 (SAE J1979).

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

(1.5) SAE J1850 "Class B Data Communications Network Interface", May 2001 (SAE 1850).

(1.6) SAE J2012 "Diagnostic Trouble Code Definitions – Equivalent to ISO/DIS 15031-6", December 2007 (SAE J2012).

(1.7) ISO 9141-2:1994 "Road Vehicles-Diagnostic Systems-CARB Requirements for Interchange of Digital Information", February 1994 (ISO 9141-2).

(1.8) ISO 14230-4:2000 "Road Vehicles-Diagnostic Systems-KWP 2000 Requirements for Emission-related Systems", June 2000 (ISO 14230-4).

(1.9) ISO 15765-4:2005 "Road Vehicles-Diagnostics on Controller Area Network (CAN) - Part 4: Requirements for emissions-related systems", January 2005 (ISO 15765-4).

(1.10) SAE J1939 consisting of:

(1.10.1) J1939 "Recommended Practice for a Serial Control and Communications Vehicle Network" March 2009;

(1.10.2) J1939/1 "Recommended Practice for Control and Communications Network for On-Highway Equipment", September 01, 2000;

(1.10.3) J1939/11 "Physical Layer, 250K bits/s, Twisted Shielded Pair", September 18, 2006;

(1.10.4) J1939/13 "Off-Board Diagnostic Connector", March 11, 2004;

(1.10.5) J1939/15 "Reduced Physical Layer, 250K bits/sec, UN-Shielded Twisted Pair (UTP)", August 21, 2008;

(1.10.6) J1939/21 "Data Link Layer", December 22, 2006;

(1.10.7) J1939/31 "Network Layer", April 02, 2004;

(1.10.8) J1939/71 "Vehicle Application Layer (Through February 2008)", January 20, 2009;

(1.10.9) J1939/73 "Application Layer - Diagnostics", September 08, 2006;

(1.10.10) J1939/81 "Network Management", May 08, 2003; and

(1.10.11) J1939/84 "OBD Communications Compliance Test Cases For Heavy

Duty Components and Vehicles", December 2008.

(1.11) SAE J1699-3 – "OBD II Compliance Test Cases", May 2006 (SAE J1699-3).

(1.12) SAE J2534-1 – "Recommended Practice for Pass-Thru Vehicle Programming", December 2004 (SAE J2534-1).

(2) *Diagnostic Connector*:

A standard data link connector conforming to SAE J1962 specifications (except as specified in section (g)(2.3)) shall be incorporated in each vehicle.

(2.1) The connector shall be located in the driver's side foot-well region of the vehicle interior in the area bound by the driver's side of the vehicle and the driver's side edge of the center console (or the vehicle centerline if the vehicle does not have a center console) and at a location no higher than the bottom of the steering wheel when in the lowest adjustable position. The connector may not be located on or in the center console (i.e., neither on the horizontal faces near the floor-mounted gear selector, parking brake lever, or cup-holders nor on the vertical faces near the car stereo, climate system, or navigation system controls). The location of the connector shall be capable of being easily identified by a "crouched" technician entering the vehicle from the driver's side.

(2.2) If the connector is covered, the cover must be removable by hand without the use of any tools and be labeled to aid technicians in identifying the location of the connector. Access to the diagnostic connector may not require opening or the removal of any storage accessory (e.g., ashtray, coinbox, etc.). The label shall be submitted to the Executive Officer for review and approval, at or before the time the manufacturer submits its certification application. The Executive Officer shall approve the label upon determining that it clearly identifies that the connector is located behind the cover and is consistent with language and/or symbols commonly used in the automotive industry.

(2.3) Any pins in the connector that provide electrical power shall be properly fused to protect the integrity and usefulness of the connector for diagnostic purposes and may not exceed 20.0 Volts DC regardless of the nominal vehicle system or battery voltage (e.g., 12V, 24V, 42V, etc.).

(3) *Communications to a Scan Tool*:

Manufacturers shall use one of the following standardized protocols for communication of all required emission related messages from on-board to off-board network communications to a scan tool meeting SAE J1978 specifications:

(3.1) SAE J1850. All required emission related messages using this protocol shall use the Cyclic Redundancy Check and the three byte header, may not use inter-byte separation or checksums, and may not require a minimum delay of 100 ms between SAE J1978 scan tool requests. This protocol may not be used on any 2008 or subsequent model year vehicle.

(3.2) ISO 9141-2. This protocol may not be used on any 2008 or subsequent model year vehicle.

(3.3) ISO 14230-4. This protocol may not be used on any 2008 or subsequent model year vehicle.

(3.4) ISO 15765-4. This protocol shall be allowed on any 2003 and subsequent model year vehicle and required on all 2008 and subsequent model year vehicles. All required emission-related messages using this protocol shall use a 500 kbps baud rate.

(4) *Required Emission Related Functions*: The following standardized functions shall be implemented in accordance with the specifications in SAE J1979 to allow for access to the required information by a scan tool meeting SAE J1978 specifications:

(4.1) Readiness Status: In accordance with SAE J1979 specifications, the OBD II system shall indicate "complete" or "not complete" since the fault memory was last cleared for each of the installed monitored components and systems identified in sections (e)(1) through (e)(8), (e)(15), (f)(1) through (f)(4), (f)(6), (f)(8), and (f)(15). All 2010 and subsequent model year diesel vehicles shall additionally indicate the appropriate readiness status for monitors identified in sections (f)(5), (f)(7), and (f)(9). All 2010 subsequent model year vehicles equipped with VVT system monitoring and subject to the test results requirements specified in section (g)(4.5.4)(C) shall additionally indicate the appropriate readiness status for VVT system monitors identified in sections (e)(13) and (f)(13). All components or systems that are monitored continuously shall always indicate "complete". Those components or systems that are not subject to continuous monitoring shall immediately indicate "complete" upon the respective diagnostic(s) being fully executed and determining that the component or system is not malfunctioning. A component or system shall also indicate "complete" if after the requisite number of decisions necessary for determining MIL status have been fully executed, the monitor indicates a malfunction for the component or system. The status for each of the monitored components or systems shall indicate "not complete" whenever fault memory has been cleared or erased by a means other than that allowed in section (d)(2). Normal vehicle shut down (i.e., key off, engine off) may not cause the status to indicate "not complete".

(4.1.1) Subject to Executive Officer approval, if monitoring is disabled for a multiple number of driving cycles due to the continued presence of extreme operating conditions (e.g., cold ambient temperatures, high altitudes, etc), readiness status for the subject monitoring system may be set to indicate "complete" without monitoring having been completed. Executive Officer approval shall be based on the conditions for monitoring system disablement and the number of driving cycles specified without completion of monitoring before readiness is indicated as "complete".

(4.1.2) For the evaporative system monitor:

(A) Except as provided below in section (g)(4.1.2)(B), the readiness status shall be set in accordance with section (g)(4.1) when both the functional check of the purge valve and the leak detection monitor of the orifice size specified in either section (e)(4.2.2)(B) or (C) (e.g., 0.040 inch or 0.020 inch) indicate that they are complete.

(B) For vehicles that utilize a 0.090 inch (in lieu of 0.040 inch) leak detection monitor in accordance with section (e)(4.2.5), the readiness status shall be set in accordance with section (g)(4.1) when both the functional check of the purge valve and the leak detection monitor of the orifice size specified in section (e)(4.2.2)(C) (e.g., 0.020 inch) indicate that they are complete.

(4.1.3) If the manufacturer elects to additionally indicate readiness status through the MIL in the key on, engine off position as provided for in section (d)(2.1.3), the readiness status shall be indicated in the following manner: If the readiness status for all monitored components or systems is "complete", the MIL shall remain continuously illuminated in the key on, engine off position for at least 15-20 seconds. If the readiness status for one or more of the monitored components or systems is "not complete", after 15-20 seconds of operation in the key on, engine off position with the MIL illuminated continuously, the MIL shall blink once per second for 5-10 seconds. The data stream value for MIL status (section (g)(4.2)) shall indicate "commanded off" during this sequence unless the MIL has also been "commanded on" for a detected fault.

(4.2) Data Stream: The following signals shall be made available on demand through the standardized data link connector in accordance with SAE J1979 specifications. The actual signal value shall always be used instead of a default or limp home value.

(4.2.1) For all vehicles: calculated load value, number of stored confirmed fault codes, engine coolant temperature, engine speed, absolute throttle position (if equipped with a throttle), vehicle speed, OBD requirements to which the engine is certified (e.g., California OBD II, EPA OBD, European OBD, non-OBD) and MIL status (i.e., commanded-on or commanded-off).

(4.2.2) For all vehicles so equipped: fuel control system status (e.g., open loop, closed loop, etc.), fuel trim, fuel pressure, ignition timing advance, intake air temperature, manifold absolute pressure, air flow rate from mass air flow sensor, secondary air status (upstream, downstream, or atmosphere), oxygen sensor output, air/fuel ratio sensor output.

(4.2.3) For all 2005 and subsequent model year vehicles using the ISO 15765-4 protocol for the standardized functions required in section (g), the following signals shall also be made available: absolute load, fuel level (if used to enable or disable any other diagnostics), relative throttle position (if equipped with a throttle), barometric pressure (directly measured or estimated), engine control module system voltage, commanded equivalence ratio, catalyst temperature (if directly measured or estimated

for purposes of enabling the catalyst monitor(s)), monitor status (i.e., disabled for the rest of this driving cycle, complete this driving cycle, or not complete this driving cycle) since last engine shut-off for each monitor used for readiness status, time elapsed since engine start, distance traveled while MIL activated, distance traveled since fault memory last cleared, and number of warm-up cycles since fault memory last cleared.

(4.2.4) For all 2005 and subsequent model year vehicles so equipped and using the ISO 15765-4 protocol for the standardized functions required in section (g): ambient air temperature, evaporative system vapor pressure, commanded purge valve duty cycle/position, commanded EGR valve duty cycle/position, EGR error between actual and commanded, PTO status (active or not active), redundant absolute throttle position (for electronic throttle or other systems that utilize two or more sensors), absolute pedal position, redundant absolute pedal position, and commanded throttle motor position.

(4.2.5) Additionally, for all 2010 and subsequent model year vehicles with a diesel engine:

(A) Calculated load (engine torque as a percentage of maximum torque available at the current engine speed), driver's demand engine torque (as a percentage of maximum engine torque), actual engine torque (as a percentage of maximum engine torque), engine oil temperature (if used for emission control or any OBD diagnostics), time elapsed since engine start; and

(B) Fuel level (if used to enable or disable any other diagnostics), barometric pressure (directly measured or estimated), engine control module system voltage; and

(C) Monitor status (i.e., disabled for the rest of this driving cycle, complete this driving cycle, or not complete this driving cycle) since last engine shut-off for each monitor used for readiness status, distance traveled (or engine run time for engines not utilizing vehicle speed information) while MIL activated, distance traveled (or engine run time for engines not utilizing vehicle speed information) since fault memory last cleared, and number of warm-up cycles since fault memory last cleared; and

(D) For all engines so equipped: absolute throttle position, relative throttle position, fuel injection timing, intake manifold temperature, intercooler temperature, ambient air temperature, commanded EGR valve duty cycle/position, actual EGR valve duty cycle/position, EGR error between actual and commanded, PTO status (active or not active), absolute pedal position, redundant absolute pedal position, commanded throttle motor position, fuel rate, boost pressure, commanded/target boost pressure, turbo inlet air temperature, fuel rail pressure, commanded fuel rail pressure, PM filter inlet pressure, PM filter inlet temperature, PM filter outlet pressure, PM filter outlet temperature, PM filter delta pressure, exhaust

pressure sensor output, exhaust gas temperature sensor output, injection control pressure, commanded injection control pressure, turbocharger/turbine speed, variable geometry turbo position, commanded variable geometry turbo position, turbocharger compressor inlet temperature, turbocharger compressor inlet pressure, turbocharger turbine inlet temperature, turbocharger turbine outlet temperature, wastegate valve position, glow plug lamp status, PM sensor output, and NOx sensor output;

(E) Additionally, for all 2010 and subsequent model year medium-duty vehicles with a diesel engine certified on an engine dynamometer: NOx NTE control area status (i.e., inside control area, outside control area, inside manufacturer-specific NOx NTE carve-out area, or NTE deficiency for NOx active area) and PM NTE control area status (i.e., inside control area, outside control area, inside manufacturer-specific PM NTE carve-out area, or NTE deficiency for PM active area);

(F) For all 2013 and subsequent model year vehicles, normalized trigger for PM filter regeneration, PM filter regeneration status; and

(G) For all 2013 and subsequent model year vehicles, average distance (or engine run time for engines not utilizing vehicle speed information) between PM filter regenerations.

(4.2.6) Additionally, for all 2013 and subsequent model year vehicles so equipped:

(A) EGR temperature, variable geometry turbo control status (e.g., open loop, closed loop), reductant level (e.g., urea tank fill level), alcohol fuel percentage, NOx adsorber regeneration status, NOx adsorber deSOx status, hybrid battery pack remaining charge; and

(B) distance traveled while low/empty SCR reductant driver warning/inducement active.

(4.2.7) Additionally, for all 2015 and subsequent model year vehicles: type of fuel currently being used.

(4.3) Freeze Frame.

(4.3.1) "Freeze frame" information required to be stored pursuant to sections (d)(2.2.7), (e)(3.4.3), (e)(6.4.4), (f)(3.4.2)(B), and (f)(4.4.2)(D) shall be made available on demand through the standardized data link connector in accordance with SAE J1979 specifications.

(4.3.2) "Freeze frame" conditions must include the fault code which caused the data to be stored and all of the signals required in section (g)(4.2.1) except number of stored confirmed fault codes, OBD requirements to which the engine is certified, MIL status, and absolute throttle position in accordance with (g)(4.3.3). Freeze frame conditions shall also include all of the signals required on the vehicle in sections (g)(4.2.2) through (g)(4.2.5)(D), (g)(4.2.5)(F), (g)(4.2.6)(A), and (g)(4.2.7) that are used for diagnostic or control purposes in the specific diagnostic or emission-critical powertrain

control unit that stored the fault code except: oxygen sensor output, air/fuel ratio sensor output, catalyst temperature, evaporative system vapor pressure, glow plug lamp status, PM sensor output, NOx sensor output, monitor status since last engine shut off, distance traveled while MIL activated, distance traveled since fault memory last cleared, and number of warm-up cycles since fault memory last cleared.

(4.3.3) In lieu of including the absolute throttle position data specified in (g)(4.2.1) in the freeze frame data, diagnostic or emission-critical powertrain control units that do not use the absolute throttle position data may include the relative throttle position data specified in (g)(4.2.3) or pedal position data specified in (g)(4.2.4).

(4.3.4) Only one frame of data is required to be recorded. Manufacturers may choose to store additional frames provided that at least the required frame can be read by a scan tool meeting SAE J1978 specifications.

(4.4) Fault Codes

(4.4.1) For all monitored components and systems, stored pending, confirmed, and permanent fault codes shall be made available through the diagnostic connector in accordance with SAE J1979 specifications. Standardized fault codes conforming to SAE J2012 shall be employed.

(4.4.2) The stored fault code shall, to the fullest extent possible, pinpoint the likely cause of the malfunction. To the extent feasible on all 2005 and subsequent model year vehicles, manufacturers shall use separate fault codes for every diagnostic where the diagnostic and repair procedure or likely cause of the failure is different. In general, rationality and functional diagnostics shall use different fault codes than the respective circuit continuity diagnostics. Additionally, input component circuit continuity diagnostics shall use different fault codes for distinct malfunctions (e.g., out-of-range low, out-of-range high, open circuit, etc.).

(4.4.3) Manufacturers shall use appropriate SAE-defined fault codes of SAE J2012 (e.g., P0xxx, P2xxx) whenever possible. With Executive Officer approval, manufacturers may use manufacturer-defined fault codes in accordance with SAE J2012 specifications (e.g., P1xxx). Factors to be considered by the Executive Officer for approval shall include the lack of available SAE-defined fault codes, uniqueness of the diagnostic or monitored component, expected future usage of the diagnostic or component, and estimated usefulness in providing additional diagnostic and repair information to service technicians. Manufacturer-defined fault codes shall be used consistently (i.e., the same fault code may not be used to represent two different failure modes) across a manufacturer's entire product line.

(4.4.4) A fault code (pending and/or confirmed, as required in sections (d) (e), and (f)) shall be stored and available to an SAE J1978 scan tool within 10

seconds after a diagnostic has determined that a malfunction has occurred. A permanent fault code shall be stored and available to an SAE J1978 scan tool no later than the end of an ignition cycle (including electronic control unit shutdown) in which the corresponding confirmed fault code causing the MIL to be illuminated has been stored.

(4.4.5) Pending fault codes:

(A) On all 2005 and subsequent model year vehicles, pending fault codes for all components and systems (including continuously and non-continuously monitored components) shall be made available through the diagnostic connector in accordance with SAE J1979 specifications (e.g., Mode/Service $07).

(B) On all 2005 and subsequent model year vehicles, a pending fault code(s) shall be stored and available through the diagnostic connector for all currently malfunctioning monitored component(s) or system(s), regardless of the MIL illumination status or confirmed fault code status (e.g., even after a pending fault has matured to a confirmed fault code and the MIL is illuminated, a pending fault code shall be stored and available if the most recent monitoring event indicates the component is malfunctioning).

(C) Manufacturers using alternate statistical protocols for MIL illumination as allowed in section (d)(2.2.6) shall submit to the Executive Officer a protocol for setting pending fault codes. The Executive Officer shall approve the proposed protocol upon determining that, overall, it is equivalent to the requirements in sections (g)(4.4.5)(A) and (B) and that it effectively provides service technicians with a quick and accurate indication of a pending failure.

(4.4.6) Permanent fault codes:

(A) Permanent fault codes for all components and systems shall be made available through the diagnostic connector in a standardized format that distinguishes permanent fault codes from both pending fault codes and confirmed fault codes.

(B) A confirmed fault code shall be stored as a permanent fault code no later than the end of the ignition cycle and subsequently at all times that the confirmed fault code is commanding the MIL on (e.g., for currently failing systems but not during the 40 warm-up cycle self-healing process described in section (d)(2.4)).

(C) Permanent fault codes shall be stored in NVRAM and may not be erasable by any scan tool command (generic or enhanced) or by disconnecting power to the on-board computer.

(D) Permanent fault codes may not be erased when the control module containing the permanent fault codes is reprogrammed unless the readiness status (refer to section (g)(4.1)) for all monitored components

and systems is set to "not complete" in conjunction with the reprogramming event.

(E) The OBD system shall have the ability to store a minimum of four current confirmed fault codes as permanent fault codes in NVRAM. If the number of confirmed fault codes currently commanding the MIL on exceeds the maximum number of permanent fault codes that can be stored, the OBD system shall store the earliest detected confirmed fault codes as permanent fault codes. If additional confirmed fault codes are stored when the maximum number of permanent fault codes is already stored in NVRAM, the OBD system may not replace any existing permanent fault code with the additional confirmed fault codes.

(4.5) Test Results

(4.5.1) For all monitored components and systems for gasoline engine vehicles identified in sections (e)(1) through (e)(8) except misfire detection, fuel system monitoring, and oxygen sensor circuit and out-of-range monitoring, and for all monitored components and systems for diesel engine vehicles identified in sections (f)(1) through (f)(9) except those required to be monitored continuously, results of the most recent monitoring of the components and systems and the test limits established for monitoring the respective components and systems shall be stored and available through the data link in accordance with SAE J1979 specifications.

(4.5.2) The test results shall be reported such that properly functioning components and systems (e.g., "passing" systems) do not store test values outside of the established test limits.

(4.5.3) The test results shall be stored until updated by a more recent valid test result or the fault memory of the OBD II system computer is cleared. Upon fault memory being cleared, test results reported for monitors that have not yet completed since the last time the fault memory was cleared shall report values that do not indicate a failure (i.e., a test value which is outside of the test limits).

(4.5.4) Additionally, for vehicles using ISO 15765-4 (see section (g)(3.4)) as the communication protocol:

(A) The test results and limits shall be made available in the standardized format specified in SAE J1979 for the ISO 15765-4 protocol. Test results using vehicle manufacturer-defined monitor identifications (i.e., SAE J1979 OBDMIDs in the range of $E1-$FF) may not be used.

(B) Test limits shall include both minimum and maximum acceptable values and shall be reported for all test results required in section (g)(4.5.1). The test limits shall be defined so that a test result equal to either test limit is a "passing" value, not a "failing" value.

(C) For 2005 and subsequent model year vehicles, misfire monitoring test results shall be calculated and reported in the standardized format specified in SAE J1979. For 25 percent of 2009, 50 percent of 2010, and 100 percent of 2011 and subsequent model year vehicles equipped with VVT systems, VVT monitoring test results and limits shall be stored and available in the standardized format specified in SAE J1979.

(D) Monitors that have not yet completed since the last time the fault memory was cleared shall report values of zero for the test result and test limits.

(E) All test results and test limits shall always be reported and the test results shall be stored until updated by a more recent valid test result or the fault memory of the OBD II system computer is cleared. For monitors with multiple pass/fail criteria (e.g., a purge flow diagnostic that can pass upon seeing a rich shift, lean shift, or engine speed change), on 25 percent of 2009, 50 percent of 2010, and 100 percent of 2011 and subsequent model year vehicles, only the test results used in the most recent decision shall be reported with valid results and limits while test results not used in the most recent decision shall report values of zero for the test results and limits (e.g., a purge flow monitoring event that passed based on seeing a rich shift shall report the results and the limits of the rich shift test and shall report values of zero for the results and limits of the lean shift and engine speed change tests).

(F) The OBD II system shall store and report unique test results for each separate diagnostic (e.g., an OBD II system with individual evaporative system diagnostics for 0.040 inch and 0.020 inch leaks shall separately report 0.040 inch and 0.020 inch test results).

(4.6) Software Calibration Identification

(4.6.1) On all vehicles, a software calibration identification number (CAL ID) for the diagnostic or emission critical powertrain control unit(s) shall be made available through the standardized data link connector in accordance with the SAE J1979 specifications. Except as provided for in section (g)(4.6.3), for 2009 and subsequent model year vehicles, the OBD II system shall use a single software calibration identification number (CAL ID) for each diagnostic or emission critical powertrain control unit(s) that replies to a generic scan tool with a unique module address.

(4.6.2) A unique CAL ID shall be used for every emission-related calibration and/or software set having at least one bit of different data from any other emission-related calibration and/or software set. Control units coded with multiple emission or diagnostic calibrations and/or software sets shall indicate a unique CAL ID for each variant in a manner that enables an off-board device to determine which variant is being used by the vehicle. Control units that utilize a strategy that will result in MIL illumination if the incorrect variant is used (e.g., control units that contain variants for manual and automatic transmissions but will illuminate the MIL if the variant

selected does not match the type of transmission on the vehicle) are not required to use unique CAL IDs.

(4.6.3) For 2009 and subsequent model year vehicles, manufacturers may request Executive Officer approval to respond with more than one CAL ID per diagnostic or emission critical powertrain control unit. Executive Officer approval of the request shall be based on the method used by the manufacturer to ensure each control unit will respond to a SAE J1978 scan tool with the CAL IDs in order of highest to lowest priority with regards to areas of the software most critical to emission and OBD II system performance.

(4.7) Software Calibration Verification Number

(4.7.1) All 2005[2] and subsequent model year vehicles shall use an algorithm to calculate a calibration verification number (CVN) that verifies the on-board computer software integrity in diagnostic or emission critical electronically reprogrammable powertrain control units. The CVN shall be made available through the standardized data link connector in accordance with the SAE J1979 specifications. The CVN shall be capable of being used to determine if the emission-related software and/or calibration data are valid and applicable for that vehicle and CAL ID. For 50 percent of 2010 and 100 percent of 2011 and subsequent model year vehicles, one CVN shall be made available for each CAL ID made available and each CVN shall be output to a generic scan tool in the same order as the CAL IDs are output to the scan tool to allow the scan tool to match each CVN to the corresponding CAL ID.

(4.7.2) Manufacturers shall request Executive Officer approval of the algorithm used to calculate the CVN. Executive Officer approval of the algorithm shall be based on the complexity of the algorithm and the difficulty in achieving the same CVN with modified calibration values.

(4.7.3) The CVN shall be calculated at least once per driving cycle and stored until the CVN is subsequently updated. Except for immediately after a reprogramming event or a non-volatile memory clear or for the first 30 seconds of engine operation after a volatile memory clear or battery disconnect, the stored value shall be made available through the data link connector to a generic scan tool in accordance with SAE J1979 specifications. The stored CVN value may not be erased when fault memory is erased by a generic scan tool in accordance with SAE J1979 specifications or during normal vehicle shut down (i.e., key off, engine off).

(4.7.4) For purposes of Inspection and Maintenance (I/M) testing, manufacturers shall make the CVN and CAL ID combination information available for all 2008 and subsequent model year vehicles in a standardized electronic

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[2] The requirements of section (g)(4.7) shall supercede the requirements set forth in title 13, CCR section 1968.1(l)(4.0).

format that allows for off-board verification that the CVN is valid and appropriate for a specific vehicle and CAL ID. The standardized electronic format is detailed in Attachment E: CAL ID and CVN Data of ARB Mail-Out #MSC 06-23, December 21, 2006, incorporated by reference. Manufacturers shall submit the CVN and CAL ID information to the Executive Officer not more than 25 days after the close of a calendar quarter.

(4.8) Vehicle Identification Number:

(4.8.1) All 2005 and subsequent model year vehicles shall have the vehicle identification number (VIN) available in a standardized format through the standardized data link connector in accordance with SAE J1979 specifications. Only one electronic control unit per vehicle shall report the VIN to an SAE J1978 scan tool.

(4.8.2) For 2012 and subsequent model year vehicles, if the VIN is reprogrammable, all emission-related diagnostic information (i.e., all information required to be erased in accordance with SAE J1979 specifications when a Mode/Service $04 clear/reset emission-related diagnostic information command is received) shall be erased in conjunction with the reprogramming of the VIN.

(4.9) ECU Name: The name of each electronic control unit that responds to an SAE J1978 scan tool with a unique address or identifier shall be communicated in a standardized format in accordance with SAE J1979 (i.e., ECUNAME in Service/Mode $09, InfoType $0A). Except as specified for vehicles with more than one engine control unit, communication of the ECU name in a standardized format is required on 50 percent of 2010, 75 percent of 2011, and 100 percent of 2012 and subsequent model year vehicles. For vehicles with more than one engine control unit (e.g., a 12 cylinder engine with two engine control units, each of which controls six cylinders), communication of the ECU name is required on all 2010 and subsequent model year vehicles.

(5) *In-use Performance Ratio Tracking Requirements*:

(5.1) For each monitor required in section (e) to separately report an in-use performance ratio, manufacturers shall implement software algorithms to report a numerator and denominator in the standardized format specified below and in accordance with the SAE J1979 specifications.

(5.2) Numerical Value Specifications:

(5.2.1) For the numerator, denominator, general denominator, and ignition cycle counter:

(A) Each number shall have a minimum value of zero and a maximum value of 65,535 with a resolution of one.

(B) Each number shall be reset to zero only when a non-volatile memory reset occurs (e.g., reprogramming event, etc.) or, if the numbers are stored in

keep-alive memory (KAM), when KAM is lost due to an interruption in electrical power to the control module (e.g., battery disconnect, etc.). Numbers may not be reset to zero under any other circumstances including when a scan tool command to clear fault codes or reset KAM is received.

(C) If either the numerator or denominator for a specific component reaches the maximum value of 65,535 ±2, both numbers shall be divided by two before either is incremented again to avoid overflow problems.

(D) If the ignition cycle counter reaches the maximum value of 65,535 ±2, the ignition cycle counter shall rollover and increment to zero on the next ignition cycle to avoid overflow problems.

(E) If the general denominator reaches the maximum value of 65,535 ±2, the general denominator shall rollover and increment to zero on the next driving cycle that meets the general denominator definition to avoid overflow problems.

(F) If a vehicle is not equipped with a component (e.g., oxygen sensor bank 2, secondary air system), the corresponding numerator and denominator for that specific component shall always be reported as zero.

(5.2.2) For the ratio:

(A) The ratio shall have a minimum value of zero and a maximum value of 7.99527 with a resolution of 0.000122.

(B) A ratio for a specific component shall be considered to be zero whenever the corresponding numerator is equal to zero and the corresponding denominator is not zero.

(C) A ratio for a specific component shall be considered to be the maximum value of 7.99527 if the corresponding denominator is zero or if the actual value of the numerator divided by the denominator exceeds the maximum value of 7.99527.

(6) *Engine Run Time Tracking Requirements*:

(6.1) For all 2010 and subsequent model year medium-duty vehicles equipped with diesel engines, manufacturers shall implement software algorithms to individually track and report in a standardized format the engine run time while being operated in the following conditions:

(6.1.1) Total engine run time;

(6.1.2) Total idle run time (with "idle" defined as accelerator pedal released by driver, engine speed greater than or equal to 50 to 150 rpm below the normal warmed-up idle speed (as determined in the drive position for vehicles equipped with an automatic transmission), PTO not active, and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle);

(6.1.3) Total run time with PTO active.

(6.1.4) Total run time with EI-AECD #1active;

(6.1.5) Total run time with EI-AECD #2 active; and so on up to

(6.1.6) Total run time with EI-AECD #n active.

(6.1.7) For 2010 through 2012 model year vehicles, manufacturers may define "idle" in section (g)(6.1.2) above as accelerator pedal released by driver, vehicle speed less than or equal to one mile per hour, and PTO not active.

(6.2) For all 2010 and subsequent model year light-duty vehicles equipped with diesel engines, manufacturers shall implement software algorithms to individually track and report in a standardized format the engine run time while being operated in the following conditions:

(6.2.1) Total engine run time;

(6.2.2) Total run time with EI-AECD #1active;

(6.2.3) Total run time with EI-AECD #2 active; and so on up to

(6.2.4) Total run time with EI-AECD #n active.

(6.3) Numerical Value Specifications:

(6.3.1) For each counter specified in section (g)(6):

(A) Each number shall conform to the standardized format specified in SAE J1979.

(B) Each number shall be reset to zero only when a non-volatile memory reset occurs (e.g., reprogramming event). Numbers may not be reset to zero under any other circumstances including when a scan tool (generic or enhanced) command to clear fault codes or reset KAM is received.

(C) If any of the individual counters reach the maximum value, all counters shall be divided by two before any are incremented again to avoid overflow problems.

(6.4) Specifications of EI-AECDs

(6.4.1) For purposes of section (g)(6.4), the following terms shall be defined as follows:

(A) "Purpose" is defined as the objective of the EI-AECD when it is activated (e.g., EGR valve protection);

(B) "Action" is defined as a specific component/element act that is commanded when the EI-AECD is activated (e.g., EGR system is derated);

(C) "Parameter" is defined as a component/element (e.g., ECT, oil temperature) used to determine when to activate the EI-AECD; and

(D) "Condition" is defined as the specific characteristic/state exhibited by the parameter (e.g., ECT above 100 degrees Celsius) that triggers activation of the EI-AECD.

(6.4.2) Each unique combination of action, parameter, and condition within a purpose shall be tracked as a separate EI-AECD and increment the timer(s) at all times the condition necessary to activate the EI-AECD is present.

(A) For EI-AECDs that implement an action of variable degree based on the varying characteristics of a parameter (e.g., derate EGR more aggressively as engine oil temperature continues to increase), the EI-AECD shall be tracked by incrementing two separate timers within a single EI-AECD (e.g., EI-AECD #1 timer 1 and EI-AECD #1 timer 2) as follows:

(i) The first of the two timers shall be incremented whenever the EI-AECD is commanding some amount of reduced emission control effectiveness up to but not including 75 percent of the maximum reduced emission control effectiveness that the EI-AECD is capable of commanding during in-use vehicle or engine operation. For example, an overheat protection strategy that progressively derates EGR and eventually shuts off EGR as oil temperature increases would accumulate time for the first timer from the time derating of EGR begins up to the time that EGR is derated 75 percent. As a second example, an overheat protection strategy that advances fuel injection timing progressively up to a maximum advance of 15 degrees crank angle as the engine coolant temperature increases would accumulate time for the first timer from the time advance is applied up to the time that advance reaches 11.25 degrees (75 percent of the maximum 15 degrees).

(ii) The second of the two timers shall be incremented whenever the EI-AECD is commanding 75 percent or more of the maximum reduced emission control effectiveness that the EI-AECD is capable of commanding during in-use vehicle or engine operation. For example, the second timer for the first example EI-AECD identified in section (g)(6.4.2)(A)(i) would accumulate time from the time that EGR is derated 75 percent up to and including when EGR is completely shut off. For the second example EI-AECD identified in section (g)(6.4.2)(A)(i), the second timer would accumulate time from the time fuel injection timing advance is at 11.25 degrees up to and including the maximum advance of 15 degrees.

(6.4.3) A manufacturer may request Executive Officer approval to combine multiple unique actions, parameters, and/or conditions to be tracked within a single EI-AECD. The manufacturer shall submit a plan for combining, tracking, and incrementing the EI-AECD to the Executive Officer for approval. Executive Officer approval of the plan shall be based on the effectiveness and the equivalence of the incrementing plan to determine the amount of EI-AECD activity per condition relative to the measure of EI-

AECD activity under section (g)(6.4.2).

(6.4.4) For EI-AECDs that are activated solely due to elevation, the timer shall be incremented only for the portion of EI-AECD activation when the elevation is below 8000 feet (e.g., the timer for an EI-AECD that is activated when the elevation is above 5000 feet shall be incremented only when the EI-AECD is active and the elevation is below 8000 feet).

(6.4.5) For EI-AECDs that are initially activated due to engine warm-up and are subsequently reactivated after the engine has warmed up, the timer shall be incremented only when the EI-AECD is active after the initial engine warm-up (e.g., an EI-AECD that turns off an emission control at low engine coolant temperature would not increment the timer during initial warm-up but would increment the timer if coolant temperature subsequently dropped below the low temperature and reactivated the EI-AECD later in the drive cycle).

(6.4.6) If more than one EI-AECD is currently active, the timers for both EI-AECDs shall accumulate time, regardless if there is overlap or redundancy in the commanded action (e.g., two different EI-AECDs independently but simultaneously commanding EGR off shall both accumulate time in their respective timers).

(7) *Exceptions to Standardization Requirements.*

(7.1) For medium-duty vehicles equipped with a diesel engine certified on an engine dynamometer, a manufacturer may request Executive Officer approval to use both: (1) an alternate diagnostic connector, and emission-related message structure and format in lieu of the standardization requirements in sections (g)(2) and (4) that refer to SAE J1962, SAE J1978, and SAE J1979, and (2) an alternate communication protocol in lieu of the identified protocols in section (g)(3). The Executive Officer shall approve the request if the alternate diagnostic connector, communication protocol, and emission-related message format and structure requested by the manufacturer meet the standardization requirements in title 13, CCR section 1971.1.1 applicable for 2013 and subsequent model year heavy-duty diesel engines and the information required to be made available in section (g)(4.1) through (g)(6) (e.g., readiness status, data stream parameters, permanent fault codes, engine run time tracking data) is available in a standardized format through the alternate emission-related message format.

(7.2) For 2004 model year vehicles only, wherever the requirements of sections (g)(2) and (g)(4) reflect a substantive change from the requirements of title 13, CCR sections 1968.1(e), (f), (k), or (l) for the 2003 model year vehicles, the manufacturer may request Executive Officer approval to continue to use the requirements of section 1968.1 in lieu of the requirements of sections (g)(2) and (g)(4). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or engineering evaluation that demonstrate that software or hardware changes would be required to comply

with the requirements of sections (g)(2) and (g)(4) and that the system complies with the requirements of sections 1968.1(e), (f), (k), and (l).

(h) *Monitoring System Demonstration Requirements For Certification*

(1) *General.*

(1.1) Certification requires that manufacturers submit emission test data from one or more durability demonstration test vehicles (test vehicles). For applications certified on engine dynamometers, engines may be used instead of vehicles.

(1.2) The Executive Officer may approve other demonstration protocols if the manufacturer can provide comparable assurance that the malfunction criteria are chosen based on meeting emission requirements and that the timeliness of malfunction detection is within the constraints of the applicable monitoring requirements.

(1.3) For flexible fuel vehicles capable of operating on more than one fuel or fuel combinations, the manufacturer shall submit a plan for providing emission test data to the Executive Officer for approval. The Executive Officer shall approve the plan if it is determined to be representative of expected in-use fuel or fuel combinations and provides accurate and timely evaluation of the monitored systems.

(2) *Selection of Test Vehicles*:

(2.1) Prior to submitting any applications for certification for a model year, a manufacturer shall notify the Executive Officer of the test groups planned for that model year. The Executive Officer will then select the test group(s) that the manufacturer shall use as demonstration test vehicles to provide emission test data. The selection of test vehicles for production vehicle evaluation, as specified in section (j), may take place during this selection process.

(2.2) A manufacturer certifying one to five test groups in a model year shall provide emission test data from a test vehicle from one test group. A manufacturer certifying six to fifteen test groups in a model year shall provide emission test data from test vehicles from two test groups. A manufacturer certifying sixteen or more test groups in a model year shall provide emission test data from test vehicles from three test groups. The Executive Officer may waive the requirement for submittal of data from one or more of the test groups if data have been previously submitted for all of the test groups.

(2.3) For the test vehicle(s), a manufacturer shall use a certification emission durability test vehicle(s), a representative high mileage vehicle(s), or a vehicle(s) aged to the end of the full useful life using an ARB-approved alternative durability procedure (ADP).

(3) *Required Testing for Gasoline/Spark-ignited vehicles*:

Except as provided below, the manufacturer shall perform single-fault testing based on the applicable FTP test with the following components/systems set at

their malfunction criteria limits as determined by the manufacturer for meeting the requirements of section (e):

(3.1) Exhaust Gas Sensors:

(3.1.1) The manufacturer shall perform a test with all primary oxygen sensors (conventional switching sensors and wide range or universal sensors) used for fuel control simultaneously possessing a response rate deteriorated to the malfunction criteria limit. Manufacturers shall also perform a test for any other oxygen sensor parameter that can cause vehicle emissions to exceed the malfunction threshold (e.g., 1.5 times the applicable standards due to a shift in air/fuel ratio at which oxygen sensor switches, decreased amplitude, etc.). When performing additional test(s), all primary and secondary (if applicable) oxygen sensors used for fuel control shall be operating at the malfunction criteria limit for the applicable parameter only. All other primary and secondary oxygen sensor parameters shall be with normal characteristics.

(3.1.2) For vehicles utilizing sensors other than oxygen sensors for primary fuel control (e.g., hydrocarbon sensors, etc.), the manufacturer shall submit, for Executive Officer approval, a demonstration test plan for performing testing of all of the sensor parameters that can cause vehicle emissions to exceed the malfunction threshold (e.g., 1.5 times the applicable standards). The Executive Officer shall approve the plan if it is determined that it will provide data that will assure proper performance of the diagnostics of the sensors, consistent with the intent of section (h).

(3.2) EGR System: The manufacturer shall perform a test at the low flow limit.

(3.3) VVT System: For 2006 through 2008 model year Low Emission II applications and all 2009 and subsequent model year vehicles, the manufacturer shall perform a test at each target error limit and slow response limit calibrated to the malfunction criteria (e.g., 1.5 times the FTP standard) in sections (e)(13.2.1) and (13.2.2). In conducting the VVT system demonstration tests, the manufacturer may use computer modifications to cause the VVT system to operate at the malfunction limit if the manufacturer can demonstrate that the computer modifications produce test results equivalent to an induced hardware malfunction.

(3.4) Fuel System:

(3.4.1) For vehicles with adaptive feedback based on the primary fuel control sensor(s), the manufacturer shall perform a test with the adaptive feedback based on the primary fuel control sensor(s) at the rich limit(s) and a test at the lean limit(s) established by the manufacturer in section (e)(6.2.1) to detect a malfunction before emissions exceed the malfunction threshold (e.g., 1.5 times the applicable standards).

(3.4.2) For vehicles with feedback based on a secondary fuel control sensor(s) and subject to the malfunction criteria in section (e)(6.2.1), the

manufacturer shall perform a test with the feedback based on the secondary fuel control sensor(s) at the rich limit(s) and a test at the lean limit(s) established by the manufacturer in section (e)(6.2.1) to detect a malfunction before emissions exceed the malfunction threshold (e.g., 1.5 times the applicable standards).

(3.4.3) For other fuel metering or control systems, the manufacturer shall perform a test at the criteria limit(s).

(3.4.4) For purposes of fuel system testing, the fault(s) induced may result in a uniform distribution of fuel and air among the cylinders. Non-uniform distribution of fuel and air used to induce a fault may not cause misfire. In conducting the fuel system demonstration tests, the manufacturer may use computer modifications to cause the fuel system to operate at the malfunction limit if the manufacturer can demonstrate that the computer modifications produce test results equivalent to an induced hardware malfunction.

(3.5) Misfire: The manufacturer shall perform a test at the malfunction criteria limit specified in section (e)(3.2.2). The testing is not required for diesel applications.

(3.6) Secondary Air System: The manufacturer shall perform a test at the low flow limit. Manufacturers performing only a functional check in accordance with the provisions of section (e)(5.2.2)(B) or (e)(5.2.4) shall perform a test at the functional check flow malfunction criteria.

(3.7) Catalyst System: The manufacturer shall perform a test using a catalyst system deteriorated to the malfunction criteria using methods established by the manufacturer in accordance with sections (e)(1.2.6) and (1.2.7).

(3.8) Heated Catalyst Systems: The manufacturer shall perform a test at the malfunction criteria limit established by the manufacturer in section (e)(2.2).

(3.9) Other systems: The manufacturer shall conduct demonstration tests for all other emission control components designed and calibrated to an emission threshold malfunction criteria (e.g., 1.5 times any of the applicable emission standards) (e.g., hydrocarbon traps, adsorbers, etc.) under the provisions of section (e)(16).

(3.10) The manufacturer may electronically simulate deteriorated components if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction but may not make any vehicle control unit modifications (unless otherwise excepted above or exempted pursuant to this section) when performing demonstration tests. All equipment necessary to duplicate the demonstration test must be made available to the ARB upon request. A manufacturer may request Executive Officer approval to electronically simulate a deteriorated component with engine control unit modifications. The Executive Officer shall approve the request upon determining the

manufacturer has submitted data and/or engineering analysis demonstrating that is technically infeasible, very difficult, and/or resource intensive to implant the fault with modifications external to the engine control unit.

(4) *Required Testing for Diesel/Compression-ignition vehicles*:

Except as provided below, the manufacturer shall perform single-fault testing based on the applicable test with the following components/systems set at their malfunction criteria limits as determined by the manufacturer for meeting the requirements of section (f).

(4.1) NMHC Catalyst: The manufacturer shall perform a separate test for each monitored NMHC catalyst(s) that is used for a different purpose (e.g., oxidation catalyst upstream of a PM filter, NMHC catalyst used downstream of an SCR catalyst). The catalyst(s) being evaluated shall be deteriorated to the applicable malfunction criteria established by the manufacturer in section (f)(1.2.2) using methods established by the manufacturer in accordance with section (f)(1.2.4). For each monitored NMHC catalyst(s), the manufacturer shall also demonstrate that the OBD II system will detect a catalyst malfunction with the catalyst at its maximum level of deterioration (i.e., the substrate(s) completely removed from the catalyst container or "empty" can). Emission data are not required for the empty can demonstration.

(4.2) NOx Catalyst: The manufacturer shall perform a separate test for each monitored NOx catalyst(s) that is used for a different purpose (e.g., passive lean NOx catalyst, SCR catalyst). The catalyst(s) being evaluated shall be deteriorated to the applicable malfunction criteria established by the manufacturer in sections (f)(2.2.2)(A) and (f)(2.2.3)(A) using methods established by the manufacturer in accordance with section (f)(2.2.4). For each monitored NOx catalyst(s), the manufacturer shall also demonstrate that the OBD II system will detect a catalyst malfunction with the catalyst at its maximum level of deterioration (i.e., the substrate(s) completely removed from the catalyst container or "empty" can). Emission data are not required for the empty can demonstration.

(4.3) Misfire Monitoring: For 2010 and subsequent model year vehicles subject to section (f)(3.2.2)(A)(i) or (f)(3.2.5), the manufacturer shall perform a test at the malfunction criteria limit specified in section (f)(3.2.2)(A)(i) or (f)(3.2.5). A misfire monitor demonstration test is not required for vehicles not subject to section (f)(3.2.2)(A)(i) and not subject to section (f)(3.2.5).

(4.4) Fuel System: The manufacturer shall perform a separate test for each applicable malfunction limit established by the manufacturer for the fuel system parameters (e.g., fuel pressure, injection timing, injection quantity) specified in sections (f)(4.2.1) through (f)(4.2.3). When performing a test for a specific parameter, the fuel system shall be operating at the malfunction criteria limit for the applicable parameter only. All other parameters shall be with normal characteristics. In conducting the fuel system demonstration tests, the manufacturer may use computer modifications to cause the fuel system to

operate at the malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction.

(4.5) Exhaust Gas Sensor: The manufacturer shall perform a test for each exhaust gas sensor parameter calibrated to the malfunction criteria in sections (f)(5.2.1)(A)(i), (f)(5.2.1)(B)(i), and (f)(5.2.2)(A). When performing a test, all exhaust gas sensors used for the same purpose (e.g., for the same feedback control loop, for the same control feature on parallel exhaust banks) shall be operating at the malfunction criteria limit for the applicable parameter only. All other exhaust gas sensor parameters shall be with normal characteristics.

(4.6) EGR System: The manufacturer shall perform a test at each flow, slow response, and cooling limit calibrated to the malfunction criteria in sections (f)(6.2.1) through (f)(6.2.3) and (f)(6.2.5). In conducting the EGR cooler performance demonstration test, the EGR cooler(s) being evaluated shall be deteriorated to the applicable malfunction criteria using methods established by the manufacturer in accordance with section (f)(6.2.5)(C). In conducting the EGR system slow response demonstration tests, the manufacturer may use computer modifications to cause the EGR system to operate at the malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction or that there is no reasonably feasible method to induce a hardware malfunction.

(4.7) Boost Pressure Control System: The manufacturer shall perform a test at each boost, response, and cooling limit calibrated to the malfunction criteria in sections (f)(7.2.1) through (f)(7.2.4). In conducting the charge air undercooling demonstration test, the charge air cooler(s) being evaluated shall be deteriorated to the applicable malfunction criteria established by the manufacturer in section (f)(7.2.4)(A) using methods established by the manufacturer in accordance with section (f)(7.2.4)(C).

(4.8) NOx Adsorber: The manufacturer shall perform a test using a NOx adsorber(s) deteriorated to the malfunction criteria in section (f)(8.2.1). The manufacturer shall also demonstrate that the OBD II system will detect a NOx adsorber malfunction with the NOx adsorber at its maximum level of deterioration (i.e., the substrate(s) completely removed from the container or "empty" can). Emission data are not required for the empty can demonstration.

(4.9) PM Filter: The manufacturer shall perform a test using a PM filter(s) deteriorated to each applicable malfunction criteria in sections (f)(9.2.1), (f)(9.2.2), and (f)(9.2.4). The manufacturer shall also demonstrate that the OBD II system will detect a PM filter malfunction with the filter at its maximum level of deterioration (i.e., the filter(s) completely removed from the filter container or "empty" can). Emission data are not required for the empty can demonstration.

(4.10) Cold Start Emission Reduction Strategy: The manufacturer shall perform a test

at the malfunction criteria for the system or for each component monitored according to section (f)(12.2.2).

(4.11) VVT System: The manufacturer shall perform a test at each target error limit and slow response limit calibrated to the malfunction criteria in sections (f)(13.2.1) and (f)(13.2.2). In conducting the VVT system demonstration tests, the manufacturer may use computer modifications to cause the VVT system to operate at the malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction.

(4.12) For each of the testing requirements of section (h)(4), if the manufacturer has established that only a functional check is required because no failure or deterioration of the specific tested system could result in an engine's emissions exceeding the emission malfunction criteria, the manufacturer is not required to perform a demonstration test; however the manufacturer is required to provide the data and/or engineering analysis used to determine that only a functional test of the system(s) is required.

(4.13) For each of the testing requirements of (h)(4), when performing a test, all components or systems used in parallel for the same purpose (e.g., separate VVT actuators on the intake valves for Bank 1 and Bank 2, separate NOx converting catalysts on parallel exhaust banks) shall be simultaneously deteriorated to the malfunction criteria limit. Components or systems in series or used for different purposes (e.g., upstream and downstream exhaust gas sensors in a single exhaust bank, separate high pressure and low pressure EGR systems) may not be simultaneously deteriorated to the malfunction criteria limit.

(4.14) The manufacturer may electronically simulate deteriorated components if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction but may not make any engine control unit modifications (unless otherwise provided above or exempted pursuant to this section) when performing demonstration tests. All equipment necessary to duplicate the demonstration test must be made available to ARB upon request. A manufacturer may request Executive Officer approval to electronically simulate a deteriorated component with engine control unit modifications. The Executive Officer shall approve the request upon determining the manufacturer has submitted data and/or engineering analysis demonstrating that it is technically infeasible, very difficult, and/or resource intensive to implant the fault with modifications external to the engine control unit.

(5) *Testing Protocol*:

(5.1) Preconditioning: The manufacturer shall use an applicable cycle (FTP, SET, or Unified Cycle) for preconditioning test vehicles prior to conducting each of the above emission tests. Upon determining that a manufacturer has provided data and/or an engineering evaluation that demonstrate that additional

preconditioning is necessary to stabilize the emission control system, the Executive Officer shall allow the manufacturer to perform a single additional preconditioning cycle, identical to the initial preconditioning cycle, or a Federal Highway Fuel Economy Driving Cycle, following a ten minute (20 minutes for medium duty engines certified on an engine dynamometer) hot soak after the initial preconditioning cycle. The manufacturer may not require the test vehicle to be cold soaked prior to conducting preconditioning cycles in order for the monitoring system testing to be successful.

(5.2) Test Sequence:

(5.2.1) The manufacturer shall set the system or component on the test vehicle for which detection is to be tested at the criteria limit(s) prior to conducting the applicable preconditioning cycle(s). If a second preconditioning cycle is permitted in accordance with section (h)(5.1) above, the manufacturer may adjust the system or component to be tested before conducting the second preconditioning cycle. The manufacturer may not replace, modify, or adjust the system or component after the last preconditioning cycle has taken place.

(5.2.2) After preconditioning, the test vehicle shall be operated over the applicable cycle to allow for the initial detection of the tested system or component malfunction. This test cycle may be omitted from the testing protocol if it is unnecessary. If required by the designated monitoring strategy, a cold soak may be performed prior to conducting this driving cycle.

(5.2.3) The test vehicle shall then be operated over the applicable exhaust emission test. If monitoring is designed to run during the Unified Cycle, a second Unified Cycle may be conducted prior to the exhaust emission test.

(5.3) A manufacturer required to test more than one test vehicle (section (h)(2.2)) may utilize internal calibration sign-off test procedures (e.g., forced cool downs, less frequently calibrated emission analyzers, etc.) instead of official exhaust emission test procedures to obtain the emission test data required in section (h) for all but one of the required test vehicles. The manufacturer may elect this option if the data from the alternative test procedure are representative of official exhaust emission test results. Manufacturers using this option are still responsible for meeting the malfunction criteria specified in sections (e) and (f) when emission tests are performed in accordance with official exhaust emission test procedures.

(5.4) For medium-duty vehicles certified to an engine dynamometer exhaust emission standard, a manufacturer may request Executive Officer approval to utilize an alternate testing protocol for demonstration of MIL illumination if the engine dynamometer emission test cycle does not allow all of a monitor's enable conditions to be satisfied. A manufacturer may request the use of an alternate engine dynamometer test cycle or the use of chassis testing to demonstrate proper MIL illumination. In evaluating the manufacturer's request, the Executive Officer shall consider the technical necessity for using

an alternate test cycle and the degree to which the alternate test cycle demonstrates that in-use operation with the malfunctioning component will properly result in MIL illumination.

(6) *Evaluation Protocol*:

(6.1) For all tests conducted under section (h), the MIL shall be illuminated upon detection of the tested system or component malfunction before the end of the first engine start portion of the exhaust emission test (or before the hot start portion of the last Unified Cycle, if applicable) in accordance with requirements of sections (e) and (f).

(6.2) For all tests conducted under section (h), manufacturers may use Non-Methane Hydrocarbon (NMHC) emission results in lieu of Non-Methane Organic Gas (NMOG) emission results for comparison to the applicable standards or malfunction criteria (e.g., 1.5 times the FTP standards). If NMHC emission results are used in lieu of NMOG, the emission result shall be multiplied by 1.04 to generate an equivalent NMOG result before comparison to the applicable standards.

(6.3) If the MIL illuminates prior to emissions exceeding the applicable malfunction criteria specified in sections (e) and (f), no further demonstration is required. With respect to the misfire monitor demonstration test, if a manufacturer has elected to use the minimum misfire malfunction criteria of one percent as allowed in sections (e)(3.2.2)(A) and (f)(3.2.2)(B), no further demonstration is required if the MIL illuminates with misfire implanted at the malfunction criteria limit.

(6.4) If the MIL does not illuminate when the systems or components are set at their limit(s), the criteria limit or the OBD II system is not acceptable.

(6.4.1) Except for testing of the catalyst (i.e., components monitored under (e)(1), (f)(2) or (f)(8)) or PM filter system, if the MIL first illuminates after emissions exceed the applicable malfunction criteria specified in sections (e) and (f), the test vehicle shall be retested with the tested system or component adjusted so that the MIL will illuminate before emissions exceed the applicable malfunction criteria specified in sections (e) and (f). If the component cannot be adjusted to meet this criterion because a default fuel or emission control strategy is used when a malfunction is detected (e.g., open loop fuel control used after an O2 sensor malfunction is determined, etc.), the test vehicle shall be retested with the component adjusted to the worst acceptable limit (i.e., the applicable monitor indicates the component is performing at or slightly better than the malfunction criteria). For the OBD II system to be approved, the MIL must not illuminate during this test and the vehicle emissions must be below the applicable malfunction criteria specified in sections (e) and (f).

(6.4.2) In testing the catalyst (i.e., components monitored under (e)(1), (f)(2) or (f)(8)) or PM filter system, if the MIL first illuminates after emissions exceed

the applicable emission threshold(s) specified in sections (e) and (f), the tested vehicle shall be retested with a less deteriorated catalyst or PM filter system (i.e., more of the applicable engine out pollutants are converted or trapped). For the OBD II system to be approved, testing shall be continued until either of the following conditions are satisfied:

(A) The MIL is illuminated and emissions do not exceed the thresholds specified in sections (e) and (f); or

(B) The manufacturer demonstrates that the MIL illuminates within acceptable upper and lower limits of the threshold specified in sections (e) and (f) for MIL illumination. The manufacturer shall demonstrate acceptable limits by continuing testing until the test results show:

(i) The MIL is illuminated and emissions exceed the thresholds specified in sections (e) and (f) by 25 percent or less of the applicable standard (e.g., emissions are less than 2.0 times the applicable standard for a malfunction criterion of 1.75 times the standard); and

(ii) The MIL is not illuminated and emissions are below the thresholds specified in sections (e) and (f) by no more than 25 percent of the standard (e.g., emissions are between 1.5 and 1.75 times the applicable standard for a malfunction criterion of 1.75 times the standard).

(6.5) If an OBD II system is determined unacceptable by the above criteria, the manufacturer may recalibrate and retest the system on the same test vehicle. In such a case, the manufacturer must confirm, by retesting, that all systems and components that were tested prior to recalibration and are affected by the recalibration function properly under the OBD II system as recalibrated.

(6.6) Where applicable for diesel vehicles, the emission test results shall be adjusted as required under section (d)(6.2).

(7) *Confirmatory Testing*:

(7.1) The ARB may perform confirmatory testing to verify the emission test data submitted by the manufacturer under the requirements of section (h) comply with the requirements of section (h) and the malfunction criteria identified in sections (e) and (f). This confirmatory testing is limited to the vehicle configuration represented by the demonstration vehicle(s). For purposes of section (h)(7), vehicle configuration shall have the same meaning as the term used in 40 CFR 86.082-2.

(7.2) The ARB or its designee may install appropriately deteriorated or malfunctioning components in an otherwise properly functioning test vehicle of a test group represented by the demonstration test vehicle(s) (or simulate a deteriorated or malfunctioning component) in order to test any of the components or systems required to be tested in section (h). Upon request by the Executive Officer, the manufacturer shall make available a vehicle and all

test equipment (e.g., malfunction simulators, deteriorated components, etc.) necessary to duplicate the manufacturer's testing. The Executive Officer shall make the request within six months of reviewing and approving the demonstration test vehicle data submitted by the manufacturer for the specific test group.

(7.3) Vehicles with OBD II systems represented by the demonstration vehicle(s) may be recalled for corrective action if a representative sample of vehicles uniformly fails to meet the requirements of section (h).

(i) *Certification Documentation*

(1) When submitting an application for certification of a test group, the manufacturer shall submit the following documentation. If any of the items listed below are standardized for all of a manufacturer's test groups, the manufacturer may, for each model year, submit one set of documents covering the standardized items for all of its test groups.

(1.1) For the required documentation not standardized across all test groups, the manufacturer may propose to the Executive Officer that documentation covering a specified combination of test groups be used. These combinations shall be known as "OBD II groups". Executive Officer approval shall be granted for those groupings that include test groups using the same OBD II strategies and similar calibrations. If approved by the Executive Officer, the manufacturer may submit one set of documentation from one or more representative test group(s) that are a part of the OBD II group. The Executive Officer shall determine whether a selected test group(s) is representative of the OBD II group as a whole. To be approved as representative, the test group(s) must possess the most stringent exhaust emission standards and OBD II monitoring requirements and cover all of the emission control devices within the OBD II group.

(1.2) With Executive Officer approval, one or more of the documentation requirements of section (i) may be waived or modified if the information required would be redundant or unnecessarily burdensome to generate.

(1.3) To the extent possible, the certification documentation shall use SAE J1930 terms, abbreviations, and acronyms.

(2) The following information shall be submitted as "Part 1" of the certification application. Except as provided below for demonstration data, the Executive Officer will not issue an Executive Order certifying the covered vehicles without the information having been provided. The information must include:

(2.1) A description of the functional operation of the OBD II system including a complete written description for each monitoring strategy that outlines every step in the decision making process of the monitor. Algorithms, diagrams, samples of data, and/or other graphical representations of the monitoring strategy shall be included where necessary to adequately describe the information.

(2.2) A table, in the standardized format detailed in Attachment A of ARB Mail-Out #95-20, May 22, 1995, incorporated by reference.

(2.2.1) The table must include the following information for each monitored component or system (either computer-sensed or -controlled) of the emission control system:

(A) corresponding fault code

(B) monitoring method or procedure for malfunction detection

(C) primary malfunction detection parameter and its type of output signal

(D) fault criteria limits used to evaluate output signal of primary parameter

(E) other monitored secondary parameters and conditions (in engineering units) necessary for malfunction detection

(F) monitoring time length and frequency of checks

(G) criteria for storing fault code

(H) criteria for illuminating malfunction indicator light

(I) criteria used for determining out of range values and input component rationality checks

(2.2.2) Wherever possible, the table shall use the following engineering units:

(A) Degrees Celsius (°C) for all temperature criteria

(B) KiloPascals (KPa) for all pressure criteria related to manifold or atmospheric pressure

(C) Grams (g) for all intake air mass criteria

(D) Pascals (Pa) for all pressure criteria related to evaporative system vapor pressure

(E) Miles per hour (mph) for all vehicle speed criteria

(F) Relative percent (%) for all relative throttle position criteria (as defined in SAE J1979)

(G) Voltage (V) for all absolute throttle position criteria (as defined in SAE J1979)

(H) Per crankshaft revolution (/rev) for all changes per ignition event based criteria (e.g., g/rev instead of g/stroke or g/firing)

(I) Per second (/sec) for all changes per time based criteria (e.g., g/sec)

(J) Percent of nominal tank volume (%) for all fuel tank level criteria

(2.3) A logic flowchart describing the step by step evaluation of the enable criteria and malfunction criteria for each monitored emission-related component or system.

(2.4) Emission test data, a description of the testing sequence (e.g., the number and types of preconditioning cycles), approximate time (in seconds) of MIL illumination during the test, fault code(s) and freeze frame information stored at the time of detection, corresponding SAE J1979 test results (e.g. Mode/Service $06) stored during the test, and a description of the modified or deteriorated components used for fault simulation with respect to the demonstration tests specified in section (h). The Executive Officer may approve conditional certification of a test group prior to the submittal of this data for ARB review and approval. Factors to be considered by the Executive Officer in approving the late submission of information identified in section (i)(2.4) shall include the reason for the delay in the data collection, the length of time until data will be available, and the demonstrated previous success of the manufacturer in submitting the data prior to certification.

(2.5) Data supporting the misfire monitor:

(2.5.1) For gasoline vehicles, data supporting the misfire monitor shall include:

(A) The established percentage of misfire that can be tolerated without damaging the catalyst over the full range of engine speed and load conditions.

(B) Data demonstrating the probability of detection of misfire events of the misfire monitoring system over the full engine speed and load operating range for the following misfire patterns: random cylinders misfiring at the malfunction criteria established in section (e)(3.2.2), one cylinder continuously misfiring, and paired cylinders continuously misfiring.

(C) Data identifying all disablement of misfire monitoring that occurs during the FTP and US06 cycles. For every disablement that occurs during the cycles, the data should identify: when the disablement occurred relative to the driver's trace, the number of engine revolutions that each disablement was present for, and which disable condition documented in the certification application caused the disablement. The data shall be submitted in the standardized format detailed in Attachment A: Misfire Disablement and Detection Chart of ARB Mail-Out #06-23, December 21, 2006, incorporated by reference.

(D) Manufacturers are not required to use the durability demonstration vehicle to collect the misfire data for sections (i)(2.5.1)(A) though (C).

(2.5.2) For diesel medium-duty vehicles subject to the monitoring requirements of section (f)(3.2.2), data supporting the misfire monitor shall include:

(A) Data demonstrating the probability of detection of misfire events of the misfire monitoring system over the required engine speed and load

operating range for the following misfire patterns: random cylinders misfiring at the malfunction criteria established in section (f)(3.2.2), one cylinder continuously misfiring, and paired cylinders continuously misfiring.

(B) Data identifying all disablement of misfire monitoring that occurs during the chassis dynamometer FTP and Unified cycles. For every disablement that occurs during the cycles, the data shall identify: when the disablement occurred relative to the driver's trace, the number of engine revolutions that each disablement was present for, and which disable condition documented in the certification application caused the disablement. The number of 1000-revolution intervals completed and the number of 1000-revoluation intervals in which the misfire threshold was exceeded shall also be identified. The data shall be submitted in the standardized format detailed in Attachment A: Misfire Disablement and Detection Chart of ARB Mail-Out #06-23.

(2.6) Data supporting the limit for the time between engine starting and attaining the designated heating temperature for after-start heated catalyst systems.

(2.7) For diesel vehicle monitors in section (f) that are required to indicate a malfunction before emissions exceed an emission threshold based on any applicable standard (e.g., 1.5 times any of the applicable standards), the test cycle and standard determined by the manufacturer to be the most stringent for each applicable monitor in accordance with section (d)(6.1) and the adjustment factors determined by the manufacturer for each applicable monitor in accordance with section (d)(6.2).

(2.8) A listing of all electronic powertrain input and output signals (including those not monitored by the OBD II system) that identifies which signals are monitored by the OBD II system.

(2.9) A written description of all parameters and conditions necessary to begin closed loop operation.

(2.10) A summary table identifying every test group and each of the OBD II phase-in requirements that apply to each test group.

(2.11) A written identification of the communication protocol utilized by each test group for communication with an SAE J1978 scan tool.

(2.12) A pictorial representation or written description of the diagnostic connector location including any covers or labels.

(2.13) A written description of the method used by the manufacturer to meet the requirements of sections (e)(9) and (f)(10) for PCV and CV system monitoring including diagrams or pictures of valve and/or hose connections.

(2.14) A cover letter identifying all concerns and deficiencies applicable to the equivalent previous model year test group and the changes and/or resolution of each concern or deficiency for the current model year test group.

(2.15) For diesel engine vehicles, a written description of each AECD utilized by the manufacturer including the identification of each EI-AECD relative to the data required to be tracked and reported in the standardized format specified in section (g)(6) (e.g., EI-AECD #1 is "engine overheat protection as determined by coolant temperature greater than..."), the sensor signals and/or calculated values used to invoke each AECD, the engineering data and/or analysis demonstrating the need for such an AECD, the actions taken when each AECD is activated, the expected in-use frequency of operation of each AECD, and the expected emission impact from each AECD activation.

(2.16) A checklist of all the malfunction criteria in sections (e) or (f) and the corresponding diagnostic noted by fault code for each malfunction criterion. The formats of the checklists are detailed in Attachments F and G of ARB Mail-Out #MSC 06-23, December 21, 2006, incorporated by reference.

(2.17) Any other information determined by the Executive Officer to be necessary to demonstrate compliance with the requirements of this regulation.

(3) "Part 2". The following information shall be submitted by January 1st of the applicable model year:

(3.1) A listing and block diagram of the input parameters used to calculate or determine calculated load values and the input parameters used to calculate or determine fuel trim values.

(3.2) A scale drawing of the MIL and the fuel cap indicator light, if present, which specifies location in the instrument panel, wording, color, and intensity.

(4) "Part 3". The following information shall be submitted upon request of the Executive Officer:

(4.1) Data supporting the criteria used to detect a malfunction when catalyst deterioration causes emissions to exceed the applicable malfunction criteria specified in sections (e) and (f).

(4.2) Data supporting the criteria used to detect evaporative system leaks.

(4.3) Any other information determined by the Executive Officer to be necessary to demonstrate compliance with the requirements of this regulation.

(j) *Production Vehicle Evaluation Testing.*

(1) *Verification of Standardized Requirements.*

(1.1) Requirement: For 2005 and subsequent model year vehicles, manufacturers shall perform testing to verify that all vehicles meet the requirements of section (g)(3) and (g)(4) relevant to proper communication of required emission-related messages to an SAE J1978 scan tool.

(1.2) Selection of Test Vehicles: Manufacturers shall perform this testing every model year on one production vehicle from every unique calibration within two months of the start of normal production for that calibration. Manufacturers

may request Executive Officer approval to group multiple calibrations together and test one representative calibration per group. The Executive Officer shall approve the request upon finding that the software designed to comply with the standardization requirements of section (g) in the representative calibration vehicle is identical (e.g., communication protocol message timing, number of supported data stream parameters, etc.) to all others in the group and that any differences in the calibrations are not relevant with respect to meeting the criteria in section (j)(1.4).

(1.3) Test Equipment: For the testing required in section (j)(1), manufacturers shall utilize an off-board device to conduct the testing. Prior to conducting testing, manufacturers are required to request and receive Executive Officer approval of the off-board device that the manufacturer will use to perform the testing. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data, specifications, and/or engineering analysis that demonstrate that the off-board device meets the minimum requirements to conduct testing according to SAE J1699-3 using the software developed and maintained for the SAE J1699-3 committee and available through www.sourceforge.net and SAE J2534 compliant hardware configured specifically for SAE J1699-3 testing.

(1.4) Required Testing (i.e., "static" testing portion of SAE J1699-3):

(1.4.1) The testing shall verify that the vehicle can properly establish communications between all emission-related on-board computers and any SAE J1978 scan tool designed to adhere strictly to the communication protocols allowed in section (g)(3);

(1.4.2) The testing shall further verify that the vehicle can properly communicate to any SAE J1978 scan tool:

(A) The current readiness status from all on-board computers required to support readiness status in accordance with SAE J1979 and section (g)(4.1) while the engine is running;

(B) The MIL command status while the MIL is commanded off and while the MIL is commanded on in accordance with SAE J1979 and section (g)(4.2) while the engine is running, and in accordance with SAE J1979 and sections (d)(2.1.2) during the MIL functional check and, if applicable, (g)(4.1.3) during the MIL readiness status check while the engine is off;

(C) All data stream parameters required in section (g)(4.2) in accordance with SAE J1979 including the identification of each data stream parameter as supported in SAE J1979 (e.g., Mode/Service $01, PID $00);

(D) The CAL ID, CVN, and VIN (if applicable) in accordance with SAE J1979 and sections (g)(4.6) through (4.8);

(E) An emission-related fault code (permanent, confirmed, and pending) in accordance with SAE J1979 (including correctly indicating the number of

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stored fault codes (e.g., Mode/Service $01, PID $01, Data A)) and section (g)(4.4);

(1.4.3) The testing shall also verify that the vehicle can properly respond to any SAE J1978 scan tool request to clear emission-related fault codes and reset readiness status.

(1.5) Reporting of Results:

(1.5.1) The manufacturer shall notify the Executive Officer within one month of identifying any vehicle that does not meet the requirements of section (j)(1.4). The manufacturer shall submit a written report of the problem(s) identified and propose corrective action (if any) to remedy the problem(s) to the Executive Officer for approval. Factors to be considered by the Executive Officer in approving the proposed corrective action shall include the severity of the problem(s), the ability of the vehicle to be tested in an I/M program, the ability of service technicians to access the required diagnostic information, the impact on equipment and tool manufacturers, and the amount of time prior to implementation of the proposed corrective action.

(1.5.2) Within three months of any passing testing conducted pursuant to section (j)(1), a manufacturer shall submit a report of the results to the Executive Officer for review.

(1.5.3) In accordance with section (k)(6), manufacturers may request Executive Officer approval for a retroactive deficiency to be granted for items identified during this testing.

(2) *Verification of Monitoring Requirements.*

(2.1) For 2004 and subsequent model year vehicles, within the first six months after normal production begins, manufacturers shall conduct a complete evaluation of the OBD II system of one or more production vehicles (test vehicles) and submit the results of the evaluation to the Executive Officer.

(2.2) Selection of test vehicles:

(2.2.1) Prior to submitting any applications for certification for a model year, a manufacturer shall notify the Executive Officer of the test groups planned for that model year. The Executive Officer will then select the test group(s), in accordance with sections (j)(2.2.2) and (j)(2.2.3) below, that the manufacturer shall use as test vehicles to provide evaluation test results. This selection process may take place during durability demonstration test vehicle selection specified in section (h).

(2.2.2) A manufacturer shall evaluate one production vehicle per test group selected for monitoring system demonstration in section (h).

(2.2.3) In addition to the vehicles selected in section (j)(2.2.2) above, a manufacturer shall evaluate vehicles chosen from test groups that are not

selected for monitoring system demonstration testing under section (h). The number of additional vehicles to be tested shall be equal to the number of vehicles selected for monitoring system demonstration in section (h).

(2.2.4) The Executive Officer may waive the requirements for submittal of evaluation results from one or more of the test groups if data has been previously submitted for all of the test groups.

(2.3) Evaluation requirements:

(2.3.1) The evaluation shall demonstrate the ability of the OBD II system on the selected production vehicle to detect a malfunction, illuminate the MIL, and store a confirmed fault code when a malfunction is present and the monitoring conditions have been satisfied for each individual diagnostic required by title 13, CCR section 1968.2.1.

(2.3.2) The evaluation shall verify that malfunctions detected by non-MIL illuminating diagnostics of components used to enable any other OBD II system diagnostic (e.g., fuel level sensor) will not inhibit the ability of other OBD II system diagnostics to properly detect malfunctions.

(2.3.3) On vehicles so equipped, the evaluation shall verify that the software used to track the numerator and denominator for purposes of determining in-use monitoring frequency correctly increments as required in section (d)(4)(i.e., the "dynamic" testing portion of SAE J1699-3).

(2.3.4) Malfunctions may be mechanically implanted or electronically simulated but internal on-board computer hardware or software changes may not be used to simulate malfunctions. Emission testing to confirm that the malfunction is detected before the appropriate malfunction threshold (e.g., 1.5 times the applicable standards) is exceeded is not required.

(2.3.5) Manufacturers shall submit a proposed test plan for Executive Officer approval prior to evaluation testing being performed. The test plan shall identify the method used to induce a malfunction in each diagnostic. If the Executive Officer determines that the requirements of section (j)(2) are satisfied, the proposed test plan shall be approved.

(2.3.6) Subject to Executive Officer approval, manufacturers may omit demonstration of specific diagnostics. The Executive Officer shall approve a manufacturer's request if the demonstration cannot be reasonably performed without causing physical damage to the vehicle (e.g., on-board computer internal circuit faults).

(2.3.7) For evaluation of test vehicles selected in accordance with section (j)(2.2.2), manufacturers are not required to demonstrate diagnostics that were previously demonstrated prior to certification as required in section (h).

(2.4) Manufacturers shall submit a report of the results of all testing conducted pursuant to section (j)(2) to the Executive Officer for review. This report shall

identify the method used to induce a malfunction in each diagnostic, the MIL illumination status, and the confirmed fault code(s) stored.

(2.5) In accordance with section (k)(6), manufacturers may request Executive Officer approval for a retroactive deficiency to be granted for items identified during this testing.

(3) *Verification and Reporting of In-use Monitoring Performance.*

(3.1) Manufacturers are required to collect and report in-use monitoring performance data representative of every test group certified by the manufacturer and equipped with in-use monitoring performance tracking software in accordance with section (d)(4) to the ARB within twelve months from either the time vehicles in the test group were first introduced into commerce or the start of normal production for such vehicles, whichever is later. The manufacturer may propose to the Executive Officer that multiple test groups be combined to collect representative data. Executive Officer approval shall be granted upon determining that the proposed groupings include test groups using the same OBD II strategies and similar calibrations and that are expected to have similar in-use monitoring performance. If approved by the Executive Officer, the manufacturer may submit one set of data for each of the approved groupings.

(3.2) For each test group or combination of test groups, the data must include all of the in-use performance tracking data reported through SAE J1979 (i.e., all numerators, denominators, and the ignition cycle counter), the date the data was collected, the odometer reading, the vehicle VIN, and the ECM software calibration identification number and be in the standardized format detailed in Attachment D: Rate Based Data of ARB Mail-Out #06-23, December 21, 2006, incorporated by reference.

(3.3) Manufacturers shall submit a plan to the Executive Officer for review and approval of the sampling method, number of vehicles to be sampled, time line to collect the data, and reporting format. The Executive Officer shall approve the plan upon determining that it provides for effective collection of data from a representative sample of vehicles that, at a minimum, is fifteen vehicles, will likely result in the collection and submittal of data within the required twelve month time frame, will generate data that are representative of California drivers and temperatures, and does not, by design, exclude or include specific vehicles in an attempt to collect data only from vehicles with the highest in-use performance ratios.

(3.4) Upon request of the manufacturer, the Executive Officer may reduce the minimum sample size of fifteen vehicles set forth in section (j)(3.3) for test groups with low sales volume. In granting approval of a sampling plan with a reduced minimum sample size, the Executive Officer shall consider, among other things, information submitted by the manufacturer to justify the smaller sample size, sales volume of the test group(s), and the sampling mechanism utilized by the manufacturer to procure vehicles. In lieu of defining a fixed

minimum sample size for low sales volume test groups, sampling plans approved for collection of data on higher sales volume test groups under section (j)(3.3) shall also be approved by the Executive Officer for low sales test groups if they use the identical sampling mechanism to procure vehicles from the low sales volume test groups.

(k) *Deficiencies.*

(1) For 2004 and subsequent model year vehicles, the Executive Officer, upon receipt of an application from the manufacturer, may certify vehicles even though said vehicles may not comply with one or more of the requirements of title 13, CCR section 1968.2.1. In granting the certification, the Executive Officer shall consider the following factors: the extent to which the requirements of section 1968.2.1 are satisfied overall based on a review of the vehicle applications in question, the relative performance of the resultant OBD II system compared to systems fully compliant with the requirements of title 13, CCR section 1968.2.1, and a demonstrated good-faith effort on the part of the manufacturer to: (1) meet the requirements in full by evaluating and considering the best available monitoring technology; and (2) come into compliance as expeditiously as possible. The Executive Officer may not grant certification to a vehicle in which the reported noncompliance for which a deficiency is sought would be subject to ordered recall pursuant to section 1968.5.1 (c)(3)(A).

(2) Manufacturers of non-complying systems are subject to fines pursuant to section 43016 of the California Health and Safety Code. Except as allowed in section (k)(7) for light-duty and medium-duty diesel vehicles, the specified fines apply to the third and subsequently identified deficiencies, with the exception that fines shall apply to all monitoring system deficiencies wherein a required monitoring strategy is completely absent from the OBD system.

(3) The fines are in the amount of $50 per deficiency per vehicle for non-compliance with any of the monitoring requirements specified in sections (e)(1) through (e)(8), (e)(11), (e)(13)(e)(14), (e)(16), (f)(1) through (f)(9), (f)(13), and (f)(16) and $25 per deficiency per vehicle for non-compliance with any other requirement of section 1968.2.1. In determining the identified order of deficiencies, deficiencies subject to a $50 fine are identified first. Total fines per vehicle under section (k) may not exceed $500 per vehicle and are payable to the State Treasurer for deposit in the Air Pollution Control Fund.

(4) Manufacturers must re-apply for Executive Officer approval of a deficiency each model year. In considering the request to carry-over a deficiency, the Executive Officer shall consider the factors identified in section (k)(1) including the manufacturer's progress towards correcting the deficiency. For all deficiencies except for deficiencies associated with PM filter monitoring section (f)(9.2.1)(A), the Executive Officer may not allow manufacturers to carry over monitoring system deficiencies for more than two model years unless it can be demonstrated that substantial vehicle hardware modifications and additional lead time beyond two years would be necessary to correct the deficiency, in which case the Executive Officer shall allow the deficiency to be carried over for three model

years. For deficiencies associated with PM filter monitoring section (f)(9.2.1)(A), if the manufacturer can demonstrate that substantial vehicle hardware modifications and additional lead time would be necessary to correct the deficiency, the Executive shall allow the deficiency to be carried over up to and including the 2013 model year.

(5) Except as allowed in section (k)(6), deficiencies may not be retroactively granted after certification.

(6) Request for retroactive deficiencies

(6.1) Manufacturers may request that the Executive Officer grant a deficiency and amend a vehicle's certification to conform to the granting of the deficiencies during the first 6 months after commencement of normal production for each aspect of the monitoring system: (a) identified by the manufacturer (during testing required by section (j)(2) or any other testing) to be functioning different than the certified system or otherwise not meeting the requirements of any aspect of section 1968.2.1; and (b) reported to the Executive Officer. If the Executive Officer grants the deficiencies and amended certification, their approval would be retroactive to the start of production.

(6.2) Executive Officer approval of the request for a retroactive deficiency shall be granted provided that the conditions necessary for a pre-certification deficiency determination are satisfied (see section (k)(1)) and the manufacturer could not have reasonably anticipated the identified problem before commencement of production.

(6.3) In granting the amended certification, the Executive Officer shall include any approved post-production deficiencies together with all previously approved deficiencies in computing fines in accordance with section (k)(2).

(7) Exceptions to Fines Requirements.

(7.1) For 2007 through 2009 model year light-duty and 2007 through 2012 model year medium-duty diesel vehicles, in cases where one or more of the deficiencies is for the aftertreatment monitoring requirements of sections (f)(1), (2), (8), or (9) and the deficient monitor is properly able to detect all malfunctions prior to emissions exceeding twice the required monitor threshold (e.g., before emissions exceed 10 times the standard for NMHC if the threshold is 5.0 times the standard for NMHC), the specified fines shall apply to the fourth and subsequently identified deficiencies in lieu of the third and subsequently identified deficiencies. If none of the deficiencies are for the requirements of sections (f)(1), (2), (8), or (9) or if the deficient aftertreatment monitor exceeds twice the required monitor threshold, the specified fines shall apply to the third and subsequently identified deficiencies. In all cases, the exception that fines shall apply to all monitoring system deficiencies wherein a required monitoring strategy is completely absent from the OBD system still applies.

(7.2) For 2013 through 2014 model year light-duty and medium-duty diesel vehicles that utilize PM sensors for PM filter filtering performance monitoring (section (f)(9.2.1)(A)), in cases where the deficiency is for a monitor required to detect malfunctions of the PM filter filtering performance (section (f)(9.2.1)(A)), the PM sensor (section (f)(5.2.2)), or the PM sensor heater (section (f)(5.2.4)), the deficiency shall be exempt from the specified fines of section (k)(3) and the deficiency shall not be included in the count of deficiencies used in (k)(2) to determine the number of deficiencies subject to fines.

(8) Any OBD II system installed on a production vehicle that fails to conform with the certified OBD II system for that vehicle or otherwise fails to meet the requirements of section 1968.2.1 and has not been granted a deficiency pursuant to the provisions of section (k)(1) through (k)(7) are considered non-compliant. The vehicles are subject to enforcement pursuant to applicable provisions of the Health and Safety Code and title 13, CCR section 1968.5.1.

NOTE: Authority cited: Sections 39010, 39600, 39601, 43000.5, 43013, 43018, 43100, 43101, 43104, 43105, 43105.5 and 43106, Health and Safety Code. Reference: Sections 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600, 39601, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150, 43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211 and 43212, Health and Safety Code.

§ 1968.5.1. Enforcement of Malfunction and Diagnostic System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *General*

(1) *Applicability.*

(A) These procedures shall be used to assure compliance with the requirements of title 13, California Code of Regulations (CCR) section 1968.2.1 for all 2004 and subsequent model year passenger cars, light-duty trucks, medium-duty vehicles, and engines certified on an engine dynamometer for use in medium-duty vehicles (the classifications of which shall jointly be referred to for purposes of this regulation as vehicles) equipped with OBD II systems that have been certified for sale in California.

(B) Vehicles manufactured prior to the 2004 model year are covered by the general enforcement and penalty provisions of the Health and Safety Code, and the specific provisions of title 13, CCR sections 1968.1 and 2111 through 2149.

(2) *Purpose.*

The purpose of this section is to establish the enforcement protocol that shall be used by the ARB to assure that vehicles certified for sale in California are equipped with OBD II systems that properly function and meet the purposes and requirements of title 13, CCR section 1968.2.1.

(3) *Definitions.*

The definitions applicable to these rules include those set forth in Health and Safety Code section 39010 et seq. and in title 13, CCR sections 1900(b) and 1968.2.1(c), which are incorporated by reference herein. The following definitions are specifically applicable to section 1968.5.1 and take precedence over any contrary definitions.

"Days", when computing any period of time, unless otherwise noted, means normal working days that a manufacturer is open for business.

"Executive Officer" means the Executive Officer of the Air Resources Board or his or her authorized representative.

"Influenced OBD II-Related Recall" means an inspection, repair, adjustment, or modification program initiated and conducted by a manufacturer as a result of enforcement testing conducted by the ARB or any other information for the purpose of correcting any nonconforming OBD II system for which direct notification of vehicle owners is necessary.

"Major Monitor" means those monitors covered by the requirements set forth in title 13, CCR sections 1968.2.1(e)(1.0) through (e)(8.0), (e)(11.0) through (e)(14.0), (e)(16.0), (f)(1.0) through (f)(9), (f)(12), (f)(13), and (f)(16).

"Motor Vehicle Class" means a group or set of vehicles subject to enforcement testing that have been determined by the Executive Officer to share common or similar hardware, software, OBD II monitoring strategy, or emission control strategy.

"Motor Vehicle Manufacturer" means the manufacturer granted certification to sell motor vehicles in the State of California.

"Nonconforming OBD II System" means an OBD II system on a production vehicle that has been determined not to comply with the emission standards as defined in title 13, CCR section 1968.2.1(c), irrespective of whether vehicles in the motor vehicle class, on average, meet other applicable emission standards (e.g., exhaust emission standards defined in title 13, CCR section 1960.1, evaporative emission standards defined in title 13, CCR section 1976).

"OBD II Emission Testing" refers to testing conducted to determine compliance with the malfunction criteria in title 13, CCR sections 1968.2.1(e) and (f) that are based on a multiple of, or an additive to, a tailpipe emission standard or an absolute measurement from an applicable emission test cycle (e.g., 1.5 times the applicable FTP emission standards, PM standard plus 0.02 g/bhp-hr, PM level of 0.03 g/bhp-hr as measured from an applicable emission test cycle).

"OBD II Ratio Testing" refers to testing conducted to determine compliance with the required in-use monitor performance ratio in title 13, CCR section 1968.2.1(d)(3.2.1).

"Ordered OBD II-Related Recall" means an inspection, repair, adjustment, or modification program required by the ARB to be conducted by the manufacturer to correct any nonconforming OBD II system for which direct notification of vehicle owners is necessary.

"Quarterly Reports" refer to the following calendar periods: January 1 – March 31; April 1 – June 30; July 1 – September 30; October 1 – December 31.

"Test Sample Group" means a group of production vehicles in a designated motor vehicle class that are equipped with OBD II systems and are selected and tested as part of the ARB enforcement testing program set forth in section (b).

"Voluntary OBD II-Related Recall" means an inspection, repair, adjustment, or modification program voluntarily initiated and conducted by a manufacturer to correct any nonconforming OBD II system for which direct notification of vehicle owners is necessary.

(b) *Testing Procedures*

(1) *Purpose.*

To assure that OBD II systems on production motor vehicles comply with the requirements of title 13, CCR section 1968.2.1, the ARB may periodically evaluate vehicles from a motor vehicle class.

(2) *Preliminary Testing and Evaluation.*

(A) As part of his or her evaluation of vehicles to determine compliance with the requirements of title 13, CCR section 1968.2.1, the Executive Officer may routinely conduct testing on any production vehicles that have been certified for sale in California.

(B) Based upon such testing or any other information, including data from California or other State Inspection and Maintenance (I/M) stations, warranty information reports, and field information reports, the Executive Officer may conduct enforcement testing pursuant to sections (b)(3) through (5) below.

(3) *Vehicle Selection for Enforcement Testing.*

(A) *Determining the Motor Vehicle Class.*

(i) Upon deciding to conduct enforcement testing, the Executive Officer shall determine the motor vehicle class to be tested. In determining the scope of the motor vehicle class to be tested, the Executive Officer shall consider the similarities and differences in the OBD II systems of potentially affected vehicles. Among other things, the Executive Officer shall consider whether vehicles share similar computer hardware and software, calibrations, or OBD II monitoring and emission control strategies.

(ii) The default motor vehicle class is the test group or OBD II group used by the manufacturer to certify the vehicles to be tested. However, upon concluding that a subgroup of vehicles differs from other vehicles in the identified test group or OBD II group and that a reasonable basis exists to believe that the differences may directly impact the type of testing that will be performed, the Executive Officer may determine that a subgroup of the test group or OBD II group is the appropriate motor vehicle class for testing.

(iii) Similarly, upon concluding that vehicles from several OBD II groups (which may include OBD II groups from different model years) share such common characteristics that a reasonable basis exists to believe that results of enforcement testing may be applicable to a motor vehicle class larger than a specific test group or OBD II group, the Executive Officer may determine that the appropriate motor vehicle class includes more than one test group or OBD II group.

(iv) Except for testing to determine if an OBD II system has been designed to deactivate based on age and/or mileage (title 13, CCR section 1968.2.1

(d)(1.3)), the Executive Officer may not conduct testing of a motor vehicle class whose vehicles, on average, exceed the defined full useful life of the motor vehicle class. For purposes of the determination of this average, the Executive Officer shall use the accrual rates appropriate for vehicles in the motor vehicle class as defined in EMFAC2000 "Public Meeting to Consider Approval of Revisions to the State's On-Road Motor Vehicle Emissions Inventory: Technical Support Document, Section 7.1, 'Estimation of Average Mileage Accrual Rates from Smog Check Data,'" May 2000, incorporated by reference.

(B) *Size of Test Sample Group*. After determining the motor vehicle class to be tested, the Executive Officer shall determine the appropriate number of vehicles to include in the test sample group for enforcement testing in accordance with the following guidelines:

(i) For OBD II emission testing, the Executive Officer shall follow the provisions of title 13, CCR section 2137 regarding test sample size. In accordance with section 2137, the Executive Officer shall test 10 vehicles that have been procured following the protocol of section (b)(3)(C) below and meet the selection criteria of section (b)(3)(D)(i) below to determine the emissions characteristics of the motor vehicle class being tested.

(ii) For OBD II ratio testing, the Executive Officer shall collect data from a test sample group of 30 vehicles that have been procured following the protocol of section (b)(3)(C) below and meet the selection criteria of section (b)(3)(D)(ii) below to determine the in-use OBD II monitoring performance of the motor vehicle class being tested.

(iii) In determining compliance with any other requirements of title 13, CCR section 1968.2.1 (e.g., diagnostic connector location, communication protocol standards, MIL illumination protocol, evaporative system diagnostics, etc.), the Executive Officer shall determine, on a case by case basis, the number of vehicles meeting the selection criteria of section (b)(3)(D)(iii) needed to assure that the results of such testing may be reasonably inferred to the motor vehicle class. The Executive Officer's determination shall be based upon the nature of the noncompliance and the scope of the motor vehicle class. The test sample group could be as few as two test vehicles.

(C) *Protocol for Procuring Vehicles for Test Sample Group.*

(i) For OBD II emission and ratio testing, the Executive Officer shall procure vehicles consistent with the procurement process followed by the Executive Officer under title 13, CCR section 2137 (e.g., obtaining lists of all vehicles in the motor vehicle class within a specified geographical area, mailing postcards soliciting participation of vehicles within the specified area, selecting vehicles from those that responded to the solicitation, inspecting selected vehicles to determine whether appropriate to include in sample group, etc.). In selecting vehicles for OBD II emission testing, the

Executive Officer shall include only vehicles meeting the criteria set forth in section (b)(3)(D)(i) below. For OBD II ratio testing, the Executive Officer shall include only vehicles meeting the criteria set forth in section (b)(3)(D)(ii) below.

(ii) For all other testing, the Executive Officer shall, on a case by case basis, determine the appropriate manner for procuring vehicles. In making his or her determination, the Executive Officer shall consider the nature of the noncompliance and the scope of the motor vehicle class. If the Executive Officer concludes that a reasonable basis exists to believe that a vehicle operator's driving or maintenance habits would not substantially impact test results to determine noncompliance, he or she may procure vehicle(s) by any means that assures effective collection and testing of vehicles (e.g., rental car agencies, fleet vehicles, etc.). In all cases, however, the selection process must ensure proper selection of vehicles in accord with section (b)(3)(D)(iii) below.

(D) *Vehicles to be included in a Test Sample Group.*

(i) In selecting vehicles to be included in a test sample group for enforcement OBD II emission testing, the Executive Officer shall include only vehicles that:

a. Are certified to the requirements of title 13, CCR section 1968.2.1 and California exhaust emission standards.

b. Are registered for operation in California.

c. Have mileage that is equal to or less than 75 percent of the certified full useful life mileage and have an age of less than the certified full useful life age for the subject vehicles.

d. Have not been tampered with or equipped with add-on or modified parts that would cause the OBD II system not to comply with the requirements of title 13, CCR section 1968.2.1 or would have a permanent effect on exhaust emission performance.

e. Have not been subjected to abuse (e.g., racing, overloading, misfueling) neglect, improper maintenance, or other factors that would cause the OBD II system not to comply with the requirements of title 13, CCR section 1968.2.1 or would have a permanent effect on exhaust emission performance.

f. Have no detected or known malfunction(s) that would affect the performance of the OBD II system and are unrelated to the monitor or system being evaluated. At its discretion, the ARB may elect to repair a vehicle with a detected or known malfunction and then include the vehicle in the test sample group.

g. Have had no major repair to the engine or major repair of the vehicle resulting from a collision.

h. Have no problem that might jeopardize the safety of laboratory personnel.

(ii) In selecting vehicles to be included in a test sample group for enforcement OBD II ratio testing, the Executive Officer shall include only vehicles that:

a. Are certified to the requirements of title 13, CCR section 1968.2.1.

b. Have collected sufficient vehicle operation data for the monitor to be tested. For monitors required to meet the in-use monitor performance ratio and to track and report ratio data pursuant to title 13, CCR section 1968.2.1(d)(3.2), sufficient vehicle operation data shall mean the denominator meets the criteria set forth in sections (b)(3)(D)(ii)1. through 3. below. For monitors required to meet the in-use monitor performance ratio but not required to track and report ratio data pursuant to title 13, CCR section 1968.2.1(d)(3.2), sufficient vehicle operation data shall mean that vehicles that have a denominator that meets the criteria set forth in sections (b)(3)(D)(ii)1. through 3. below after undergoing testing as set forth in section (b)(4)(C)(ii) below. Specifically, the denominator, as defined in title 13, CCR section 1968.2.1(d)(4.3), for the monitor to be tested must have a value equal to or greater than:

1. 150 for evaporative system monitors, secondary air system monitors, and monitors utilizing a denominator incremented in accordance with title 13, CCR sections 1968.2.1(d)(4.3.2)(E) or (F) (e.g., cold start monitors, air conditioning system monitors, etc.) and not covered in section (b)(3)(D)(ii)2. below, or

2. 50 for PM filter monitors, NMHC converting catalyst monitors, PM sensor monitors, and PM sensor heater monitors utilizing a denominator incremented in accordance with title 13, CCR section 1968.2.1(d)(4.3.2)(F), (G), (H), or (I), or

3. 300 for catalyst, oxygen sensor, EGR, VVT, and all other component monitors not covered in sections (b)(3)(D)(ii)1. and 2. above.

c. Have not been tampered with or equipped with add-on or modified parts that would cause the OBD II system not to comply with the requirements of title 13, CCR section 1968.2.1.

d. Have mileage and age that are less than or equal to the certified full useful life mileage and age for the subject vehicles.

(iii) In selecting vehicles to be included in a test sample group for enforcement testing of any other requirement of title 13, CCR section 1968.2.1 (not covered by sections (b)(3)(D)(i) or (ii) above), the Executive Officer shall include only vehicles that:

a. Are certified to the requirements of title 13, CCR section 1968.2.1.

b. Have not been tampered with or equipped with add-on or modified parts that would cause the OBD II system not to comply with the requirements of title 13, CCR section 1968.2.1.

c. Have no detected or known malfunction(s) that would affect the performance of the OBD II system and are unrelated to the monitor or system being evaluated. At its discretion, the ARB may elect to repair a vehicle with a detected or known malfunction and then include the vehicle in the test sample group.

d. Have mileage and age that are less than or equal to the certified full useful life mileage and age for the subject vehicles.

(iv) If the Executive Officer discovers, by either evidence presented by the manufacturer as provided in section (b)(7) or on his or her own, that a vehicle fails to meet one or more of the applicable criteria of section (b)(3)(D)(i) through (iii), the Executive Officer shall remove the vehicle from the test sample group. The Executive Officer may replace any vehicle removed with an additional vehicle selected in accordance with sections (b)(3)(C) and (D) above. Test results relying on data from the removed vehicle shall be recalculated without using the data from the removed vehicle.

(4) *Enforcement Testing Procedures.*

(A) Prior to conducting any testing under section (b)(4), the Executive Officer may replace components monitored by the OBD II system with components that are sufficiently deteriorated or simulated to cause malfunctions that exceed the malfunction criteria established pursuant to title 13, CCR sections 1968.2.1(e) and (f) in a properly operating system. The Executive Officer may not use components deteriorated or simulated to represent failure modes that could not have been foreseen to occur by the manufacturer (e.g., the use of leaded gasoline in an unleaded vehicle, etc.). Upon request by the Executive Officer, the manufacturer shall make available all test equipment (e.g., malfunction simulators, deteriorated "threshold" components, etc.) necessary to duplicate testing done by the manufacturer to determine the malfunction criteria used for major monitors subject to OBD II emission testing.

(B) OBD II Emission Testing. After the test sample group has been selected and procured, the Executive Officer may perform one or more of the following tests:

(i) Emission testing with the test procedures used by the Executive Officer for in-use testing of compliance with exhaust emission standards in accordance with title 13, CCR sections 2138 and 2139.

(ii) On-road or dynamometer testing with the vehicle being driven in a manner that reasonably ensures that all of the monitoring conditions disclosed in the manufacturer's certification application for the tested monitor are encountered.

(C) *OBD II Ratio Testing.*

(i) For OBD II ratio testing of monitors required to meet the in-use monitor performance ratio and to track and report ratio data pursuant to title 13, CCR section 1968.2.1(d)(3.2), after the test sample group has been selected and procured, the Executive Officer shall download the data from monitors required to track and report such data.

(ii) For OBD II ratio testing of monitors required to meet the in-use monitor performance ratio but not required to track and report ratio data pursuant to title 13, CCR section 1968.2.1(d)(3.2), after the test sample group has been selected and procured, the Executive Officer shall collect data by installing instrumentation or data-logging equipment on the vehicles. After installation of the equipment, the vehicles shall be returned to the vehicle owner/operator to continue to operate the vehicle until the minimum denominator criteria (see section (b)(3)(D)(ii)b.) are satisfied. The Executive Officer shall then calculate the ratio from the data collected in a manner that will allow the Executive Officer to effectively determine the in-use monitor performance ratio in accordance with the requirements of title 13, CCR section 1968.2.1(d)(3.2).

(D) *Testing for compliance with any other requirement of title 13, CCR section 1968.2.1.* After the test sample group has been selected and procured, the Executive Officer may perform one or more of the following tests:

(i) Emission testing on the applicable FTP cycle or other applicable emission test cycle used for measuring exhaust or evaporative emissions.

(ii) On-road or dynamometer testing with the vehicle being driven in a manner that reasonably ensures that all of the monitoring conditions disclosed in the manufacturer's certification application for the tested monitor are encountered.

(iii) Any other testing determined to be necessary by the Executive Officer. This may include, but is not limited to, the use of special test equipment to verify compliance with standardization requirements.

(5) *Additional Testing.*

(A) Based upon testing of the motor vehicle class in section (b)(4) above and after review of all evidence available at the conclusion of such testing, the Executive Officer may elect to conduct further testing of a subgroup of vehicles from the motor vehicle class if the Executive Officer has determined that:

(i) a subgroup of tested vehicles differs sufficiently enough from other vehicles in the tested motor vehicle class, and

(ii) a reasonable basis exists to believe that the identified differences may indicate that the subgroup may be nonconforming whereas the tested motor vehicle class as a whole is not.

(B) Hereinafter all references to motor vehicle class shall be applicable to the subgroup meeting the conditions of section (b)(5)(A) above.

(C) In any testing of a subgroup of vehicles under section (b)(5), the Executive Officer shall follow the vehicle selection and testing procedures set forth in sections (b)(3) and (4) above.

(6) *Finding of Nonconformance after Enforcement Testing.*

After conducting enforcement testing pursuant to section (b)(4) above, the Executive Officer shall make a finding of nonconformance of the OBD II system in the identified motor vehicle class if:

(A) *OBD II Emission Testing.*

(i) Intermediate In-Use Gasoline Thresholds. For 2004 through 2008 model year vehicles subject to gasoline/spark ignited monitoring requirements in title 13, CCR section 1968.2.1(e) , the results of the OBD II emission tests indicate that 50 percent or more of the vehicles in the test sample do not properly illuminate the MIL when emissions exceed:

a. 2.0 times the FTP standards for malfunction criteria defined in title 13, CCR section 1968.2.1(e) that require MIL illumination at 1.5 or 1.75 times the FTP standards;

b. 3.5 times the FTP standards for malfunction criteria defined in title 13, CCR section 1968.2.1(e) that require MIL illumination at 2.5 times the FTP standards; or

c. 4.5 times the FTP standards for malfunction criteria defined in title 13, CCR section 1968.2.1(e) that require MIL illumination at 3.5 times the FTP standards.

(ii) *Intermediate In-Use Diesel Thresholds.*

a. For 2007 through 2012 model year vehicles subject to diesel/compression-ignition monitoring requirements in title 13, CCR section 1968.2.1(f), the results of the OBD II emission tests indicate that 50 percent or more of the vehicles in the test sample do not properly illuminate the MIL when emissions exceed:

1. an additional 1.0 times the applicable standards above the malfunction criteria for malfunction criteria defined in title 13, CCR section 1968.2.1(f) that require MIL illumination at less than 3.5 times the applicable standards (e.g., 3.5 times the applicable standards for a malfunction criteria of 2.5 times the applicable standards); or

2. an additional 1.5 times the applicable standards above the malfunction criteria for malfunction criteria defined in title 13, CCR section 1968.2.1(f) that require MIL illumination at greater than or equal to 3.5 times the applicable standards (e.g., 6.5 times the

applicable standards for a malfunction criteria of 5.0 times the applicable standards); or

3. an additional 1.0 times the applicable standards above the malfunction criteria for malfunction criteria defined in title 13, CCR section 1968.2.1(f) that require MIL illumination at an additive threshold of less than or equal to 0.3 g/bhp-hr NOx, an additive threshold of less than or equal to 0.02 g/bhp-hr PM, or an absolute threshold of less than or equal to 0.03 g/bhp-hr (e.g., 0.07 g/bhp-hr PM for an additive malfunction criteria of 0.03 g/bhp-hr with a standard of 0.02 g/bhp-hr); or

4. an additional 1.5 times the applicable standards above the malfunction criteria for malfunction criteria defined in title 13, CCR section 1968.2.1(f) that require MIL illumination at an additive threshold of greater than 0.3 g/bhp-hr NOx, an additive threshold of greater than 0.02 g/bhp-hr PM, or an absolute threshold of greater than 0.03 g/bhp-hr PM (e.g., 1.0 g/bhp-hr NOx for an additive malfunction criteria of 0.5 g/bhp-hr with a standard of 0.2 g/bhp-hr).

b. For 2010 through 2012 model year medium-duty vehicles certified to an engine dynamometer standard, the "applicable standards" used in section (b)(6)(A)(ii) shall be limited to the emission test cycle and standard (i.e., FTP or SET) determined by the manufacturer to be more stringent and documented as such in the certification application in accordance with title 13, CCR section 1968.2.1(d)(6.1).

c. For 2007 through 2009 model year vehicles subject to adjustment for infrequent regeneration events in accordance with title 13, CCR section 1968.2.1(d)(6.2), OBD II emission enforcement testing for monitors using the provisions of title 13, CCR section 1968.2.1(d)(6.2.3) (baseline-derived adjustment factors instead of malfunction threshold component-specific adjustment factors) shall be limited to using emission test results without the infrequent regeneration event occurring and applying the same baseline-derived adjustment factors used by the manufacturer at the time of certification.

d. For 2013 through 2015 model year medium-duty vehicles, with respect to the NOx malfunction criteria for the NOx converting catalyst conversion efficiency monitor (title 13, CCR section 1968.2.1(f)(2.2.2)), reductant delivery performance monitor (title 13, CCR section 1968.2.1(f)(2.2.3)(A)), and NOx sensor monitor (title 13, CCR section 1968.2.1(f)(5.2.2)(A)), the Executive Officer shall make a finding of nonconformance of the OBD II system if the results of the OBD II emission tests indicate that 50 percent or more of the vehicles in the test sample do not properly illuminate the MIL when emissions exceed an additional 0.2 g/bhp-hr above the NOx malfunction criteria defined in title 13, CCR section 1968.2.1(f)(2.2.2)(A)(ii)c. or 1968.2.1(f)(5.2.2)(A)(ii)c.

e. For 2013 through 2015 model year medium-duty vehicles, for the PM filter filtering performance monitor (title 13, CCR section 1968.2.1(f)(9.2.1)), the Executive Officer shall make a finding of nonconformance of the OBD II system if the results of the OBD II emission tests indicate that 50 percent or more of the vehicles in the test sample do not properly illuminate the MIL when emissions exceed 0.05 g/bhp-hr.

(iii) *Final In-Use Thresholds.* For 2009 and subsequent model year vehicles subject to the gasoline/spark-ignited requirements of title 13, CCR section 1968.2.1(e) and, except as provided in sections (b)(6)(A)(ii)d. and e. above, for 2013 and subsequent model year vehicles subject to the diesel/compression-ignition requirements of title 13, CCR section 1968.2.1(f), the results of the OBD II emission tests indicate that 50 percent or more of the vehicles in the test sample do not properly illuminate the MIL when the emission malfunction criteria defined in title 13, CCR sections 1968.2.1(e) or (f) are exceeded.

(B) *OBD II Ratio Testing.*

(i) For monitors specified in sections (b)(6)(B)(i)a. through e. below, the data collected from the vehicles in the test sample indicate either that the average in-use monitor performance ratio for one or more of the monitors in the test sample group is less than 0.100 or that 66.0 percent or more of the vehicles in the test sample group have an in-use monitor performance ratio of less than 0.100 for the same monitor:

a. monitors on 2004 through 2018 model year vehicles certified to a ratio of 0.100 in accordance with title 13, CCR section 1968.2.1(d)(3.2.1) (D),

b. monitors specified in title 13, CCR section 1968.2.1(e) on 2007 through 2012 model year vehicles for the first three model years the monitor is certified to the in-use performance ratio monitoring requirements of title 13, CCR sections 1968.2.1(d)(3.2.1)(A) through (C),

c. the fuel system air-fuel ratio cylinder imbalance monitor specified in title 13, CCR section 1968.2.1(e)(6.2.1)(C) on 2015 through 2017 model year vehicles,

d. the secondary exhaust gas sensor monitor specified in title 13, CCR section 1968.2.1(e)(7.2.2)(C) on 2012 through 2014 model year vehicles, and

e. monitors specified in title 13, CCR section 1968.2.1(f) on 2013 through 2015 model year vehicles.

(ii) For monitors that are certified to the ratios in title 13, CCR sections 1968.2.1(d)(3.2.1)(A) through (C) and are not described in sections (b)(6)(B)(i)b. through e. above, the data collected from the vehicles in the test sample indicate either that 66.0 percent or more of the vehicles in the

test sample group have an in-use monitor performance ratio of less than the required minimum ratio defined in title 13, CCR section 1968.2.1(d)(3.2.1) for the same monitor or that the average in-use monitor performance ratio for one or more of the monitors in the motor vehicle class is less than the required minimum ratio defined in title 13, CCR section 1968.2.1(d)(3.2.1) as defined by determining the average in-use monitor performance ratio for one or more of the monitors in the test sample group is less than:

a. 0.230 for secondary air system monitors and other cold start related monitors utilizing a denominator incremented in accordance with title 13, CCR section 1968.2.1(d)(4.3.2)(E) (e.g., cold start strategy monitors, etc.);

b. For evaporative system monitors:

1. 0.230 for monitors designed to detect malfunctions identified in title 13, CCR section 1968.2.1(e)(4.2.2)(C) (i.e., 0.020 inch leak detection);

2. 0.460 for monitors designed to detect malfunctions identified in title 13, CCR section 1968.2.1(e)(4.2.2)(A) and (B) (i.e., purge flow and 0.040 inch leak detection);

c. 0.297 for catalyst, oxygen sensor, EGR, VVT system, and all other monitors specifically required in section title 13, CCR sections 1968.2.1(e) and (f) to meet the monitoring condition requirements of title 13, CCR section 1968.2.1(d)(3.2).

(C) *All Other OBD II Testing.*

(i) The results of the testing indicate that at least 30 percent of the vehicles in the test sample do not comply with the same requirement of title 13, CCR section 1968.2.1.

(ii) The results of the testing indicate that at least 30 percent of the vehicles in the test sample do not comply with one or more of the requirements of title 13, CCR section 1968.2.1 while the engine is running and while in the key on, engine off position such that Inspection and Maintenance or scan tool equipment designed to access the following parameters via the standards referenced in title 13, CCR section 1968.2.1 cannot obtain valid and correct data for the following parameters:

a. The current readiness status from all on-board computers required to support readiness status in accordance with Society of Automotive Engineers J1979 (SAE J1979) as incorporated by reference in title 13, CCR section 1968.2.1(g)(1) and section 1968.2.1(g)(4.1);

b. The current MIL command status while the MIL is commanded off and while the MIL is commanded on in accordance with SAE J1979 and title 13, CCR section 1968.2.1(g)(4.2), and in accordance with SAE J1979

and title 13, CCR sections 1968.2.1(d)(2.1.2) during the MIL functional check and, if applicable, title 13, CCR 1968.2.1(g)(4.1.3) during the MIL readiness status check;

c. The current permanent fault code(s) in accordance with SAE J1979 and section title 13, CCR 1968.2.1(g)(4.4);

d. The data stream parameters (Mode/Service $01) for: engine speed (PID $0C) and OBD requirements to which the vehicle or engine is certified (PID $1C); and for 2008 and subsequent model year vehicles using the ISO 15765-4 protocol that have not implemented permanent fault codes subject to (b)(6)(C)(ii)c., number of warm-up cycles since codes cleared (PID $30), distance since codes cleared (PID $31), and engine run time since codes cleared (PID $4E); as required in title 13, CCR section 1968.2.1(g)(4.2) and in accordance with SAE J1979;

e. The CAL ID, CVN, and VIN (Mode $09 PIDs $01 through $06) as required in title 13, CCR sections 1968.2.1(g)(4.6), (g)(4.7.1), (g)(4.7.3), and (g)(4.8) and in accordance with SAE J1979;

f. The proper identification of all data identified in (b)(6)(C)(ii)a. through (b)(6)(C)(ii)e. as supported or unsupported as required in title 13, CCR section 1968.2.1(g)(4) and in accordance with SAE J1979 (e.g., Mode/Service $01, PIDs $00, $20, $40; Mode/Service $09, PID $00, etc.); or

g. For vehicles using an alternate connector and communication protocol (e.g., SAE J1939) as provided for in title 13, CCR section 1968.2.1(g)(7.1), the parameters and data identified in sections (b)(6)(C)(ii)a. through f. in accordance with title 13, CCR section 1968.2.1(g)(4) and with the specified alternate connector and communication protocol in lieu of in accordance with SAE J1979.

(iii) If the finding of nonconformance under section (b)(6)(C)(i) above concerns vehicles that do not comply with the requirements of title 13, CCR section 1968.2.1(d)(4) or (5) (e.g., numerators or denominators are not properly being incremented), it shall be presumed that the nonconformance would result in an OBD II ratio enforcement test result that would be subject to an ordered OBD II-related recall in accord with the criterion in section (c)(3)(A)(i). The manufacturer may rebut such a presumption by presenting evidence in accord with section (b)(7)(C)(iii) below that demonstrates to the satisfaction of the Executive Officer that the identified nonconformance would not result in an ordered OBD II-related recall under section (c)(3)(A)(i).

(7) *Executive Officer Notification to the Manufacturer Regarding Determination of Nonconformance.*

(A) Upon making the determination of nonconformance in section (b)(6) above, the Executive Officer shall notify the manufacturer in writing.

(B) The Executive Officer shall include in the notice:

(i) a description of each group or set of vehicles in the motor vehicle class covered by the determination;

(ii) the factual basis for the determination, including a summary of the test results relied upon for the determination;

(iii) a statement that the Executive Officer shall provide to the manufacturer, upon request and consistent with the California Public Records Act, Government Code section 7920.000 et seq., all records material to the Executive Officer's determination;

(iv) a provision allowing the manufacturer no less than 90 days from the date of issuance of the notice to provide the Executive Officer with any information contesting the findings set forth in the notice; and

(v) a statement that if a final determination is made that the motor vehicle class is equipped with a nonconforming OBD II system, the manufacturer may be subject to appropriate remedial action, including recall and monetary penalties.

(C) Within the time period set by the Executive Officer in section (b)(7)(B)(iv) and any extensions of time granted under section (b)(7)(H), the manufacturer shall provide the Executive Officer, consistent with paragraphs (i) through (iii) below, with any test results, data, or other information derived from vehicle testing that may rebut or mitigate the results of the ARB testing, including any evidence that a motor vehicle class, if determined to be nonconforming, should be exempted from mandatory recall. (See section (c)(3)(B) below.).

(i) For OBD II emission testing and OBD II ratio testing:

a. The manufacturer may submit evidence to demonstrate that vehicles in the test sample group used by the Executive Officer were inappropriately selected, procured, or tested in support of a request to have vehicles excluded from the test sample group in accordance with section (b)(3)(D)(iv).

b. If the manufacturer elects to conduct additional testing of vehicles in the motor vehicle class and submit the results of such testing to the Executive Officer, the manufacturer shall:

1. Present evidence that it has followed the vehicle procurement and test procedures set forth in sections (b)(3) and (4) above, or

2. If the manufacturer elects to use different procurement and testing procedures, submit a detailed description of the procedures used and evidence that such procedures provide an equivalent level of assurance that the results are representative of the motor vehicle class.

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(ii) If the manufacturer objects to the size of the test sample group or the method used to procure vehicles in the test sample group used by the Executive Officer pursuant to section (b)(3)(B)(iii) or (b)(3)(C)(ii), the manufacturer shall set forth what it considers to be the appropriate size and procurement method, the reasons therefore, and test data from vehicles that confirm the manufacturer's position.

(iii) If the manufacturer elects to present evidence to overcome the presumption of nonconformance in section (b)(6)(C)(ii) above, the manufacturer shall demonstrate that the vehicles in the motor vehicle class comply with in-use monitor performance ratio requirements of title 13, CCR section 1968.2.1(d)(3.2) by presenting:

a. Evidence in accord with the procurement and testing requirements of sections (b)(3) and (4).

b. Any other evidence that provides an equivalent level of proof that vehicles operated in California comply with the in-use monitor performance ratio requirements.

(D) The Executive Officer may, but is not required to, accept any information submitted by a manufacturer pursuant to section (b)(7)(C) above after the time established for submission of such information has passed unless the manufacturer could not have reasonably foreseen the need for providing the information within the time period provided. In determining whether to accept late information, the Executive Officer will consider the lateness of the submission, the manufacturer's reasons for why such information was not timely presented, the materiality of the information to the Executive Officer's final determination, and what effect any delay may have on effective enforcement and the health and welfare of the State.

(E) The requirements of section (b)(7) shall not be construed to abridge the manufacturer's right to assert any privilege or right provided under California law.

(F) After receipt of any information submitted by the manufacturer pursuant to section (b)(7)(C) above, the Executive Officer shall consider all information submitted by the manufacturer and may conduct any additional testing that he or she believes is necessary.

(G) *Final Determination.*

(i) Within 60 days after completing any additional testing that the Executive Officer deemed necessary under section (b)(7)(F) above, the Executive Officer shall notify the manufacturer of his or her final determination regarding the finding of nonconformity of the OBD II system in the motor vehicle class. The determination shall be made after considering all of the information collected and received, including all information that has been received from the manufacturer.

(ii) The notice must include a description of each test group(s), OBD II group(s), or subgroups thereof, that has been determined to have a nonconforming OBD II system and set forth the factual bases for the determination.

(H) *Extensions.* The Executive Officer may for good cause extend the time requirements set forth in section (b)(7). In granting additional time to a manufacturer, the Executive Officer shall consider, among other things, any documentation submitted by the manufacturer regarding the time that it reasonably believes is necessary to conduct its own testing, why such information could not have been more expeditiously presented, and what effect any delay caused by granting the extension may have on effective enforcement and the health and welfare of the State. The Executive Officer shall grant a manufacturer a reasonable extension of time upon the manufacturer demonstrating that despite the exercise of reasonable diligence, the manufacturer has been unable to produce relevant evidence in the time initially provided.

(c) *Remedial Action*

(1) *Voluntary OBD II-Related Recalls.* If a manufacturer initiates a voluntary OBD II-related recall campaign, the manufacturer shall notify the Executive Officer of the recall at least 45 days before owner notification is to begin. The manufacturer shall also submit a voluntary OBD II-related recall plan for approval, as prescribed under section (d)(1) below. A voluntary recall plan shall be deemed approved unless disapproved by the Executive Officer within 30 days after receipt of the recall plan.

(2) *Influenced OBD II-Related Recalls.*

(A) Upon being notified by the Executive Officer, pursuant to section (b)(7)(G), that a motor vehicle class is equipped with a nonconforming OBD II system, the manufacturer may, within 45 days from the date of service of such notification, elect to conduct an influenced OBD II-related recall of all vehicles within the motor vehicle class for the purpose of correcting the nonconforming OBD II systems. Upon such an election, the manufacturer shall submit an influenced OBD II-related recall plan for approval, as prescribed under section (d)(1) below.

(B) If a manufacturer does not elect to conduct an influenced OBD II-related recall under section (c)(2)(A) above, the Executive Officer may order the manufacturer to undertake appropriate remedial action, up to and including the recall and repair of the nonconforming OBD II systems.

(3) *Ordered Remedial Action-Mandatory Recall.*

(A) Except as provided in sections (c)(3)(B) below, the Executive Officer shall order the recall and repair of all vehicles in a motor vehicle class that have been determined to be equipped with a nonconforming OBD II system if

enforcement testing conducted pursuant to section (b) above or information received from the manufacturer indicates that:

(i) For monitors on 2007 and subsequent model year vehicles certified to the ratios in title 13, CCR sections 1968.2.1(d)(3.2.1)(A) through (C), the average in-use monitor performance ratio for one or more of the major monitors in the test sample group is less than or equal to 33.0 percent of the applicable required minimum ratio established in title 13, CCR section 1968.2.1(d)(3.2.1) (e.g., if the required ratio is 0.336, less than or equal to a ratio of 0.111) or 66.0 percent or more of the vehicles in the test sample group have an in-use monitor performance ratio of less than or equal to 33.0 percent of the applicable required minimum ratio established in title 13, CCR section 1968.2.1(d)(3.2.1) for the same major monitor. For monitors on 2004 through 2018 model year vehicles certified to the 0.100 ratio in title 13, CCR section 1968.2.1(d)(3.2.1)(D), the Executive Officer shall determine the remedial action for nonconformances regarding the in-use monitor performance ratio in accordance with section (c)(4) below.

(ii) When the vehicle is tested on-road and driven so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the OBD II system is unable to detect and illuminate the MIL for a malfunction of a component/system monitored by a major monitor (other than the monitors for misfire causing catalyst damage and the evaporative system) prior to emissions exceeding two times the malfunction criteria of title 13, CCR sections 1968.2.1(e) and (f) (e.g., if the malfunction criteria is 1.75 times the applicable FTP standard, recall would be required when emissions exceed 3.5 times the applicable FTP standard or if the malfunction criteria is the PM standard plus 0.02 g/bhp-hr and the PM standard is 0.01 g/bhp-hr, recall would be required when emissions exceed 0.06 g/bhp-hr). Additionally, for the first two years that a new major monitor is required in title 13, CCR section 1968.2.1(e) (e.g., 2006 and 2007 model year for cold start strategy monitoring in title 13, CCR section 1968.2.1(e)(11)), the Executive Officer shall use three times the malfunction criteria in lieu of two times the malfunction criteria (e.g., if the malfunction criterion is 1.5 times the applicable FTP standard, recall would be required when emissions exceed 4.5 times the applicable FTP standard). Additionally, for major monitors on 2007 through 2009 model year vehicles certified to the monitoring requirements in title 13, CCR section 1968.2.1(f) and for the PM filter filtering performance monitor (title 13, CCR section 1968.2.1(f)(9.2.1)) on 2013 model year medium-duty vehicles, the Executive Officer shall determine the remedial action for nonconformances regarding emission exceedance in accordance with section (c)(4) below in lieu of the criteria in section (c)(3)(ii). For purposes of the emission exceedance determination, carbon monoxide (CO) emissions are not considered.

(iii) For misfire monitors:

a. Gasoline misfire monitor: The monitor for misfire causing catalyst damage is unable to properly detect and illuminate the MIL for misfire rates that are more than 20 percentage points greater than the misfire rates disclosed by the manufacturer in its certification application as causing catalyst damage (e.g., if the disclosed misfire rate is 12 percent, recall would be required if the misfire rate is greater than 32 percent without proper detection).

b. Diesel misfire monitor: For 2019 and subsequent model year medium-duty diesel vehicles, the misfire monitor is unable to properly detect and illuminate the MIL for misfire rates that are more than 10 percentage points greater than the misfire malfunction criteria specified in title 13, CCR section 1968.2.1(f)(3.2.2) (e.g., misfire rate more than 15 percent if the misfire malfunction criteria is 5 percent).

(iv) When the vehicle is tested on-road and driven so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the evaporative system monitor is unable to detect and illuminate the MIL for a cumulative leak or leaks in the evaporative system equivalent to that caused by an orifice with a diameter of at least 1.5 times the diameter of the required orifice in title 13, CCR section 1968.2.1(e)(4.2.2)(C).

(v) When the vehicle is tested on-road and driven so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the OBD II system cannot detect and illuminate the MIL for a malfunction of a component that effectively disables a major monitor and the major monitor, by being disabled, meets the criteria for recall identified in sections (c)(3)(A)(ii) or (iv) above (e.g. is unable to detect and illuminate the MIL for malfunctions that cause FTP emissions to exceed two times the malfunction criteria).

(vi) For 2013 and subsequent model year medium-duty diesel vehicles, when the vehicle is tested on-road and driven so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the PM filter monitor is unable to detect and illuminate the MIL for any of the following:

a. a missing substrate fault in accordance with title 13, CCR section 1968.2.1(f)(9.2.5); or

b. a malfunction of the PM filter that causes PM emissions to be equal to or greater than the emission level of the engine or vehicle, as measured from an applicable emission test cycle (i.e., FTP or SET), with the PM filter substrate completely removed.

(vii) The motor vehicle class cannot be tested so as to obtain valid test results in accordance with the criteria identified in section (b)(6)(C)(ii) due to the nonconforming OBD II system.

(B) A motor vehicle class shall not be subject to mandatory recall if the Executive Officer determines that, even though a monitor meets a criterion set forth in section (c)(3)(A)(i)-(vi) for mandatory recall:

(i) The OBD II system can still detect and illuminate the MIL for all malfunctions monitored by the nonconforming monitor (e.g., monitor "A" is non-functional but monitor "B" is able to detect all malfunctions of the component(s) monitored by monitor "A").

(ii) The monitor meets the criterion solely due to a failure or deterioration mode of a monitored component or system that could not have been reasonably foreseen to occur by the manufacturer.

(iii) The failure or deterioration of the monitored component or system that cannot be properly detected causes the vehicle to be undriveable (e.g., vehicle stalls continuously or the transmission will not shift out of first gear, etc.) or causes an overt indication such that the driver is certain to respond and have the problem corrected (e.g., illumination of an over-temperature warning light or charging system light that uncorrected will result in an undriveable vehicle, etc.).

(C) A motor vehicle class that is not subject to mandatory recall pursuant to paragraph (B) above may still be subject to remedial action pursuant to section (c)(4) below.

(4) *Other Ordered Remedial Action.*

(A) If the Executive Officer has determined based upon enforcement testing conducted pursuant to section (b) above or information received from the manufacturer that a motor vehicle class is equipped with a nonconforming OBD II system and the nonconformance does not fall within the provisions of section (c)(3)(A) above, he or she may require the manufacturer to undertake remedial action up to and including recall of the affected motor vehicle class.

(B) In making his or her findings regarding remedial action, the Executive Officer shall consider the capability of the OBD II system to properly function. This determination shall be based upon consideration of all relevant circumstances including, but not limited to, those set forth below.

(i) Whether the manufacturer identified and informed the ARB about the nonconformance(s) or whether the ARB identified the nonconformance(s) prior to being informed by the manufacturer.

(ii) The number of nonconformances.

(iii) If the identified nonconformance(s) is with a major monitor(s), the nature and extent of the nonconformance(s), including:

a. the degree to which the in-use monitor performance ratio(s) is below the required ratio(s) specified in title 13, CCR section 1968.2.1(d)(3.2.1), and

b. the amount of the emission exceedance(s) over the established malfunction criteria set forth in title 13, CCR sections 1968.2.1(e) and (f) before a malfunction is detected and the MIL is illuminated.

(iv) If the identified nonconformance(s) is with a non-major monitor the nature and extent of the nonconformance(s), including:

a. the degree to which the in-use monitor performance ratio(s) (where applicable) is below the required ratio(s) specified in title 13, CCR section 1968.2.1(d)(3.2.1),

b. the degree to which the monitored component must be malfunctioning or exceed the established malfunction criteria set forth in title 13, CCR sections 1968.2.1(e) and (f) before a malfunction is detected and the MIL is illuminated, and

c. the effect that the nonconformance(s) has on the operation of a major monitor(s).

(v) The impact of the nonconformance on vehicle owners (e.g., cost of future repairs, driveability, etc.) and the ability of the service and repair industry to make effective repairs (e.g., difficulty in accessing fault information, diagnosing the root cause of a failure, etc.).

(vi) The degree to which the identified nonconformance(s) complicates, interferes with, disrupts, or hampers a service technician's ability to follow California I/M testing protocol when performing a California I/M inspection.

(vii) The failure of the data link connector of the motor vehicle class to meet the requirements of title 13, CCR section 1968.2.1(g)(2).

(viii) The failure of the crankcase ventilation system in a motor vehicle class to comply with the requirements of title 13, CCR sections 1968.2.1(e)(9) or (f)(10).

(ix) The failure of the cooling system monitor in a motor vehicle class to properly verify that the cooling system reaches the highest enable temperature used for any other monitor when the vehicle is operated in the monitoring conditions disclosed in the manufacturer's certification application, or failure to comply with any requirement in title 13, CCR sections 1968.2.1(e)(10) or (f)(11).

(x) The estimated frequency that a monitor detects a malfunction and illuminates the MIL when no component malfunction is present (i.e., false MILs).

(xi) The estimated frequency that a monitor fails to detect a malfunction and illuminate the MIL when the monitoring conditions, as set forth in the manufacturer's approved certification application, have been satisfied and a faulty or deteriorated monitored component is present (i.e., false passes).

(xii) Whether the manufacturer submitted false, inaccurate, or incomplete documentation regarding the identified nonconformance at the time of certification pursuant to title 13, CCR section 1968.2.1(i) and the extent to which the false, inaccurate, or incomplete documentation was material to the granting of certification.

(C) In making the determination, the average tailpipe and evaporative emissions of vehicles within the affected motor vehicle class shall not be considered.

(5) *Assessment of Monetary Penalties.* The Executive Officer may seek penalties pursuant to the applicable provisions of the Health and Safety Code for violations of the requirements of title 13, CCR section 1968.2.1 or for production vehicles otherwise failing to be equipped with OBD II systems that have been certified by the ARB. In determining the penalty amounts that the ARB may seek, the Executive Officer shall consider all relevant circumstances including the factors set forth below:

(A) Whether the manufacturer self-reported the nonconformity or the ARB discovered the nonconformity independent of the manufacturer.

(B) The nature and degree of the nonconformity and whether the manufacturer should reasonably have discovered the nonconformity and taken corrective action by voluntary OBD II-related recall or running changes during the production year.

(C) The economic benefits, if any, gained by the manufacturer from not complying with the provisions of title 13, CCR section 1968.2.1.

(D) The manufacturer's history of compliance with the OBD II requirements.

(E) The preventative efforts taken by the manufacturer to avoid noncompliance, including any programs followed by the manufacturer to ensure compliance.

(F) The manufacturer's efforts to correct the nonconformity once it was identified.

(G) The innovative nature and magnitude of effort, including the cost of any other proposed remedial action, necessary to correct the nonconformity.

(H) The deterrent effect of the penalty.

(I) Whether the manufacturer has failed to provide complete and accurate information required to be submitted at the time of certification pursuant to title 13, CCR section 1968.2.1(i).

(J) The nature and degree that OBD II systems on production vehicles differ from the systems that have been certified by the ARB.

(6) *Notice to Manufacturer for an Ordered Remedial Action.*

(A) The Executive Officer shall immediately notify the manufacturer upon the Executive Officer determining the type of remedial action to be taken.

(B) For remedial actions other than the assessment of monetary penalties, the notice must:

(i) specifically set forth the remedial action that is being ordered,

(ii) include a description of the test group(s), OBD II group(s), or subgroup(s) thereof, that has been determined to have a nonconforming OBD II system,

(iii) set forth the factual bases for the determination, and

(iv) designate a date at least 45 days from the date of receipt of such notice by which the manufacturer shall submit a plan, pursuant to section (d)(1) below, outlining the remedial action to be undertaken consistent with the Executive Officer's order. Except as provided in section (c)(7)(C) below, all plans shall be submitted to the Chief, Emissions Certification and Compliance Division, CA Air Resources Board, 4001 Iowa Avenue, Riverside, California 92507, within the time limit specified in the notice. The Executive Officer may grant the manufacturer an extension of time for good cause.

(C) For cases in which the ARB elects to seek monetary penalties pursuant to authority granted under the Health and Safety Code, the Executive Officer shall issue a notice to the manufacturer that he or she will be filing a complaint in the appropriate administrative or civil court forum seeking penalties against the manufacturer for violations of title 13, CCR section 1968.2.1. The notice must include a description of the test group(s), OBD II group(s), or subgroup(s) thereof, that have been determined to have a nonconforming OBD II system and set forth the factual bases for the determination.

(7) *Availability of Public Hearing to Contest Remedial Actions Other than Determination to Seek Monetary Penalties.*

(A) Within 45 days from the date of receipt of the notice that is required under section (c)(6) above, the manufacturer may request a public hearing pursuant to the procedures set forth in title 17, CCR section 60055.1, et seq., to contest the findings of nonconformity, the necessity for, or the scope of any ordered remedial action. Pursuant to those procedures, the Executive Officer has the initial burden of presenting evidence that those parts of the Executive Officer's determination specifically challenged are supported by the facts and applicable law. (Title 17, CCR section 60055.32(d)(1).) Each issue of controversy shall be decided based upon the preponderance of the evidence presented at the hearing. (Title 17, CCR section 60055.32(h).)

(B) Notwithstanding the provisions of title 17, CCR section 60055.17(a)(1), administrative hearings conducted pursuant to a request filed under section (c)(7)(A) above shall be referred to the Office of Administrative Hearings, which shall otherwise follow the procedures established in title 17, CCR section 60055.1 et seq.

(C) If a manufacturer requests a public hearing pursuant to section (c)(7)(A) above and if the Executive Officer's determination of nonconformity is confirmed at the hearing, the manufacturer shall submit the required remedial action plan in accordance with section (d)(1) below within 30 days after receipt of the Board's decision.

(d) *Requirements for Implementing Remedial Actions*

(1) *Remedial Action Plans.*

(A) A manufacturer initiating a remedial action (voluntary, influenced, or ordered), other than payment of monetary penalties, shall develop a remedial action plan that contains the following information, unless otherwise specified:

(i) A description of each test group, OBD II group, or subgroup thereof covered by the remedial action, including the number of vehicles, the engine families, test groups, or subgroups within the identified class(es), the make(s), model(s), and model years of the covered vehicles, and such other information as may be required to identify the covered vehicles.

(ii) A description of the nonconforming OBD II system and, in the case of a recall (whether voluntary, influenced, or ordered), the specific modifications, alterations, repairs, adjustments, or other changes to correct the nonconforming OBD II system, including data and/or engineering evaluation supporting the specific corrections.

(iii) A description of the method that the manufacturer will use to determine the names and addresses of vehicle owners and the manufacturer's method and schedule for notifying the service facilities and vehicle owners of the remedial action.

(iv) A copy of all instructions that the manufacturer will use to notify service facilities about the required remedial action and the specific corrections, if any, that will be required to be made to the nonconforming OBD II systems.

(v) A description of the procedure to be followed by vehicle owners to obtain remedial action for the nonconforming OBD II system. This must include the date, on or after which the owner can have required remedial action performed, the time reasonably necessary to perform the labor to remedy the nonconformity, and the designation of facilities at which the nonconformity can be remedied.

(vi) If some or all of the nonconforming OBD II systems are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of such class of service agents and what steps, including a copy of all instructions mailed to such service agents, the manufacturer will take to assure that such agents are prepared and equipped to perform the proposed remedial action.

(vii) A copy of the letter of notification to be sent to vehicle owners.

(viii) A proposed schedule for implementing the remedial action, including identified increments of progress towards full implementation.

(ix) A description of the method that the manufacturer will use to assure that an adequate supply of parts will be available to initiate the remedial action campaign on the date set by the manufacturer and that an adequate supply of parts will continue to be available throughout the campaign.

(x) A description and test data of the emission impact, if any, that the proposed remedial action may cause to a representative vehicle from the motor vehicle class to be remedied.

(xi) A description of the impact, if any, and supporting data and/or engineering evaluation, that the proposed remedial action will have on fuel economy, driveability, performance, and safety of the motor vehicle class covered by the remedial action.

(xii) Any other information, reports, or data which the Executive Officer may reasonably determine to be necessary to evaluate the remedial action plan.

(B) *Approval and Implementation of Remedial Action Plans.*

(i) If the Executive Officer finds that the remedial action plan is designed effectively to address the required remedial action and complies with the provisions in section (d)(1)(A) above, he or she shall notify the manufacturer in writing within 30 days of receipt of the plan that the plan has been approved.

(ii) The Executive Officer shall approve a voluntary, influenced, or ordered remedial action plan if the plan contains the information specified in section (d)(1)(A) above and is designed to notify the vehicle owner and implement the remedial action in an expeditious manner.

(iii) In disapproving an ordered remedial action plan, the Executive Officer shall notify the manufacturer in writing of the disapproval and the reasons for the determination. The manufacturer shall resubmit a revised remedial action plan that fully addresses the reasons for the Executive Officer's disapproval within 10 days of receipt of the disapproval notice.

(iv) Upon receipt of the approval notice of the ordered remedial action plan from the Executive Officer, the manufacturer shall, within 45 days of receipt of the notice, begin to notify vehicle owners and implement the remedial action campaign.

(v) If the Executive Officer disapproves a voluntary or influenced remedial action plan, the manufacturer shall either accept the proposed modifications to the plan as suggested by the Executive Officer, resubmit a revised remedial action plan that fully addresses the reasons for the Executive Officer's disapproval within 30 days, or be subject to an Executive Officer order that the manufacturer undertake appropriate remedial action pursuant to section (c)(2)(B) above.

(vi) Upon receipt of the voluntary or influenced remedial action approval notice from the Executive Officer, the manufacturer shall begin to notify vehicle owners and implement the remedial action campaign according to the schedule indicated in the remedial action plan.

(2) *Eligibility for Remedial Action.*

(A) The manufacturer may not condition a vehicle owner's eligibility for remedial action required under section 1968.5.1 on the proper maintenance or use of the vehicle.

(B) The manufacturer shall not be obligated to repair a component which has been modified or altered such that the remedial action cannot be performed without additional cost.

(3) *Notice to Owners.*

(A) The manufacturer shall notify owners of vehicles in the motor vehicle class covered by the remedial order. The notice must be made by first-class mail or by such other means as approved by the Executive Officer. When necessary, the Executive Officer may require the use of certified mail for ordered remedial actions to assure effective notification.

(B) The manufacturer shall use all reasonable means necessary to locate vehicle owners, including motor vehicle registration lists available from the California Department of Motor Vehicles and commercial sources such as R.L. Polk & Co.

(C) The notice must contain the following:

(i) For ordered remedial actions, a statement: "The California Air Resources Board has determined that your (vehicle or engine) (is or may be) equipped with an improperly functioning on-board emission-related diagnostic system that violates established standards and regulations that were adopted to protect your health and welfare from the dangers of air pollution."

(ii) For voluntary and influenced remedial actions, a statement: "Your (vehicle or engine) (is or may be) equipped with an improperly functioning on-board emission-related diagnostic system that violates (California or California and Federal) standards and regulations" if applicable as determined by the Executive Officer.

(iii) A statement that the nonconformity of any such vehicles will be remedied at the expense of the manufacturer.

(iv) A statement that eligibility for remedial action may not be denied solely on the basis that the vehicle owner used parts not manufactured by the original equipment vehicle manufacturer, or had repairs performed by outlets other than the vehicle manufacturer's franchised dealers.

(v) Instructions to the vehicle owners on how to obtain remedial action, including instructions on whom to contact (i.e., a description of the facilities

where the vehicles should be taken for the remedial action), the first date that a vehicle may be brought in for remedial action, and the time that it will reasonably take to correct the nonconformity.

(vi) The statement: "In order to assure your full protection under the emission warranty provisions, it is recommended that you have your (vehicle or engine) serviced as soon as possible. Failure to do so could be determined as lack of proper maintenance of your (vehicle or engine)."

(vii) A telephone number for vehicle owners to call to report difficulty in obtaining remedial action.

(viii) A card to be used by a vehicle owner in the event the vehicle to be recalled has been sold. Such card should be addressed to the manufacturer, have postage paid, and shall provide a space in which the owner may indicate the name and address of the person to whom the vehicle was sold or transferred.

(ix) If the remedial action involves recall, the notice must also provide:

a. A clear description of the components that will be affected by the remedial action and a general statement of the measures to be taken to correct the nonconformity.

b. A statement that such nonconformity, if not corrected, may cause the vehicle to fail an emission inspection or I/M smog check test.

c. A statement describing the adverse effects, if any, of an uncorrected nonconforming OBD II system on the performance, fuel economy, or durability of the vehicle.

d. A statement that after remedial action has been taken, the manufacturer will have the service facility issue a certificate showing that a vehicle has been corrected under the recall program, and that such a certificate will be required to be provided to the Department of Motor Vehicles as a condition for vehicle registration.

(D) A notice sent pursuant to this section or any other communication sent to vehicle owners or dealers may not contain any statement, expressed or implied, that the OBD II system is compliant or that the OBD II system will not degrade air quality.

(E) The Executive Officer shall inform the manufacturer of any other requirements pertaining to the notification under section (d)(3) which the Executive Officer has determined as reasonable and necessary to assure the effectiveness of the recall campaign.

(4) *Label Indicating that Recall Repairs Have Been Performed.*

(A) If the required remedial action involves recall of a test group(s), OBD II group(s), or subgroup(s) thereof, the manufacturer shall require those who

perform inspections and/or recall repairs to affix a label to each vehicle that has been inspected and/or repaired.

(B) The label must be placed in a location approved by the Executive Officer and must be fabricated of a material suitable for such location in which it is installed and which is not readily removable.

(C) The label must contain the remedial action campaign number and a code designating the facility at which the remedial action or inspection to determine the need for remedial action was performed.

(5) *Proof of Performance of Remedial Action Certificate*. If the required remedial action involves a recall, the manufacturer shall provide, through its service agents, to owners of vehicles that have had the remedial action performed a certificate that confirms that the vehicle has been recalled and that required inspection and/or repairs have been performed. The certificate must be in a format prescribed by the Executive Officer, however, the Executive Officer may not require a format different in any way from the format of the certificate required in title 13, CCR sections 2117 and 2129.

(6) *Record Keeping and Reporting Requirements*.

(A) The manufacturer shall maintain sufficient records to enable the Executive Officer to conduct an analysis of the adequacy of the remedial action.

(B) Unless otherwise specified by the Executive Officer, the manufacturer shall report on the progress of the remedial action campaign by submitting reports for eight consecutive quarters commencing with the quarter immediately after the recall campaign begins. The reports shall be submitted no later than 25 days after the close of each calendar quarter to: Chief, Emissions Certification and Compliance Division, CA Air Resources Board, 4001 Iowa Avenue, Riverside, California 92507. For each recall campaign, the quarterly report must contain the following:

(i) The test group and the remedial action campaign number designated by the manufacturer and a brief description of the nature of the campaign.

(ii) The date owner notifications began and date completed.

(iii) The number of vehicles involved in the remedial action campaign.

(iv) The number of vehicles known or estimated to be equipped with the nonconforming OBD II system and an explanation of the means by which this number was determined.

(v) The number of vehicles inspected during the campaign since its inception.

(vi) The number of vehicles found to be affected by the nonconformity during the campaign since its inception.

(vii) The number of vehicles receiving remedial action during the campaign since its inception.

(viii) The number of vehicles determined to be unavailable for inspection or remedial action, during the campaign since its inception, due to exportation, theft, scrapping, or other reasons (specify).

(ix) The number of vehicles, during the campaign since its inception, determined to be ineligible for remedial action under section (d)(2)(B).

(x) An initial list, using the following data elements and designated positions, indicating all vehicles subject to recall that the manufacturer has not been invoiced for, or a subsequent list indicating all vehicles subject to the recall that the manufacturer has been invoiced for since the previous report. The list must be supplied in a standardized computer format to be specified by the Executive Officer. The data elements must be written in "ASCII" code without a comma separating each element. For example: XTY32A71234E-9456123408-25-91A. The add flag (see below) should reflect the vehicles for which the manufacturer has not been invoiced and the delete flag should reflect changes since the previous report. The Executive Officer may change the frequency of this submittal depending on the needs of enforcement. The Executive Officer may not, however, require a frequency or format for this submittal that is different in any way from the frequency or format determined by the Executive Officer as required for reporting of data in title 13, CCR sections 2119(a)(10) and 2133(a)(10).

Data Elements	*Positions*
• File Code (designated by DMV)	1
• License Plate Number	2-8
• Last three VIN positions	9-11
• Recall ID Number	12-17
• Mfg. ID Number	18-22
(Mfg. Occupational License Number)	
• Recall Start Date (mmddyyyy)	23-30
• Add or Delete Flag (A/D)	31
• Complete VIN if personalized license plate	32-48
(File Code "L" or "S")	

(xi) A copy of any service bulletins issued during the reporting period by the manufacturer to franchised dealerships or other service agents that relate to the nonconforming OBD II system and the remedial action and have not previously been reported to the Executive Officer.

(xii) A copy of all communications transmitted to vehicle owners that relate to the nonconforming OBD II systems and the required remedial action and have not been previously reported to the Executive Officer.

(C) If the manufacturer determines that any of the information submitted to the Executive Officer pursuant to section (d) has changed or is incorrect, the manufacturer shall submit the revised information, with an explanation.

(D) The manufacturer shall maintain in a form suitable for inspection, such as computer information, storage devices, or card files, and shall make available to the Executive Officer or his or her authorized representative upon request, the names and addresses of vehicle owners:

(i) To whom notification was sent;

(ii) Whose vehicles were repaired or inspected under the recall campaign;

(iii) Whose vehicles were determined not to be eligible for remedial action because the vehicles were modified, altered, or unavailable due to exportation, theft, scrapping, or other reason specified in the answer to sections (d)(6)(B)(viii) and (ix).

(E) The information gathered by the manufacturer to compile the reports required by these procedures must be retained for no less than one year beyond the useful life of the vehicles and must be made available to authorized personnel of the ARB upon request.

(F) The filing of any report under the provisions of these procedures must not affect the manufacturer's responsibility to file reports or applications, obtain approval, or give notice under any other provisions of law.

(7) *Extension of Time.*

Upon request of the manufacturer, the Executive Officer may extend any deadline set forth in section 1968.5.1(d) upon finding that the manufacturer has demonstrated good cause for the requested extension.

(e) *Penalties for Failing to Comply with the Requirements of Section (d).*

(1) In addition to the penalties that may be assessed by the Executive Officer pursuant to section (c) because of a manufacturer's failure to comply with the requirements of title 13, CCR section 1968.2.1, a manufacturer may be subject to penalties pursuant to section 43016, Health and Safety Code for failing to comply with the requirements of section (d).

(2) If a manufacturer fails to comply with a voluntary or influenced remedial action plan, the Executive Officer may order remedial action pursuant to section (c) above.

NOTE: Authority cited: Sections 39010, 39600, 39601, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, 43106, 43154, 43211 and 43212, Health and Safety Code. Reference: Sections 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600-39601, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150,

43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211 and 43212, Health and Safety Code.

§1971.1.1. On-Board Diagnostic System Requirements--2010 and Subsequent Model-Year Heavy-Duty Engines. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *Purpose.*

The purpose of this regulation is to reduce motor vehicle and motor vehicle engine emissions by establishing emission standards and other requirements for onboard diagnostic systems (OBD systems) that are installed on 2010 and subsequent model-year engines certified for sale in heavy-duty applications in California. The OBD systems, through the use of an onboard computer(s), shall monitor emission systems in-use for the actual life of the engine and shall be capable of detecting malfunctions of the monitored emission systems, illuminating a malfunction indicator light (MIL) to notify the vehicle operator of detected malfunctions, and storing fault codes identifying the detected malfunctions. The use and operation of OBD systems will ensure reductions in in-use motor vehicle and motor vehicle engine emissions through improvements of emission system durability and performance.

(b) *Applicability.*

Except as specified in section (d)(7) and elsewhere in this regulation (title 13, CCR section 1971.1.1), all 2010 and subsequent model-year heavy-duty engines shall be equipped with an OBD system that has been certified by the Executive Officer as meeting all applicable requirements of this regulation (title 13, CCR section 1971.1.1).[3]

(c) *Definitions.*

"Actual life" refers to the entire period that an engine is operated on public roads in California up to the time an engine is retired from use.

"Alternate-fueled engine" refers to an engine using a fuel different from or in addition to gasoline fuel or diesel fuel (e.g., compressed natural gas (CNG), liquefied petroleum gas). For the purposes of this regulation, alternate-fueled engines include dedicated alternate-fueled engines (i.e., engines designed to operate exclusively on the alternate fuel) and engines that can use more than one type of fuel but cannot be reasonably operated in-use exclusively on gasoline or diesel fuel (e.g., engines with diesel pilot injection and CNG main injection where engine operation is limited to idle if CNG fuel is not available or engines which use gasoline-only operation during cold start and CNG-only operation for the rest of the driving cycle and engine operation defaults to a limp-home restricted speed and load if CNG fuel is not available). For engines that can use more than one type of fuel but can be operated in-use exclusively on gasoline or diesel fuel, the engines are considered alternate-fueled

[3] Unless otherwise noted, all section references refer to section 1971.1.1 of title 13, CCR.

engines only for the portion of operation the engine uses a fuel other than exclusively gasoline or diesel (e.g., a gasoline and CNG engine that can operate exclusively on gasoline is considered an alternate-fueled engine only while operating on CNG and is not subject to the provisions or relief of this regulation for alternate-fueled engines while operating exclusively on gasoline). For alternate-fueled engines, the manufacturer shall meet the requirements of section (d)(7.5).

"Alternate phase-in", as allowed in section (g)(5.8), is a phase-in schedule that achieves equivalent compliance volume by the end of the last year of a scheduled phase-in provided in this regulation. The compliance volume is the number calculated by multiplying the percent of engines (based on the manufacturer's projected sales volume of all engines unless specifically stated otherwise in section (e), (f), or (g)) meeting the new requirements per year by the number of years implemented prior to and including the last year of the scheduled phase-in and then summing these yearly results to determine a cumulative total (e.g., a three year, 20/50/100 percent scheduled phase-in would be calculated as (20*3 years) + (50*2 years) + (100*1 year) = 260; a two-year 20/50 percent scheduled phase-in would be calculated as (20*2 years) + (50*1 year) = 90). Manufacturers are allowed to include engines introduced before the first year of the scheduled phase-in (e.g., in the previous example, 10 percent introduced one year before the scheduled phase-in begins would be calculated as (10*4 years) and added to the cumulative total). However, manufacturers are only allowed to include engines introduced up to one model year before the first year of the scheduled phase-in. The Executive Officer shall consider acceptable any alternate phase-in that results in an equal or larger cumulative total by the end of the last year of the scheduled phase-in and ensures that all engines subject to the phase-in will comply with the respective requirements no later than two model years following the last year of the scheduled phase-in.

For alternate phase-in schedules resulting in all engines complying one model year following the last year of the scheduled phase-in, the compliance volume shall be calculated as described directly above. For example, a 20/50/100 percent scheduled phase-in during the 2016-2018 model years would have a cumulative total of 260. If the manufacturer's planned alternate phase-in schedule is 40/50/80/100 percent during the 2016-2019 model years, the final compliance volume calculation would be (40*3 years) + (50*2 years) + (80*1 year) = 300, which is greater than 260 and therefore would be acceptable as an alternate phase-in schedule.

For alternate phase-in schedules resulting in all engines complying two model years following the last year of the scheduled phase-in, the compliance volume calculation shall be calculated as described directly above and shall also include a negative calculation for engines not complying until one or two model years following the last year of the scheduled phase-in. The negative calculation shall be calculated by multiplying the percent of engines not meeting the new requirements in the final year of the phase-in by negative one and the percent of engines not meeting the new requirements in the one year after the final year of the phase-in by negative two. For example, if 10 percent of a manufacturer's engines did not comply by the final year of the scheduled phase-in and 5 percent

did not comply by the end of the first year after the final year of the scheduled phase-in, the negative calculation result would be (10*(-1 years)) + (5*(-2 years)) = -20. The final compliance volume calculation is the sum of the original compliance volume calculation and the negative calculation. For example, a 20/50/100 percent scheduled phase-in during the 2016-2018 model years would have a cumulative total of 260. If a manufacturer's planned alternate phase-in schedule is 40/70/80/90/100 percent during the 2016-2020 model years, the final compliance volume calculation would be (40*3 years) + (70*2 years) + (80*1 year) + (20*(-1 year)) + (10*(-2 years)) = 300, which is greater than 260 and therefore would be acceptable as an alternate phase-in schedule.

"Applicable standards" refers to the specific exhaust emission standards or family emission limits (FEL), including the Federal Test Procedure (FTP) and Supplemental Emission Test (SET) standards, to which the engine is certified.

"Auxiliary Emission Control Device (AECD)" refers to any approved AECD (as defined by 40 Code of Federal Regulations (CFR) 86.082-2 and 86.094-2).

"Emission Increasing Auxiliary Emission Control Device (EI-AECD)" refers to any approved AECD that: reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and use; and the need for the AECD is justified in terms of protecting the vehicle against damage or accident. An AECD that is certified as an NTE deficiency shall not be considered an EI-AECD. An AECD that does not sense, measure, or calculate any parameter or command or trigger any action, algorithm, or alternate strategy shall not be considered an EI-AECD. An AECD that is activated solely due to any of the following conditions shall not be considered an EI-AECD: (1) operation of the vehicle above 8000 feet in elevation; (2) ambient temperature; (3) when the engine is warming up and is not reactivated once the engine has warmed up in the same driving cycle; (4) failure detection (storage of a fault code) by the OBD system; (5) execution of an OBD monitor; or (6) execution of an infrequent regeneration event.

"Base fuel schedule" refers to the fuel calibration schedule programmed into the Powertrain Control Module or programmable read-only memory (PROM) when manufactured or when updated by some off-board source, prior to any learned on-board correction.

"Calculated load value" refers to the percent of engine capacity being used and is defined in Society of Automotive Engineers (SAE) J1979 "E/E Diagnostic Test Modes," February 2012 (SAE J1979), incorporated by reference (section (h)(1.4)). For diesel applications, the calculated load value is determined by the ratio of current engine output torque to maximum engine output torque at current engine speed as defined by parameter definition 5.2.1.7 of SAE J1939-71 "Vehicle Application Layer (Through May 2010)," March 2011.

"Confirmed fault code," for purposes of engines using International Standards Organization (ISO) 15765-4, is defined as the diagnostic trouble code stored when an OBD system has confirmed that a malfunction exists (e.g., typically on the second

driving cycle that the malfunction is detected) in accordance with the requirements of sections (d)(2), (f), (g), and (h)(4.4).

"Continuously," if used in the context of monitoring conditions for circuit continuity, lack of circuit continuity, circuit faults, and out-of-range values, means monitoring is always enabled, unless alternate enable conditions have been approved by the Executive Officer in accordance with section (d)(3.1.1), and sampling of the signal used for monitoring occurs at a rate no less than two samples per second. If a computer input component is sampled less frequently for control purposes, the signal of the component may instead be evaluated each time sampling occurs.

"Deactivate" means to turn-off, shutdown, desensitize, or otherwise make inoperable through software programming or other means during the actual life of the engine.

"Diagnostic or emission critical" electronic control unit refers to the engine control unit and any other on-board electronic powertrain control unit that:

(1) has primary control over any of the monitors required by sections (e)(1) through (f)(9), (g)(1) through (g)(2), and (g)(4), but does not include circuit or out-of-range fault monitors required by sections (e)(9.2.1)(A)(ii), (e)(9.2.1)(B)(ii), (e)(9.2.2)(B), (e)(9.2.4)(B), (f)(8.2.1)(B), (f)(8.2.2)(B), (f)(8.2.2)(D), (f)(8.2.3)(A), (f)(8.2.3)(B), and (g)(1.1.2); or

(2) except for anti-lock brake system (ABS) control units or stability/traction control units,:

(a) has primary control over any rationality fault diagnostic or functional check for more than four input components or more than two output components required to be monitored by section (g)(3); or

(b) for 2016 and subsequent model year engines, is field reprogrammable and has primary control over any rationality fault diagnostic or function check for any input or output component required to be monitored by section (g)(3).

For purposes of criteria (1) and (2) above, "primary control" over a monitor means the control unit does any of the following: (a) determines if any enable conditions are satisfied; (b) calculates all or part of the diagnostic decision statistic or metric by which pass or fail decisions are made (e.g., the comparison of a component's measured or calculated level of performance to a fault threshold); or (c) makes or processes pass or fail decisions (e.g., debounces diagnostic decision statistics or commands MIL illumination or fault code storage). Further, for purposes of criterion (2)(a) above, all glow plugs in an engine shall be considered "one" output component in lieu of each glow plug being considered a separate component. Additionally, for purposes of criterion (2)(b) above, "field reprogrammable" means a control unit that is capable of supporting a manufacturer service procedure intended to be executed in a dealership or other vehicle service environment that results in the downloading of new software and/or calibration data into the control unit.

"Diesel engine" refers to an engine using a compression ignition thermodynamic cycle.

"Driving cycle" is defined as a trip that meets any of the four conditions below:

(1) Begins with engine start and ends with engine shutoff;

(2) Begins with engine start and ends after four hours of continuous engine-on operation;

(3) Begins at the end of the previous four hours of continuous engine-on operation and ends after four hours of continuous engine-on operation; or

(4) Begins at the end of the previous four hours of continuous engine-on operation and ends with engine shutoff.

For monitors that run during engine-off conditions, the period of engine-off time following engine shutoff and up to the next engine start may be considered part of the driving cycle for conditions (1) and (4). For vehicles that employ engine shutoff strategies that do not require the vehicle operator to restart the engine to continue driving (e.g., hybrid bus with engine shutoff at idle), the manufacturer may request Executive Officer approval to use an alternate definition for driving cycle (e.g., key on and key off). Executive Officer approval of the alternate definition shall be based on equivalence to engine startup and engine shutoff signaling the beginning and ending of a single driving event for a conventional vehicle. Engine restarts following an engine shut-off that has been neither commanded by the vehicle operator nor by the engine control strategy but caused by an event such as an engine stall may be considered a new driving cycle or a continuation of the existing driving cycle. For engines that are not likely to be routinely operated for long continuous periods of time, a manufacturer may also request Executive Officer approval to use an alternate definition for driving cycle (e.g., solely based on engine start and engine shutoff without regard to four hours of continuous engine-on time). Executive Officer approval of the alternate definition shall be based on manufacturer-submitted data and/or information demonstrating the typical usage, operating habits, and/or driving patterns of these vehicles.

"Emission standard," as it applies to OBD compliance and the remedies provided for in the Health and Safety Code for noncompliance, relates to the emission characteristics of a motor vehicle and engine and means:

(1) a numerical limit on the amount of a given pollutant that a motor vehicle or motor vehicle engine may emit into the atmosphere; or
(2) a requirement that a motor vehicle or motor vehicle engine be equipped with a certain type of pollution-control device or some other design feature related to the control of emissions.

"Engine family" means a grouping of vehicles or engines in a manufacturer's product line determined in accordance with 40 CFR 86.098-24 (eff. 2013).

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"Engine rating" means a unique combination of displacement, rated power, calibration (fuel, emission, and engine control), AECDs, and other engine and emission control components within an engine family.

"OBD parent rating" means the specific engine rating selected according to section (d)(7.1.1) or (d)(7.2.2)(B) for compliance with section 1971.1.1.

"OBD child rating" means an engine rating (other than the OBD parent rating) within the engine family containing the OBD parent rating selected according to section (d)(7.1.1) or an engine rating within the OBD group(s) defined according to section (d)(7.2.1) and subject to section (d)(7.2.3).

"Evaporative emission standards" are a subset of emission standards that refer to the specific motor vehicle fuel evaporative emission standards and test procedures incorporated by reference in title 13, CCR section 1976 to which the engine is certified.

"Exhaust emission standards" or "tailpipe emission standards" are a subset of emission standards that collectively refer to the specific FTP standards and SET standards to which an engine is certified.

"Engine misfire" means lack of combustion in the cylinder due to absence of spark, poor fuel metering, poor compression, or any other cause. This does not include lack of combustion events in non-active cylinders due to default fuel shut-off or cylinder deactivation strategies.

"Engine start" is defined as the point when the engine reaches a speed 150 rpm below the normal, warmed-up idle speed (as determined in the drive position for vehicles equipped with an automatic transmission). For hybrid vehicles or for engines employing alternate engine start hardware or strategies (e.g., integrated starter and generators), the manufacturer may request Executive Officer approval to use an alternate definition for engine start (e.g., ignition key "on"). Executive Officer approval of the alternate definition shall be based on equivalence to an engine start for a conventional vehicle.

"Family Emission Limit (FEL)" refers to the exhaust emission levels to which an engine family is certified under the averaging, banking, and trading program incorporated by reference in title 13, CCR section 1956.8.

"Fault memory" means information pertaining to malfunctions stored in the onboard computer, including fault codes, stored engine conditions, and MIL status.

"Federal Test Procedure (FTP) test" refers to an exhaust emission test conducted according to the test procedures incorporated by reference in title 13, CCR section 1956.8(b) and (d) that is used to determine compliance with the FTP standard to which an engine is certified.

"FTP cycle". For engines certified on an engine dynamometer, FTP cycle refers to the engine dynamometer schedule in 40 CFR appendix 1 of part 86, section (f)(1), entitled, "EPA Engine Dynamometer Schedule for Heavy-Duty

Otto-Cycle Engines," or section (f)(2), entitled, "EPA Engine Dynamometer Schedule for Heavy-Duty Diesel Engines."

"FTP standard" refers to the certification exhaust emission standards and test procedures applicable to the FTP cycle incorporated by reference in title 13, CCR sections 1956.8(b) and (d) to which the engine is certified.

"Fuel trim" refers to feedback adjustments to the base fuel schedule. Short-term fuel trim refers to dynamic or instantaneous adjustments. Long-term fuel trim refers to much more gradual adjustments to the fuel calibration schedule than short-term trim adjustments.

"Fueled engine operation" is the state where any fuel is introduced into the engine for the purposes of combustion.

"Functional check" for an output component or system means verification of proper response of the component and system to a computer command.

"Gasoline engine" refers to an Otto-cycle engine.

"Heavy-duty engine" means an engine that is used to propel a heavy-duty vehicle.

"Heavy-duty vehicle" means any motor vehicle having a manufacturer's gross vehicle weight rating (GVWR) greater than 14,000 pounds.

"Hybrid vehicle" refers to a vehicle that has both of the following on-vehicle sources of stored energy and can draw propulsion energy from the source mentioned in 2): 1) a consumable fuel and 2) an energy storage device such as a battery, capacitor, pressure reservoir, or flywheel.

"Ignition Cycle" means a driving cycle that begins with engine start, meets the engine start definition for at least two seconds plus or minus one second, and ends with engine shutoff. For hybrid vehicles, "ignition cycle" means a driving cycle that begins when the propulsion system active definition is met for at least two seconds plus or minus one second, and ends when the propulsion system active definition is no longer met.

"Keep-alive memory (KAM)," for the purposes of this regulation, is defined as a type of memory that retains its contents as long as power is provided to the on-board control unit. KAM is not erased upon shutting off the engine but may be erased if power to the on-board control unit is interrupted (e.g., vehicle battery disconnected, fuse to control unit removed). In some cases, portions of KAM may be erased with a scan tool command to reset KAM.

"Key on, engine off position" refers to a vehicle with the ignition key in the engine run position (not engine crank or accessory position) but with the engine not running.

"Malfunction" means any deterioration or failure of a component or system that causes the performance to be outside of the applicable limits in sections (e) through (g).

"Manufacturer" for the purpose of this regulation means the holder of the Executive Order for the engine family.

"MIL-on fault code," for purposes of engines using SAE J1939, refers to the diagnostic trouble code stored when an OBD system has confirmed that a malfunction exists (e.g., typically on the second driving cycle that the malfunction is detected) and has commanded the MIL on in accordance with the requirements of sections (d)(2), (e), (g), and (h)(4.4).

"Non-volatile random access memory (NVRAM)," for the purposes of this regulation, is defined as a type of memory that retains its contents even when power to the on-board control unit is interrupted (e.g., vehicle battery disconnected, fuse to control unit removed). NVRAM is typically made non-volatile either by use of a back-up battery within the control unit or through the use of an electrically erasable and programmable read-only memory (EEPROM) chip.

"Not-To-Exceed (NTE) control area" refers to the bounded region of the engine's torque and speed map, as defined in 40 CFR 86.1370-2007, where emissions must not exceed a specific emission cap for a given pollutant under the NTE requirement.

"Manufacturer-specific NOx NTE carve-out area" refers to regions within the NTE control area for NOx where the manufacturer has limited NTE testing as allowed by 40 CFR 86.1370-2007(b)(7).

"Manufacturer-specific PM NTE carve-out area" refers to regions within the NTE control area for PM where the manufacturer has limited NTE testing as allowed by 40 CFR 86.1370-2007(b)(7).

"NTE deficiency" refers to regions or conditions within the NTE control area for NOx or PM where the manufacturer has received a deficiency as allowed by 40 CFR 86.007-11(a)(4)(iv).

"OBD group" refers to a combination of engines, engine families, or engine ratings that use the same OBD strategies and similar calibrations. A manufacturer is required to submit a grouping plan for Executive Officer review and approval detailing the OBD groups and the engine families and engine ratings within each group for a model year.

"Pending fault code" is defined as the diagnostic trouble code stored upon the initial detection of a malfunction (e.g., typically on a single driving cycle) prior to illumination of the MIL in accordance with the requirements of sections (d)(2), (e) through (g), and (h)(4.4).

"Permanent fault code" is defined as a confirmed or MIL-on fault code that is stored in NVRAM as specified in sections (d)(2) and (h)(4.4).

"Percentage of misfire" as used in sections (e)(2) and (f)(2) means the percentage of misfires out of the total number of firing events for the specified interval.

"Power Take-Off (PTO) unit" refers to an engine driven output provision for the purposes of powering auxiliary equipment (e.g., a dump-truck bed, aerial bucket, or tow-truck winch).

"Previously MIL-on fault code," for purposes of engines using SAE J1939, is defined as the diagnostic trouble code stored when an OBD system has confirmed that a malfunction no longer exists (e.g., after the third consecutive driving cycle in which the corresponding monitor runs and the malfunction is not detected), extinguishes the MIL, and erases the corresponding MIL-on fault code in accordance with the requirements of sections (d)(2), (e), (g), and (h)(4.4).

"Propulsion system active" is the state where the powertrain (e.g., engine, electric machine) is enabled by the driver (e.g., after ignition on for conventional vehicles, after power button pushed for some hybrid vehicles) such that the vehicle is ready to be used (e.g., vehicle is ready to be driven, ready to be shifted from "park" to "drive"). For purposes of this definition, "the state where the powertrain is enabled" does not include activations that are not driver-initiated (e.g., conditions where portions of the vehicle system wake up to perform OBD monitoring).

"Rationality fault diagnostic" for an input component means verification of the accuracy of the input signal while in the range of normal operation and when compared to all other available information.

"Redline engine speed" shall be defined by the manufacturer as either the recommended maximum engine speed as normally displayed on instrument panel tachometers or the engine speed at which fuel shutoff occurs.

"Response rate" for exhaust gas sensors refers to the delay from when the sensor is exposed to a different make-up of exhaust gas constituents until it outputs a signal reflecting the different make-up of exhaust gas constituents. For example, for oxygen sensors, response rate is the delay from when the oxygen sensor is exposed to a change in exhaust gas from richer/leaner than stoichiometric to leaner/richer than stoichiometric to the time when the oxygen sensor indicates the lean/rich condition. Similarly, for wide-range air-fuel (A/F) sensors, response rate is the delay from when the sensor is exposed to a different A/F ratio to the time it indicates the different A/F ratio. For NOx and PM sensors, response rate is the delay from when the sensor is exposed to a different NOx or PM exhaust gas level until it indicates the different NOx or PM exhaust gas level.

"Secondary air" refers to air introduced into the exhaust system by means of a pump or aspirator valve or other means that is intended to aid in the oxidation of HC and CO contained in the exhaust gas stream.

"Similar conditions" as used in sections (e)(1), (e)(2), (f)(1), and (f)(2) means engine conditions having an engine speed within 375 rpm, load conditions within 20 percent, and the same warm-up status (i.e., cold or hot) as the engine conditions stored pursuant to (e)(1.4.2)(E), (e)(2.4.2)(C), (f)(1.4.5), and (f)(2.4.4). The Executive Officer may approve other definitions of similar conditions based on comparable timeliness and reliability in detecting similar engine operation.

"Small volume manufacturer" is defined in title 13, CCR section 1900(b), with the exception that California sales of less than 1200 heavy-duty engines will be used in lieu of 4500 heavy-duty engines.

"Start of production" is the time when the manufacturer has produced two percent of the projected volume for the engine or vehicle, whichever is specified in sections (k) and (l).

"Supplemental Emission Test (SET) cycle" refers to the driving schedule defined as the "supplemental steady state emission test" in 40 CFR 86.1360-2007.

"SET standard" refers to the certification exhaust emission standards and test procedures applicable to the SET cycle incorporated by reference in title 13, CCR sections 1956.8(b) and (d) to which the engine is certified.

"Warm-up cycle" means a driving cycle with sufficient vehicle operation such that the coolant temperature has risen by at least 40 degrees Fahrenheit from engine start and reaches a minimum temperature of at least 160 degrees Fahrenheit (140 degrees Fahrenheit for applications with diesel engines). Alternatively, manufacturers may define warm-up cycle as a driving cycle with vehicle operation in which the following criteria are met: for vehicles using the ISO 15765-4 protocol, the manufacturers may use the criteria specified in sections (d)(2.3.1)(C)(ii)b.3.i., ii., and iii. herein, and for vehicles using the SAE J1939 protocol, the manufacturer may use the criteria specified in sections (d)(2.3.2)(D)(ii)b.3.i., ii., and iii. herein.

"Weighted sales number" means a manufacturer's projected sales number for engines to be used in California heavy-duty vehicles multiplied by a weight class factor. Sales numbers for diesel engines for heavy-duty vehicles less than 19,499 pounds GVWR shall be multiplied by 1.0. Sales numbers for diesel engines for heavy-duty vehicles from 19,500 to 33,000 pounds shall be multiplied by 1.68. Sales numbers for diesel engines for heavy-duty vehicles greater than 33,000 pounds and urban buses shall be multiplied by 3.95. Sales numbers for all gasoline engines for heavy-duty vehicles shall be multiplied by 1.0.

(d) *General Requirements.*

Section (d) sets forth the general requirements of the OBD system. Specific performance requirements for components and systems that shall be monitored are set forth in sections (e) through (g) below. The OBD system is required to detect all malfunctions specified in sections (e) through (g). However, except as specified elsewhere, the OBD system is not required to use a unique monitor to detect each malfunction specified.

(1) The OBD System.

(1.1) If a malfunction is present as specified in sections (e) through (g), the OBD system shall detect the malfunction, store a pending, confirmed, MIL-on, or previously MIL-on fault code in the onboard computer's memory, and illuminate the MIL as required.

(1.2) The OBD system shall be equipped with a standardized data link connector to provide access to the stored fault codes as specified in section (h).

(1.3) The OBD system shall be designed to operate, without any required scheduled maintenance, for the actual life of the engine in which it is installed and may not be programmed or otherwise designed to deactivate based on age and/or mileage of the vehicle during the actual life of the engine. This section is not intended to alter existing law and enforcement practice regarding a manufacturer's liability for an engine beyond its useful life, except where an engine has been programmed or otherwise designed so that an OBD system deactivates based on age and/or mileage of the engine.

(1.4) Computer-coded engine operating parameters may not be changeable without the use of specialized tools and procedures (e.g. soldered or potted computer components or sealed (or soldered) computer enclosures). Subject to Executive Officer approval, manufacturers may exempt from this requirement those product lines that are unlikely to require protection. Criteria to be evaluated in making an exemption include current availability of performance chips, performance capability of the engine, and sales volume.

(2) MIL and Fault Code Requirements.

(2.1) MIL Specifications.

(2.1.1) The MIL shall be located on the driver's side instrument panel and be of sufficient illumination and location to be readily visible under all lighting conditions and shall be amber in color when illuminated. The MIL, when illuminated, shall display the International Standards Organization (ISO) engine symbol. There shall be only one MIL used to indicate all faults detected by the OBD system on a single vehicle.

(2.1.2) The MIL shall illuminate in the key on, engine off position before engine cranking to indicate that the MIL is functional. The MIL shall continuously illuminate during this functional check for a minimum of 15 seconds. During this functional check of the MIL, the data stream value for MIL status shall indicate commanded off (see section (h)(4.2)) unless the MIL has also been commanded on for a detected malfunction. This functional check of the MIL is not required during vehicle operation in the key on, engine off position subsequent to the initial engine cranking of an ignition cycle (e.g., due to an engine stall or other non-commanded engine shutoff).

(2.1.3) At the manufacturer's option, the MIL may be used to indicate readiness status in a standardized format (see section (h)(4.1.6)) in the key on, engine off position.

(2.1.4) A manufacturer may request Executive Officer approval to also use the MIL to indicate which, if any, fault codes are currently stored (e.g., to "blink" the stored codes). The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated that the method used

to indicate the fault codes will not be unintentionally activated during a California inspection test or during routine driver operation.

(2.1.5) The MIL may not be used for any purpose other than specified in this regulation.

(2.2). MIL Illumination and Fault Code Storage Protocol.

(2.2.1) For vehicles using the ISO 15765-4 protocol for the standardized functions required in section (h):

(A) Upon detection of a malfunction, the OBD system shall store a pending fault code within 10 seconds indicating the likely area of the malfunction.

(B) After storage of a pending fault code, if the identified malfunction is again detected before the end of the next driving cycle in which monitoring occurs, the OBD system shall illuminate the MIL continuously, keep the pending fault code stored, and store a confirmed fault code within 10 seconds. If a malfunction is not detected before the end of the next driving cycle in which monitoring occurs (i.e., there is no indication of the malfunction at any time during the driving cycle), the corresponding pending fault code set according to section (d)(2.2.1)(A) shall be erased at the end of the driving cycle.

(C) A manufacturer may request Executive Officer approval to employ alternate statistical MIL illumination and fault code storage protocols to those specified in these requirements. The Executive Officer shall grant approval upon determining that the manufacturer has provided data and/or engineering evaluation that demonstrate that the alternative protocols can evaluate system performance and detect malfunctions in a manner that is equally effective and timely. Strategies requiring on average more than six driving cycles for MIL illumination may not be accepted.

(D) Storage and erasure of freeze frame conditions.

(i) The OBD system shall store and erase "freeze frame" conditions (as defined in section (h)(4.3)) present at the time a malfunction is detected.

(ii) For 2010 through 2015 model year engines, the OBD system shall store and erase freeze frame conditions in conjunction with the storage and erasure of either pending or confirmed fault codes as required elsewhere in section (d)(2.2).

(iii) For 2016 and subsequent model year engines, except as provided for in section (d)(2.2.1)(D)(iv), the OBD system shall store freeze frame conditions in conjunction with the storage of a pending fault code.

a. If the pending fault code is erased in the next driving cycle in which monitoring occurs and a malfunction is not detected (as described in section (d)(2.2.1)(B)), the OBD system may erase the corresponding freeze frame conditions.

b. If the pending fault code matures to a confirmed fault code (as described in section (d)(2.2.1)(B)), the OBD system shall either retain the currently stored freeze frame conditions or replace the stored freeze frame conditions with freeze frame conditions regarding the confirmed fault code. The OBD system shall erase the freeze frame information in conjunction with the erasure of the confirmed fault code (as described under section (d)(2.3.1)(B)).

(iv) For alternate strategies that do not store pending fault codes (i.e., monitors using alternate statistical strategies described in section (d)(2.2.1)(C) such as monitors that store a confirmed fault code and illuminate the MIL upon the first detection of a malfunction), the OBD system shall store and erase freeze frame conditions in conjunction with the storage and erasure of the confirmed fault code.

(E) The OBD system shall illuminate the MIL and store a confirmed fault code within 10 seconds to inform the vehicle operator whenever the engine enters a default or "limp home" mode of operation that can affect emissions or the performance of the OBD system or in the event of a malfunction of an on-board computer(s) itself that can affect the performance of the OBD system. If the default or "limp home" mode of operation is recoverable (i.e., the diagnostic or control strategy that caused the default or "limp home" mode of operation can run on the next driving cycle and confirm the presence of the condition that caused the default or "limp home" operation), the OBD system may, in lieu of illuminating the MIL within 10 seconds on the first driving cycle where the default or "limp home" mode of operation is entered, delay illumination of the MIL until the condition causing the default or "limp home" mode of operation is again detected before the end of the next driving cycle.

(F) Before the end of an ignition cycle, the OBD system shall store confirmed fault codes that are currently causing the MIL to be illuminated in NVRAM as permanent fault codes (as defined in section (h)(4.4.1)(F)).

(2.2.2) For vehicles using the SAE J1939 protocol for the standardized functions required in section (h):

(A) Upon detection of a malfunction, the OBD system shall store a pending fault code within 10 seconds indicating the likely area of the malfunction.

(B) After storage of a pending fault code, if the identified malfunction is again detected before the end of the next driving cycle in which monitoring occurs, the OBD system shall illuminate the MIL continuously, erase the pending fault code, and store a MIL-on fault code within 10 seconds. If a malfunction is not detected before the end of the next driving cycle in which monitoring occurs (i.e., there is no indication of the malfunction at any time during the driving cycle), the corresponding pending fault code set according to section (d)(2.2.2)(A) shall be erased at the end of the driving cycle.

(C) A manufacturer may request Executive Officer approval to employ alternate statistical MIL illumination and fault code storage protocols to those specified in these requirements. The Executive Officer shall grant approval upon determining that the manufacturer has provided data and/or engineering evaluation that demonstrate that the alternative protocols can evaluate system performance and detect malfunctions in a manner that is equally effective and timely. Strategies requiring on average more than six driving cycles for MIL illumination may not be accepted.

(D) Storage and erasure of freeze frame conditions.

(i) The OBD system shall store and erase "freeze frame" conditions (as defined in section (h)(4.3)) present at the time a malfunction is detected.

(ii) The OBD system shall store freeze frame conditions in conjunction with the storage of a pending fault code.

(iii) If the pending fault code is erased in the next driving cycle in which monitoring occurs and a malfunction is not detected (as described under section (d)(2.2.2)(B)), the OBD system may erase the corresponding freeze frame conditions.

(iv) If the pending fault code matures to a MIL-on fault code (as described under section (d)(2.2.2)(B)), the OBD system shall either retain the currently stored freeze frame conditions or replace the stored freeze frame conditions with freeze frame conditions regarding the MIL-on fault code. The OBD system shall erase the freeze frame information in conjunction with the erasure of the previously MIL-on fault code (as described under section (d)(2.3.2)(C)).

(v) For alternate strategies that do not store pending fault codes (i.e., monitors using alternate statistical strategies described in section (d)(2.2.1)(C) such as monitors that store a MIL-on fault code and illuminate the MIL upon the first detection of a malfunction), the OBD system shall store and erase freeze frame conditions in conjunction with the storage and erasure of the MIL-on fault code.

(E) The OBD system shall illuminate the MIL and store a MIL-on fault code within 10 seconds to inform the vehicle operator whenever the engine enters a default or "limp home" mode of operation that can affect emissions or the performance of the OBD system or in the event of a malfunction of an on-board computer(s) itself that can affect the performance of the OBD system. If the default or "limp home" mode of operation is recoverable (i.e., the diagnostic or control strategy that caused the default or "limp home" mode of operation can run on the next driving cycle and confirm the presence of the condition that caused the default or "limp home" operation), the OBD system may, in lieu of illuminating the MIL within 10 seconds on the first driving cycle where the default or "limp home" mode of operation is entered, delay illumination of the MIL until the condition causing the default

or "limp home" mode of operation is again detected before the end of the next driving cycle.

(F) Before the end of an ignition cycle, the OBD system shall store MIL-on fault codes that are currently causing the MIL to be illuminated in NVRAM as permanent fault codes (as defined in section (h)(4.4.2)(F)).

(2.3) MIL Extinguishing and Fault Code Erasure Protocol.

(2.3.1) For vehicles using the ISO 15765-4 protocol for the standardized functions required in section (h):

(A) Extinguishing the MIL. Except as otherwise provided in sections (e)(1.4.2)(F), (e)(2.4.2)(D), (e)(6.4.2), (f)(1.4.6), (f)(2.4.5), and (f)(7.4.2) (for diesel fuel system, diesel misfire, diesel empty reductant tank, gasoline fuel system, gasoline misfire, and gasoline evaporative system malfunctions), once the MIL has been illuminated, it shall be extinguished after at least three subsequent sequential driving cycles during which the monitoring system responsible for illuminating the MIL functions and the previously detected malfunction is no longer present provided no other malfunction has been detected that would independently illuminate the MIL according to the requirements outlined above.

(B) Erasing a confirmed fault code. For 2010 through 2015 model year engines, the OBD system may erase a confirmed fault code if the identified malfunction has not been again detected in at least 40 warm-up cycles and the MIL is presently not illuminated for that malfunction. For 2016 and subsequent model year engines, the OBD system shall erase a confirmed fault code if the identified malfunction has not been again detected in 40 warm-up cycles and the MIL is presently not illuminated for that malfunction.

(C) Erasing a permanent fault code.

(i) If the OBD system is commanding the MIL on, the OBD system shall erase a permanent fault code only if the OBD system itself determines that the malfunction that caused the permanent fault code to be stored is no longer present and is not commanding the MIL on, pursuant to the requirements of section (d)(2.3.1)(A) (which for the purposes of this section shall apply to all monitors). Erasure of the permanent fault code shall occur in conjunction with extinguishing the MIL or no later than the start of the first drive cycle that begins with the MIL commanded off.

(ii) If all fault information in the on-board computer other than the permanent fault code has been cleared (i.e., through the use of a scan tool or battery disconnect) and the OBD system is not commanding the MIL on:

a. Except as provided for in section (d)(2.3.1)(C)(ii)c., if the monitor of the malfunction that caused the permanent fault code to be stored is

subject to the minimum ratio requirements of section (d)(3.2) (e.g., catalyst monitor, comprehensive component input component rationality monitors), the OBD system shall erase the permanent fault code at the end of a driving cycle if the monitor has run and made one or more determinations during a driving cycle that the malfunction of the component or the system is not present and has not made any determinations within the same driving cycle that the malfunction is present.

b. If the monitor of the malfunction that caused the permanent fault code to be stored is not subject to the minimum ratio requirements of section (d)(3.2) (e.g., gasoline misfire monitor, gasoline fuel system monitor, comprehensive component circuit continuity monitors), the OBD system shall erase the permanent fault code at the end of a driving cycle if:

1. The monitor has run and made one or more determinations during a driving cycle that the malfunction of the component or the system is not present and has not made any determinations within the same driving cycle that the malfunction is present;

2. The monitor has not made any determinations that the malfunction is present subsequent to the most recent driving cycle in which the criteria of section (d)(2.3.1)(C)(ii)b.1. are met; and

3. The following criteria are satisfied on any single driving cycle (which may be a different driving cycle than that in which the criteria of section (d)(2.3.1)(C)(ii)b.1. are satisfied):

i. Except as provided in section (d)(2.3.1)(C)(ii)b.3.v. below, cumulative time since engine start is greater than or equal to 600 seconds;

ii. Cumulative gasoline engine operation at or above 25 miles per hour or diesel engine operation at or above 1150 rpm, either of which occurs for greater than or equal to 300 seconds;

iii. Continuous vehicle operation at idle (i.e., accelerator pedal released by driver and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle (as determined in the drive position for vehicles equipped with an automatic transmission)) for greater than or equal to 30 seconds; and

iv. The monitor has not made any determinations that the malfunction is present.

v. For hybrid vehicles, manufacturers shall use "cumulative propulsion system active time" in lieu of "cumulative time

since engine start" for the criterion in section (d)(2.3.1)(C)(ii)b.3.i.

4. Monitors required to use "similar conditions" as defined in section (c) to store and erase pending and confirmed fault codes may not require that the similar conditions be met prior to erasure of the permanent fault code.

c. For monitors subject to section (d)(2.3.1)(C)(ii)a., the manufacturer may choose to erase the permanent fault code using the criteria under section (d)(2.3.1)(C)(ii)b. in lieu of the criteria under section (d)(2.3.1)(C)(ii)a.

d. For 2010 through 2012 model year engines, manufacturers may request Executive Officer approval to use alternate criteria to erase the permanent fault code. The Executive Officer shall approve alternate criteria that will not likely require driving conditions that are longer and more difficult to meet than those required under section (d)(2.3.1)(C)(ii)b.

(2.3.2) For vehicles using the SAE J1939 protocol for the standardized functions required in section (h):

(A) Extinguishing the MIL. Except as otherwise provided in sections (e)(1.4.2)(F), (e)(2.4.2)(D) and (e)(6.4.2) for fuel system malfunctions, misfire malfunctions, and empty reductant tanks, once the MIL has been illuminated, it shall be extinguished after at least three subsequent sequential driving cycles during which the monitoring system responsible for illuminating the MIL functions and the previously detected malfunction is no longer present provided no other malfunction has been detected that would independently illuminate the MIL according to the requirements outlined above.

(B) Erasing a MIL-on fault code. The OBD system may erase a MIL-on fault code in conjunction with extinguishing the MIL as described under section (d)(2.3.2)(A). In addition to the erasure of the MIL-on fault code, the OBD system shall store a previously MIL-on fault code for that failure.

(C) Erasing a previously MIL-on fault code. For 2010 through 2015 model year engines, the OBD system may erase a previously MIL-on fault code if the identified malfunction has not been again detected in at least 40 warm-up cycles and the MIL is presently not illuminated for that malfunction. For 2016 and subsequent model year engines, the OBD system shall erase a previously MIL-on fault code if the identified malfunction has not been again detected in 40 warm-up cycles and the MIL is presently not illuminated for that malfunction.

(D) Erasing a permanent fault code. The OBD system shall erase a permanent fault code under the following conditions:

(i) If the OBD system is commanding the MIL on, the OBD system shall erase a permanent fault code only if the OBD system itself determines that the malfunction that caused the permanent fault code to be stored is no longer present and is not commanding the MIL on, pursuant to the requirements of section (d)(2.3.2)(A) (which for the purposes of this section shall apply to all monitors). Erasure of the permanent fault code shall occur in conjunction with extinguishing the MIL or no later than the start of the first drive cycle that begins with the MIL commanded off.

(ii) If all fault information in the on-board computer has been cleared (i.e., through the use of a scan tool or battery disconnect) and the OBD system is not commanding the MIL on:

a. Except as provided for in section (d)(2.3.2)(D)(ii)c., if the monitor of the malfunction that caused the permanent fault code to be stored is subject to the minimum ratio requirements of section (d)(3.2) (e.g., catalyst monitor, comprehensive component input component rationality monitors), the OBD system shall erase the permanent fault code at the end of a driving cycle if the monitor has run and made one or more determinations during a driving cycle that the malfunction of the component or the system is not present and has not made any determinations within the same driving cycle that the malfunction is present.

b. If the monitor of the malfunction that caused the permanent fault code to be stored is not subject to the minimum ratio requirements of section (d)(3.2) (e.g., continuous diesel fuel system monitors, comprehensive component circuit continuity monitors), the OBD system shall erase the permanent fault code at the end of a driving cycle if:

1. The monitor has run and made one or more determinations during a driving cycle that the malfunction of the component or the system is not present and has not made any determinations within the same driving cycle that the malfunction is present;

2. The monitor has not made any determinations that the malfunction is present subsequent to the most recent driving cycle in which the criteria of section (d)(2.3.2)(D)(ii)b.1. are met; and

3. The following criteria are satisfied on any single driving cycle (which may be a different driving cycle than that in which the criteria of section (d)(2.3.2)(D)(ii)b.1. are satisfied):

i. Except as provided in section (d)(2.3.2)(D)(ii)b.3.v. below, cumulative time since engine start is greater than or equal to 600 seconds;

ii. Cumulative gasoline engine operation at or above 25 miles per hour or diesel engine operation at or above 1150 rpm, either of which occurs for greater than or equal to 300 seconds;

iii. Continuous vehicle operation at idle (i.e., accelerator pedal released by driver and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle (as determined in the drive position for vehicles equipped with an automatic transmission)) for greater than or equal to 30 seconds; and

iv. The monitor has not made any determinations that the malfunction is present.

v. For hybrid vehicles, manufacturers shall use "cumulative propulsion system active time" in lieu of "cumulative time since engine start" for the criterion in section (d)(2.3.2)(D)(ii)b.3.i.

4. Monitors required to use "similar conditions" as defined in section (c) to store and erase pending and confirmed/MIL-on fault codes may not require that the similar conditions be met prior to erasure of the permanent fault code.

c. For monitors subject to section (d)(2.3.2)(D)(ii)a., the manufacturer may choose to erase the permanent fault code using the criteria under section (d)(2.3.2)(D)(ii)b. in lieu of the criteria under section (d)(2.3.2)(D)(ii)a.

d. For 2010 through 2012 model year engines, manufacturers may request Executive Officer approval to use alternate criteria to erase the permanent fault code. The Executive Officer shall approve alternate criteria that will not likely require driving conditions that are longer and more difficult to meet than those required under section (d)(2.3.2)(D)(ii)b.

(2.4) Exceptions to MIL and Fault Code Requirements.

(2.4.1) If the engine enters a default mode of operation, a manufacturer may request Executive Officer approval to be exempt from illuminating the MIL. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or engineering evaluation that verify either of the following:

(A) The default strategy (1) causes an overt indication (e.g., illumination of a red engine shut-down warning light) such that the driver is certain to respond and have the problem corrected, (2) is not caused by a component required to be monitored by the OBD system under sections (e) through (g), and (3) is not invoked to protect a component required to be monitored by the OBD system under sections (e) through (g); or

(B) The default strategy is an AECD that is properly activated due to the occurrence of conditions that have been approved by the Executive Officer.

(2.4.2) For gasoline engines, a manufacturer may elect to meet the MIL and fault code requirements in title 13, CCR section 1968.2.1(d)(2) in lieu of meeting the requirements of (d)(2).

(3) Monitoring Conditions.

Section (d)(3) sets forth the general monitoring requirements while sections (e) through (g) sets forth the specific monitoring requirements as well as identifies which of the following general monitoring requirements in section (d)(3) are applicable for each monitored component or system identified in sections (e) through (g).

(3.1) For all engines:

(3.1.1) As specifically provided for in sections (e) through (g), manufacturers shall define monitoring conditions, subject to Executive Officer approval, for detecting malfunctions identified in sections (e) through (g). The Executive Officer shall approve manufacturer-defined monitoring conditions that are determined (based on manufacturer-submitted data and/or other engineering documentation) to be: technically necessary to ensure robust detection of malfunctions (e.g., avoid false passes and false indications of malfunctions); designed to ensure monitoring will occur under conditions that may reasonably be expected to be encountered in normal vehicle operation and use; and designed to ensure monitoring will occur during the FTP cycle.

(3.1.2) Monitoring shall occur at least once per driving cycle in which the monitoring conditions are met.

(3.1.3) Manufacturers may request Executive Officer approval to define monitoring conditions that are not encountered during the FTP cycle as required in section (d)(3.1.1). In evaluating the manufacturer's request, the Executive Officer shall consider the degree to which the requirement to run during the FTP cycle restricts in-use monitoring, the technical necessity for defining monitoring conditions that are not encountered during the FTP cycle, data and/or an engineering evaluation submitted by the manufacturer which demonstrate that the component/system does not normally function, or monitoring is otherwise not feasible, during the FTP cycle, and, where applicable in section (d)(3.2), the ability of the manufacturer to demonstrate the monitoring conditions will satisfy the minimum acceptable in-use monitor performance ratio requirement as defined in section (d)(3.2) (e.g., data which show in-use driving meets the minimum requirements).

(3.2) As specifically provided for in sections (e) through (g), manufacturers shall define monitoring conditions in accordance with the criteria in sections (d)(3.2.1) through (3.2.3).

(3.2.1) Manufacturers shall implement software algorithms in the OBD system to individually track and report in-use performance of the following monitors in the standardized format specified in section (d)(5):

(A) NMHC converting catalyst (section (e)(5.3.1))

(B) NOx converting catalyst (section (e)(6.3.1))

(C) Catalyst (section (f)(6.3));

(D) Exhaust gas sensor (sections (e)(9.3.1)(A) or (f)(8.3.1)(A));

(E) Evaporative system (section (f)(7.3.2));

(F) EGR system (sections (e)(3.3.2) and (3.3.3) or (f)(3.3.1)) and VVT system (sections (e)(10.3) or (f)(9.3));

(G) Secondary air system (section (f)(5.3.1));

(H) PM filter (section (e)(8.3));

(I) Boost pressure control system (sections (e)(4.3.2) and (e)(4.3.3));

(J) NOx adsorber (section (e)(7.3.1));

(K) Fuel system (section (e)(1.3.3)); and

(L) Secondary oxygen sensor (section (f)(8.3.2)(A)).

The OBD system is not required to track and report in-use performance for monitors other than those specifically identified above.

(3.2.2) For all 2013 and subsequent model year engines, manufacturers shall define monitoring conditions that, in addition to meeting the criteria in sections (d)(3.1) and (d)(3.2.1), ensure that the monitor yields an in-use performance ratio (as defined in section (d)(4)) that meets or exceeds the minimum acceptable in-use monitor performance ratio for in-use vehicles. For purposes of this regulation, the minimum acceptable in-use monitor performance ratio is 0.100 for all monitors specifically required in sections (e) through (g) to meet the monitoring condition requirements of section (d)(3.2).

(3.2.3) Manufacturers may not use the calculated ratio (or any element thereof) or any other indication of monitor frequency as a monitoring condition for a monitor (e.g., using a low ratio to enable more frequent monitoring through diagnostic executive priority or modification of other monitoring conditions, or using a high ratio to enable less frequent monitoring).

(3.2.4) Upon request of a manufacturer or upon the best engineering judgment of ARB, the Executive Officer may revise the minimum acceptable in-use monitoring performance ratio specified in section (d)(3.2.2) for a specific monitor if the most reliable monitoring method developed requires a lower ratio.

(4) In-Use Monitor Performance Ratio Definition.

(4.1) For monitors required to meet the requirements in section (d)(3.2), the ratio shall be calculated in accordance with the following specifications for the numerator, denominator, and ratio.

(4.2) Numerator Specifications

(4.2.1) Definition: The numerator is defined as a measure of the number of times a vehicle has been operated such that all monitoring conditions necessary for a specific monitor to detect a malfunction have been encountered.

(4.2.2) Specifications for incrementing:

(A) Except as provided for in section (d)(4.2.2)(E), the numerator, when incremented, shall be incremented by an integer of one. The numerator may not be incremented more than once per driving cycle.

(B) The numerator for a specific monitor shall be incremented within 10 seconds if and only if the following criteria are satisfied on a single driving cycle:

(i) Every monitoring condition necessary for the monitor of the specific component to detect a malfunction and store a pending fault code has been satisfied, including enable criteria, presence or absence of related fault codes, sufficient length of monitoring time, and diagnostic executive priority assignments (e.g., diagnostic "A" must execute prior to diagnostic "B"). For the purpose of incrementing the numerator, satisfying all the monitoring conditions necessary for a monitor to determine the component is passing may not, by itself, be sufficient to meet this criteria.

(ii) For monitors that require multiple stages or events in a single driving cycle to detect a malfunction, every monitoring condition necessary for all events to have completed must be satisfied.

(iii) For monitors that require intrusive operation of components to detect a malfunction, a manufacturer shall request Executive Officer approval of the strategy used to determine that, had a malfunction been present, the monitor would have detected the malfunction. Executive Officer approval of the request shall be based on the equivalence of the strategy to actual intrusive operation and the ability of the strategy to accurately determine if every monitoring condition necessary for the intrusive event to occur was satisfied.

(iv) For the secondary air system monitor, the criteria in sections (d)(4.2.2)(B)(i) through (iii) above are satisfied during normal operation of the secondary air system. Monitoring during intrusive operation of the secondary air system later in the same driving cycle solely for the purpose of monitoring may not, by itself, be sufficient to meet this criteria.

(C) For monitors that can generate results in a "gray zone" or "non-detection zone" (i.e., results that indicate neither a passing system nor a malfunctioning system) or in a "non-decision zone" (e.g., monitors that increment and decrement counters until a pass or fail threshold is reached), the manufacturer shall submit a plan for appropriate incrementing of the numerator to the Executive Officer for review and approval. In general, the Executive Officer shall not approve plans that allow the numerator to be incremented when the monitor indicates a result in the "non-detection zone" or prior to the monitor reaching a decision. In reviewing the plan for approval, the Executive Officer shall consider data and/or engineering evaluation submitted by the manufacturer demonstrating the expected frequency of results in the "non-detection zone" and the ability of the monitor to accurately determine if a monitor would have detected a malfunction instead of a result in the "non-detection zone" had an actual malfunction been present.

(D) For monitors that run or complete during engine-off operation, the numerator shall be incremented within 10 seconds after the monitor has completed during engine-off operation or during the first 10 seconds of engine start on the subsequent driving cycle.

(E) Except as specified in section (d)(4.2.2)(F) for exponentially weighted moving averages, manufacturers utilizing alternate statistical MIL illumination protocols as allowed in sections (d)(2.2.1)(C) and (d)(2.2.2)(C) for any of the monitors requiring a numerator shall submit a plan for appropriate incrementing of the numerator to the Executive Officer for review and approval. Executive Officer approval of the plan shall be conditioned upon the manufacturer providing supporting data and/or engineering evaluation demonstrating the equivalence of the incrementing in the manufacturer's plan to the incrementing specified in section (d)(4.2.2) for monitors using the standard MIL illumination protocol and the overall equivalence of the manufacturer's plan in determining that the minimum acceptable in-use performance ratio in section (d)(3.2) is satisfied.

(F) Manufacturers using an exponentially weighted moving average (EWMA) as the alternate statistical MIL illumination protocol approved in accordance with sections (d)(2.2.1)(C) and (d)(2.2.2)(C) shall increment the numerator as follows:

(i) Following a reset or erasure of the EWMA result, the numerator may not be incremented until after the requisite number of decisions necessary for MIL illumination have been fully executed.

(ii) After the number of decisions required in section (d)(4.2.2)(F)(i) above, the numerator, when incremented, shall be incremented by an integer of one and may not be incremented more than once per driving cycle. Incrementing of the numerator shall also be in accordance with sections (d)(4.2.2)(B), (C), and (D).

(4.3) Denominator Specifications

(4.3.1) Definition: The denominator is defined as a measure of the number of times a vehicle has been operated as defined in (d)(4.3.2).

(4.3.2) Specifications for incrementing:

(A) The denominator, when incremented, shall be incremented by an integer of one. The denominator may not be incremented more than once per driving cycle.

(B) Except as provided for in sections (d)(4.3.2)(F), (I), and (J), the denominator for each monitor shall be incremented within 10 seconds if and only if the following criteria are satisfied on a single driving cycle:

(i) Cumulative time since engine start of driving cycle is greater than or equal to 600 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit;

(ii) Cumulative gasoline engine operation at or above 25 miles per hour or diesel engine operation at or above 1150 rpm, either of which occurs for greater than or equal to 300 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit; and

(iii) Continuous vehicle operation at idle (i.e., accelerator pedal released by driver and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle (as determined in the drive position for vehicles equipped with an automatic transmission)) for greater than or equal to 30 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit.

(iv) For 2010 through 2012 model year diesel engines, manufacturers may use diesel engine operation at or above 15% calculated load in lieu of 1150 rpm for the criterion in section (d)(4.3.2)(B)(ii) above.

(C) In addition to the requirements of section (d)(4.3.2)(B) above, for the evaporative system monitor, the comprehensive component input component temperature sensor rationality monitors (section (g)(3)) (e.g., intake air temperature sensor, ambient temperature sensor, fuel temperature sensor), and the engine cooling system input components (section (g)(1)), the denominator(s) shall be incremented if and only if:

(i) Cumulative time since engine start of driving cycle is greater than or equal to 600 seconds while at an ambient temperature of greater than or equal to 40 degrees Fahrenheit but less than or equal to 95 degrees Fahrenheit; and

(ii) Engine cold start occurs with engine coolant temperature at engine

start greater than or equal to 40 degrees Fahrenheit but less than or equal to 95 degrees Fahrenheit and less than or equal to 12 degrees Fahrenheit higher than ambient temperature at engine start.

(D) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator(s) for the following monitors shall be incremented if and only if the component or strategy is commanded "on" for a cumulative time greater than or equal to 10 seconds:

(i) Secondary Air System (section (f)(5))

(ii) Cold Start Emission Reduction Strategy (sections (e)(11) or (f)(4))

(iii) Components or systems that operate only at engine start-up (e.g., glow plugs, intake air heaters) and are subject to monitoring under "other emission control systems" (section (g)(4)) or comprehensive component output components (section (g)(3))

For purposes of determining this commanded "on" time, the OBD system may not include time during intrusive operation of any of the components or strategies later in the same driving cycle solely for the purposes of monitoring.

(E) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator(s) for the following component monitors (except those operated only at engine start-up and subject to the requirements of the previous section (d)(4.3.2)(D)) shall be incremented if and only if the component is commanded to function (e.g., commanded "on", "open", "closed", "locked") for a cumulative time greater than or equal to 10 seconds:

(i) Variable valve timing and/or control system (sections (e)(10) or (f)(9))

(ii) "Other emission control systems" (section (g)(4))

(iii) Comprehensive component output component (section (g)(3)) (e.g., turbocharger waste-gates, variable length manifold runners)

(iv) PM filter active/intrusive injection (section (e)(8.2.6))

(v) PM sensor heater (section (e)(9.2.4)(A))

As an alternative, in addition to the requirements of section (d)(4.3.2)(B), the manufacturer may use the criteria specified in title 13, CCR section 1968.2.1(d)(4.3.2)(F) in lieu of the criteria specified in section (d)(4.3.2)(E) above.

For the PM filter active/intrusive injection monitor, as an alternative for 2010 through 2015 model year engines, the manufacturer may use the criteria in section (d)(4.3.2)(H) in lieu of the criteria specified in section (d)(4.3.2)(E) above.

For the PM sensor heater monitor, as an alternative for 2010 through 2015 model year engines, the manufacturer may use the criteria specified in section (d)(4.3.2)(B) in lieu of the criteria specified in section (d)(4.3.2)(E) above.

(F) For the following component monitors, the manufacturer may request Executive Officer approval to use alternate or additional criteria to that set forth in section (d)(4.3.2)(B) above for incrementing the denominator. Executive Officer approval of the proposed criteria shall be based on the equivalence of the proposed criteria in measuring the frequency of monitor operation relative to the amount of vehicle operation in accordance with the criteria in section (d)(4.3.2)(B) above:

(i) "Other emission control systems" (section (g)(4))

(ii) Comprehensive component input components that require extended monitoring evaluation (section (g)(3)) (e.g., stuck fuel level sensor rationality)

(iii) PM filter frequent regeneration (section (e)(8.2.2))

(iv) PM sensor monitoring capability monitor (section (e)(9.2.2)(D))

(G) For the following monitors of components or other emission controls that experience infrequent regeneration events, the denominator(s) shall be incremented during a driving cycle in which the following two criteria are met: (1) the requirements of section (d)(4.3.2)(B) are met on the current driving cycle, and (2) the number of minutes of cumulative engine run time since the denominator was last incremented is greater than or equal to 800 minutes. The 800-minute engine run time counter shall be reset to zero and begin counting again after the denominator has been incremented and no later than the start of the next ignition cycle:

(i) Diesel NMHC converting catalyst (section (e)(5.2.2))

(ii) Diesel NMHC converting catalyst other aftertreatment assistance functions (sections (e)(5.2.3)(B) and (D))

(iii) Catalyzed PM filter NMHC conversion (section (e)(8.2.4))

(iv) 2010 through 2015 model year PM filter filtering performance and missing substrate (sections (e)(8.2.1) and (8.2.5))

As an alternative, for 2010 through 2012 model year engines, the manufacturer may request Executive Officer approval to use alternate or additional criteria to that set forth in section (d)(4.3.2)(G) above for incrementing the denominator. Executive Officer approval of the proposed criteria shall be based on the effectiveness of the proposed criteria in measuring the frequency of monitor operation relative to the amount of vehicle operation.

(H) For 2013 and subsequent model year engines, in addition to the

requirements of section (d)(4.3.2)(B) above, the denominator(s) for the following monitors shall be incremented if and only if a regeneration event is commanded for a time greater than or equal to 10 seconds:

(i) Diesel NMHC converting catalyst other aftertreatment assistance functions (sections (e)(5.2.3)(A) and (C))

(ii) PM filter incomplete regeneration (section (e)(8.2.3))

(iii) PM filter active/intrusive injection (section (e)(8.2.6))

(I) For vehicles that employ alternate engine start hardware or strategies (e.g., a vehicle with a start-stop system that does not meet the definition of a hybrid vehicle as defined in section (c)) or alternate-fueled engines, the manufacturer may request Executive Officer approval to use alternate criteria to that set forth in section (d)(4.3.2)(B) above for incrementing the denominator. In general, the Executive Officer shall not approve alternate criteria for vehicles that only employ engine shut off at or near idle/vehicle stop conditions. Executive Officer approval of the alternate criteria shall be based on the equivalence of the alternate criteria to determine the amount of vehicle operation relative to the measure of conventional vehicle operation in accordance with the criteria in section (d)(4.3.2)(B) above.

(J) For hybrid vehicles, in lieu of the criteria in section (d)(4.3.2)(B) above, the denominator for each monitor shall be incremented within ten seconds if and only if the following criteria are satisfied on a single driving cycle:

(i) Cumulative propulsion system active time is greater than or equal to 600 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit;

(ii) Cumulative gasoline engine operation at or above 25 miles per hour or diesel engine operation at or above 1150 rpm, either of which occurs for greater than or equal to 300 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit;

(iii) Continuous vehicle operation at idle (i.e., accelerator pedal released by driver and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle (as determined in the drive position for vehicles equipped with an automatic transmission)) for greater than or equal to 30 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees Fahrenheit; and

(iv) Cumulative fueled engine operation for greater than or equal to 10 seconds while at an elevation of less than 8,000 feet above sea level and at an ambient temperature of greater than or equal to 20 degrees

Fahrenheit.

As an alternative, for 2010 through 2015 model year hybrid vehicles, the manufacturer may use the criteria specified in section (d)(4.3.2)(I) in lieu of the criteria specified in section (d)(4.3.2)(J) above.

(4.4) Ratio Specifications

(4.4.1) Definition: The ratio is defined as the numerator divided by the denominator.

(4.5) Disablement of Numerators and Denominators

(4.5.1) Within 10 seconds of a malfunction being detected (i.e., a pending, confirmed, or MIL-on fault code being stored) that disables a monitor required to meet the monitoring conditions in section (d)(3.2), the OBD system shall disable further incrementing of the corresponding numerator and denominator for each monitor that is disabled. When the malfunction is no longer detected (e.g., the pending code is erased through self-clearing or through a scan tool command), incrementing of all corresponding numerators and denominators shall resume within 10 seconds.

(4.5.2) Within 10 seconds of the start of a PTO (see section (c)) operation that disables a monitor required to meet the monitoring conditions in section (d)(3.2), the OBD system shall disable further incrementing of the corresponding numerator and denominator for each monitor that is disabled. When the PTO operation ends, incrementing of all corresponding numerators and denominators shall resume within 10 seconds.

(4.5.3) The OBD system shall disable further incrementing of all numerators and denominators within 10 seconds if a malfunction of any component used to determine if the criteria of sections (d)(4.3.2)(B) are satisfied (i.e., vehicle speed/calculated load, ambient temperature, elevation, idle operation, or time of operation) has been detected (i.e., a pending, confirmed, or MIL-on fault code has been stored). Incrementing of all numerators and denominators shall resume within 10 seconds from when the malfunction is no longer present (e.g., pending code erased through self-clearing or by a scan tool command).

(5) Standardized tracking and reporting of monitor performance.

(5.1) For monitors required to track and report in-use monitor performance in section (d)(3.2), the performance data shall be tracked and reported in accordance with the specifications in sections (d)(4), (d)(5), and (h)(5.1). The OBD system shall separately report an in-use monitor performance numerator and denominator for each of the following components:

(5.1.1) For diesel engines, fuel system, NMHC catalyst, NOx catalyst, exhaust gas sensor, EGR/VVT system, PM filter, boost pressure control system, and NOx adsorber. The OBD system shall also report a general

denominator and an ignition cycle counter in the standardized format specified in sections (d)(5.5), (d)(5.6), and (h)(5.1).

(5.1.2) For gasoline engines, catalyst bank 1, catalyst bank 2, primary oxygen sensor bank 1, primary oxygen sensor bank 2, secondary oxygen sensor evaporative leak detection system, EGR/VVT system, and secondary air system. The OBD system shall also report a general denominator and an ignition cycle counter in the standardized format specified in sections (d)(5.5), (d)(5.6), and (h)(5.1).

(5.2) Numerator

(5.2.1) The OBD system shall report a separate numerator for each of the components listed in section (d)(5.1).

(5.2.2) For specific components or systems that have multiple monitors that are required to be reported under section (e) (e.g., exhaust gas sensor bank 1 may have multiple monitors for sensor response or other sensor characteristics), the OBD system shall separately track numerators and denominators for each of the specific monitors and report only the corresponding numerator and denominator for the specific monitor that has the lowest numerical ratio. If two or more specific monitors have identical ratios, the corresponding numerator and denominator for the specific monitor that has the highest denominator shall be reported for the specific component.

(5.2.3) The numerator(s) shall be reported in accordance with the specifications in section (h)(5.1.2)(A).

(5.3) Denominator

(5.3.1) The OBD system shall report a separate denominator for each of the components listed in section (d)(5.1).

(5.3.2) The denominator(s) shall be reported in accordance with the specifications in section (h)(5.1.2)(A).

(5.4) Ratio

(5.4.1) For purposes of determining which corresponding numerator and denominator to report as required in section (d)(5.2.2), the ratio shall be calculated in accordance with the specifications in section (h)(5.1.2)(B).

(5.5) Ignition cycle counter

(5.5.1) Definition:

(A) The ignition cycle counter is defined as a counter that indicates the number of ignition cycles a vehicle has experienced as defined in section (d)(5.5.2)(B).

(B) The ignition cycle counter shall be reported in accordance with the

specifications in section (h)(5.1.2)(A).

(5.5.2) Specifications for incrementing:

(A) The ignition cycle counter, when incremented, shall be incremented by an integer of one. The ignition cycle counter may not be incremented more than once per ignition cycle.

(B) The ignition cycle counter shall be incremented within 10 seconds if and only if the following criteria are met:

(i) Except as required in section (d)(5.5.2)(B)(ii) below, the engine exceeds an engine speed of 50 to 150 rpm below the normal, warmed-up idle speed (as determined in the drive position for vehicles equipped with an automatic transmission) for at least two seconds plus or minus one second.

(ii) For hybrid vehicles, the vehicle meets the propulsion system active definition (see section (c)) for at least two seconds plus or minus one second.

(C) The OBD system shall disable further incrementing of the ignition cycle counter within 10 seconds if a malfunction of any component used to determine if the criteria in section (d)(5.5.2)(B) are satisfied (i.e., engine speed or time of operation) has been detected and the corresponding pending fault code has been stored. The ignition cycle counter may not be disabled from incrementing for any other condition. Incrementing of the ignition cycle counter shall resume within 10 seconds when the malfunction is no longer present (e.g., pending code erased through self-clearing or by a scan tool command).

(5.6) General Denominator

(5.6.1) Definition:

(A) The general denominator is defined as a measure of the number of times a vehicle has been operated as defined in section (d)(5.6.2)(B).

(B) The general denominator shall be reported in accordance with the specifications in section (h)(5.1.2)(A).

(5.6.2) Specifications for incrementing:

(A) The general denominator, when incremented, shall be incremented by an integer of one. The general denominator may not be incremented more than once per driving cycle.

(B) The general denominator shall be incremented within 10 seconds if and only if the criteria identified in section (d)(4.3.2)(B) are satisfied on a single driving cycle.

(C) The OBD system shall disable further incrementing of the general

denominator within 10 seconds if a malfunction of any component used to determine if the criteria in section (d)(4.3.2)(B) are satisfied (i.e., vehicle speed/load, ambient temperature, elevation, idle operation, or time of operation) has been detected and the corresponding pending fault code has been stored. The general denominator may not be disabled from incrementing for any other condition (e.g., the disablement criteria in sections (d)(4.5.1) and (d)(4.5.2) may not disable the general denominator). Incrementing of the general denominator shall resume within 10 seconds when the malfunction is no longer present (e.g., pending code erased through self-clearing or by a scan tool command).

(6) Malfunction Criteria Determination.

(6.1) In determining the malfunction criteria for diesel engine monitors in sections (e) and (g) that are required to indicate a malfunction before emissions exceed an emission threshold based on any applicable standard (e.g., 2.0 times any of the applicable standards), the manufacturer shall:

(6.1.1) Use the emission test cycle and standard (i.e., FTP or SET) determined by the manufacturer, through use of data and/or engineering analysis, to be more stringent (i.e., to result in higher emissions with the same level of monitored component malfunction) as the "applicable standard". The manufacturer shall use data and/or engineering analysis to determine the test cycle and standard that is more stringent.

(6.1.2) Identify in the certification documentation required under section (j), the test cycle and standard determined by the manufacturer to be more stringent for each applicable monitor.

(6.1.3) If the Executive Officer reasonably believes that a manufacturer has incorrectly determined the test cycle and standard that is more stringent, the Executive Officer shall require the manufacturer to provide emission data and/or engineering analysis showing that the other test cycle and standard are less stringent.

(6.2) On engines equipped with emission controls that experience infrequent regeneration events, a manufacturer shall adjust the emission test results that are used to determine the malfunction criterion for monitors that are required to indicate a malfunction before emissions exceed a certain emission threshold (e.g., 2.0 times any of the applicable standards). Except as provided in section (d)(6.2.3), for each monitor, the manufacturer shall adjust the emission result using the procedure described in CFR title 40, part 86.004-28(i) with the component for which the malfunction criteria is being established deteriorated to the malfunction threshold. The adjusted emission value shall be used for purposes of determining whether or not the specified emission threshold is exceeded (e.g., a malfunction must be detected before the adjusted emission value exceeds 2.0 times any applicable standard).

(6.2.1) For purposes of section (d)(6.2), "regeneration" means an event during

which emissions levels change while the emission control performance is being restored by design.

(6.2.2) For purposes of section (d)(6.2), "infrequent" means having an expected frequency of less than once per FTP cycle.

(6.2.3) In lieu of using the procedure described in CFR title 40, part 86.004-28(i), the manufacturer may submit an alternate plan to calculate the adjustment factors for determining the adjusted emission values to the Executive Officer for review and approval. Executive Officer approval of the plan shall be conditioned upon the manufacturer providing data and/or engineering evaluation demonstrating the procedure is consistent with good engineering judgment in determining appropriate modifications to the tailpipe certification adjustment factors.

(6.3) In lieu of meeting the malfunction criteria for gasoline engine monitors in sections (f) and (g), the manufacturer may request Executive Officer approval to utilize OBD systems certified to the requirements of title 13, CCR section 1968.2.1 on medium-duty engines or vehicles. The Executive Officer shall approve the request upon finding that the manufacturer has used good engineering judgment in determining equivalent malfunction detection criteria on the heavy-duty engine.

(7) Implementation Schedule

(7.1) Except as specified in sections (d)(7.4) and (d)(7.5) for small volume manufacturers and alternate-fueled engines, for the 2010 through 2012 model year engines:

(7.1.1) Full OBD. Except as specified in section (d)(7.1.3) below, a manufacturer shall implement an OBD system meeting the requirements of section 1971.1.1 on one engine rating (i.e., the OBD parent rating) within one of the manufacturer's engine families. The OBD parent rating shall be from the manufacturer's heavy-duty engine family with the highest weighted sales number for the 2010 model year and shall be the engine rating with the highest weighted sales number within that engine family.

(7.1.2) Extrapolated OBD. For all other engine ratings within the engine family selected according to section (d)(7.1.1) (i.e., the OBD child ratings), except as specified in section (d)(7.1.3) below), a manufacturer shall implement an OBD system meeting the requirements of section 1971.1.1 with the exception that the OBD system is not required to detect a malfunction prior to exceeding the emission thresholds specified in the malfunction criteria in sections (e) through (g). In lieu of detecting a malfunction prior to exceeding the emission thresholds, a manufacturer shall submit a plan for Executive Officer review and approval detailing the engineering evaluation the manufacturer will use to establish the malfunction criteria for the OBD child ratings. The Executive Officer shall approve the plan upon determining that the manufacturer is using good engineering judgment to

establish the malfunction criteria for robust detection of malfunctions, including consideration of differences of base engine, calibration, emission control components, and emission control strategies.

(7.1.3) For all engine ratings (i.e., OBD parent and OBD child ratings) within the engine family selected according to (d)(7.1.1):

(A) The OBD system is exempt from having to comply with the standardization requirements set forth in the incorporated documents to this regulation (e.g., SAE J1939 defined format) within the following sections:

(i) (d)(1.2) and (h)(2) (standardized connector)

(ii) (d)(2.1.1) and (2.1.5) (dedicated standardized MIL)

(iii) (h)(3) (communication protocol)

(iv) (h)(4) (standardized communication functions with respect to the requirements to make the data available in a standardized format or in accordance with SAE J1979/1939 specifications)

(v) (h)(5.1.1) and (h)(5.2.1) with respect to the requirements to make the data available in a standardized format or in accordance with SAE J1979/1939 specifications.

(B) The OBD system shall meet the requirements of either sections (d)(2.2.1) and (2.3.1) or (d)(2.2.2) and (2.3.2) regardless of the communication protocol (e.g., standardized, proprietary) used by the OBD system.

(7.1.4) Engine Manufacturer Diagnostic (EMD) Systems. For all engine ratings in the manufacturer's engine families not selected according to section (d)(7.1.1), a manufacturer shall:

(A) Implement an EMD system meeting the requirements of title 13, CCR section 1971 in lieu of meeting the requirements of section 1971.1.1; and

(B) Monitor the NOx aftertreatment (i.e., catalyst, adsorber) on engines so-equipped. A malfunction shall be detected if:

(i) The NOx aftertreatment system has no detectable amount of NOx aftertreatment capability (i.e., NOx catalyst conversion or NOx adsorption);

(ii) The NOx aftertreatment substrate is completely destroyed, removed, or missing; or

(iii) The NOx aftertreatment assembly is replaced with a straight pipe.

(7.2) Except as specified in section (d)(7.5) for alternate-fueled engines, for the 2013 through 2015 model year engines:

(7.2.1) A manufacturer shall be required to define one or more OBD groups to cover all engine ratings in all engine families.

(7.2.2) Full OBD. A manufacturer shall implement an OBD system meeting the requirements of section 1971.1.1:

(A) On all engine ratings (i.e., OBD parent and OBD child ratings) within the engine family selected according to section (d)(7.1.1); and

(B) On one engine rating (i.e., OBD parent rating) within each of the manufacturer's OBD groups. The OBD parent rating shall be the engine rating with the highest weighted sales number for the 2013 model year within each OBD group.

(7.2.3) Extrapolated OBD. For all engine ratings not subject to section (d)(7.2.2) (i.e., OBD child ratings), a manufacturer shall implement an OBD system meeting the requirements of section 1971.1.1 with the exception that the OBD system is not required to detect a malfunction prior to exceeding the emission thresholds specified in the malfunction criteria in sections (e) through (g). In lieu of detecting a malfunction prior to exceeding the emission thresholds, a manufacturer shall submit a plan for Executive Officer review and approval detailing the engineering evaluation the manufacturer will use to establish the malfunction criteria for the OBD child ratings. The Executive Officer shall approve the plan upon determining that the manufacturer is using good engineering judgment to establish the malfunction criteria for robust detection of malfunctions, including consideration of differences of base engine, calibration, emission control components, and emission control strategies.

(7.3) Except as specified in section (d)(7.5) for alternate-fueled engines, for the 2016 and subsequent model year engines:

(7.3.1) A manufacturer shall implement an OBD system meeting the requirements of section 1971.1.1 on all engine ratings in all engine families.

(7.4) Small volume manufacturers shall be exempt from the requirements of section 1971.1.1 for 2010 through 2012 model year engines. For purposes of this requirement, a small volume manufacturer is defined as a manufacturer with projected engine sales for California heavy-duty vehicles of less than 1200 engines per year for the 2010 model year.

(7.5) For alternate-fueled engines:

(7.5.1) For 2010 through 2012 model year engines, a manufacturer shall be exempt from the requirements of section 1971.1.1.

(7.5.2) For 2013 through 2017 model year engines, the manufacturer shall:

(A) Implement an EMD system meeting the requirements of title 13, CCR section 1971 in lieu of meeting the requirements of section 1971.1.1; and

(B) Monitor the NOx aftertreatment (i.e., catalyst, adsorber) on engines so-equipped. A malfunction shall be detected if:

(i) The NOx aftertreatment system has no detectable amount of NOx

aftertreatment capability (i.e., NOx catalyst conversion or NOx adsorption);

(ii) The NOx aftertreatment substrate is completely destroyed, removed, or missing; or

(iii) The NOx aftertreatment assembly is replaced with a straight pipe.

(7.5.3) For 2018 and subsequent model year engines, a manufacturer shall implement an OBD system meeting the requirements of section 1971.1.1. The manufacturer shall submit a plan to the Executive Officer for approval of the monitoring requirements in sections (e) through (g) determined by the manufacturer to be applicable to the engine. Executive Officer approval shall be based on the appropriateness of the monitoring plan with respect to the components and systems on the engine (e.g., a spark-ignited dedicated CNG engine with a particulate matter (PM) filter and a selective catalytic reduction (SCR) system would be monitored in accordance with the misfire monitoring requirements in section (f) for spark-ignited engines and with the PM filter and SCR system monitoring requirements in section (e) for diesel engines typically equipped with the same components).

(7.6) For 2013 model year hybrid vehicles: In lieu of meeting all other requirements of section 1971.1.1, a manufacturer may meet the alternative requirements set forth in sections (d)(7.6.1) through (d)(7.6.5) below for 2013 model year hybrid vehicles:

(7.6.1) A California-certified 2013 model year engine shall be used as the base engine in the hybrid vehicle design.

(7.6.2) Any modifications made to the base engine's certified OBD system shall be solely for the purpose of preventing false malfunction determinations that could otherwise occur as a result of the integration of the hybrid system hardware and software, and such modifications shall only be made to the extent necessary to achieve this purpose. All modifications are subject to Executive Officer approval. The Executive Officer shall grant approval upon determining that the modifications are necessary and reasonable for the purposes of preventing false malfunction determinations on in-use hybrid vehicles.

(7.6.3) Notwithstanding section (d)(7.6.2) above, no modifications shall be made that would render the certified base engine noncompliant with the EMD plus NOx aftertreatment monitoring requirements set forth in section (d)(7.1.4).

(7.6.4) For all hybrid components, manufacturers shall be exempt from the monitoring requirements of section (g)(3).

(7.6.5) Manufacturers shall apply for certification to the requirements of this section. The application for certification shall identify and describe the

certified base engine, the hybrid system mated to it, all changes made to the certified engine along with the rationale describing the need for each change, and the vehicle applications into which the hybrid system will be installed.

(e) *Monitoring Requirements for Diesel/Compression-Ignition Engines.*

(1) Fuel System Monitoring

(1.1) Requirement:

The OBD system shall monitor the fuel delivery system to determine its ability to comply with applicable standards. The individual electronic components (e.g., actuators, valves, sensors, pumps) that are used in the fuel system and not specifically addressed in this section shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(1.2) Malfunction Criteria:

(1.2.1) Fuel system pressure control: The OBD system shall detect a malfunction of the fuel system pressure control system (e.g., fuel, hydraulic fluid) when the fuel system pressure control system is unable to maintain an engine's NMHC, NOx, or CO emissions at or below 2.0 times the applicable standards or the engine's PM emissions at or below the applicable standard plus 0.02 grams per brake horsepower-hour (g/bhp-hr). For engines in which no failure or deterioration of the fuel system pressure control could result in an engine's emissions exceeding these emission levels, the OBD system shall detect a malfunction when the system has reached its control limits such that the commanded fuel system pressure cannot be delivered.

(1.2.2) Injection quantity: The OBD system shall detect a malfunction of the fuel injection system when the system is unable to deliver the commanded quantity of fuel necessary to maintain an engine's NMHC, CO, and NOx emissions at or below 2.0 times the applicable standards or the engine's PM emissions at or below the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the fuel injection quantity could result in an engine's emissions exceeding these emission levels, the OBD system shall detect a malfunction when the system has reached its control limits such that the commanded fuel quantity cannot be delivered.

(1.2.3) Injection Timing: The OBD system shall detect a malfunction of the fuel injection system when the system is unable to deliver fuel at the proper crank angle/timing (e.g., injection timing too advanced or too retarded) necessary to maintain an engine's NMHC, CO, and NOx emissions at or below 2.0 times the applicable standards or the engine's PM emissions at or below the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the fuel injection timing could result in an engine's emissions exceeding these emission levels, the OBD system shall

detect a malfunction when the system has reached its control limits such that the commanded fuel injection timing cannot be achieved.

(1.2.4) Feedback control: Except as provided for in section (e)(1.2.5), if the engine is equipped with feedback or feed-forward control of the fuel system (e.g., feedback control of pressure or pilot injection quantity), the OBD system shall detect a malfunction:

(A) If the system fails to begin control within a manufacturer specified time interval;

(B) If a failure or deterioration causes open loop or default operation; or

(C) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(1.2.5) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (e)(1.2.4)(C) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on an engine with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(1.2.6) In lieu of detecting the malfunctions specified in sections (e)(1.2.4)(A) and (B) with a fuel system-specific monitor, the OBD system may monitor the individual parameters or components that are used as inputs for fuel system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (e)(1.2.4)(A) and (B).

(1.2.7) For purposes of determining the fuel system malfunction criteria in sections (e)(1.2.1) through (1.2.3):

(A) For 2010 through 2012 model year engines, the malfunction criteria shall be established by using a fault that affects either a single injector or all injectors equally.

(B) For 2013 and subsequent model year engines, for section (e)(1.2.1), the malfunction criteria shall be established by using a fault that affects all injectors equally. Additionally, for systems that have single component failures which could affect a single injector (e.g., systems that build injection pressure within the injector that could have a single component pressure fault caused by the injector itself), the malfunction criteria shall also be established by using a fault that affects a single injector.

(C) For 2013 and subsequent model year engines, for sections (e)(1.2.2) through (1.2.3), the malfunction criteria shall be established by both (1) a

fault that affects all the injectors equally and (2) a fault that affects only one injector.

(1.3) Monitoring Conditions:

(1.3.1) Except as provided in sections (e)(1.3.2) and (e)(1.3.4), the OBD system shall monitor continuously for malfunctions identified in sections (e)(1.2.1) and (e)(1.2.4) (i.e., fuel pressure control and feedback operation).

(1.3.2) For fuel systems that achieve injection fuel pressure within the injector or increase pressure within the injector (e.g. in the injector of an amplified common rail system), manufacturers may request Executive Officer approval to define the monitoring conditions for malfunctions identified in sections (e)(1.2.1) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). The Executive Officer shall approve the monitoring conditions upon the manufacturer submitting data and/or analysis identifying all possible failure modes and the effect each has (e.g., failure modes and effects analysis) on fuel pressure across the entire range of engine operating conditions, and upon the Executive Officer determining based on the data and/or analysis that the monitoring conditions allow for robust detection of all causes of fuel pressure malfunctions.

(1.3.3) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(1.2.2) and (e)(1.2.3) (i.e., injection quantity and timing) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For all 2013 and subsequent model year engines, for purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in sections (e)(1.2.2) and (e)(1.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(1.3.4) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(1.4) MIL Illumination and Fault Code Storage:

(1.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(1.4.2) Additionally, for malfunctions identified in section (e)(1.2.1) (i.e., fuel pressure control) on all 2013 and subsequent model year engines:

(A) A pending fault code shall be stored immediately upon the fuel system exceeding the malfunction criteria established pursuant to section (e)(1.2.1).

(B) Except as provided below, if a pending fault code is stored, the OBD system shall immediately illuminate the MIL and store a confirmed/MIL-on fault code if a malfunction is again detected during either of the following two events: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to those that occurred when the pending fault code was stored are encountered.

(C) The pending fault code may be erased at the end of the next driving cycle in which similar conditions have been encountered without an exceedance of the specified fuel system malfunction criteria. The pending code may also be erased if similar conditions are not encountered during the 80 driving cycles immediately after the initial detection of a malfunction for which the pending code was set.

(D) Storage of freeze frame conditions.

(i) For 2013 through 2015 model year engines, a manufacturer shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing and erasing a confirmed/MIL-on fault code. For 2016 and subsequent model year engines, a manufacturer shall store freeze frame conditions in conjunction with storing and erasing a pending fault code in accordance with section (d)(2.2.1)(D)(iii) or (d)(2.2.2)(D).

(ii) If freeze frame conditions are stored for a malfunction other than misfire (see section (e)(2)) or fuel system malfunction when a fault code is stored as specified in section (e)(1.4.2) above, the stored freeze frame information shall be replaced with freeze frame information regarding the fuel system malfunction.

(E) Storage of fuel system conditions for determining similar conditions of operation.

(i) Upon detection of a fuel system malfunction under section (e)(1.4.2), the OBD system shall store the engine speed, load, and warm-up status of the first fuel system malfunction that resulted in the storage of the pending fault code.

(ii) The manufacturer may request Executive Officer approval to use an alternate definition of similar conditions in lieu of the definition specified in section (c). The Executive Officer shall approve the alternate definition upon the manufacturer providing data or analysis demonstrating that the alternate definition provides for equivalent

robustness in detection of fuel system faults that vary in severity depending on engine speed, load, and/or warm-up status.

(F) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without a malfunction of the fuel system.

(2) Misfire Monitoring

(2.1) Requirement:

(2.1.1) The OBD system shall monitor the engine for misfire. The OBD system shall be capable of detecting misfire occurring in one or more cylinders. To the extent possible without adding hardware for this specific purpose, the OBD system shall also identify the specific misfiring cylinder.

(2.1.2) If more than one cylinder is continuously misfiring, a separate fault code shall be stored indicating that multiple cylinders are misfiring. When identifying multiple cylinder misfire, the OBD system is not required to also identify each of the continuously misfiring cylinders individually through separate fault codes.

(2.2) Malfunction Criteria:

(2.2.1) The OBD system shall detect a misfire malfunction when one or more cylinders are continuously misfiring.

(2.2.2) Additionally, for 2013 through 2015 model year engines equipped with sensors that can detect combustion or combustion quality (e.g., for use in homogeneous charge compression ignition (HCCI) control systems) and for 20 percent of 2016 model year diesel engines, 50 percent of 2017 model year diesel engines, and 100 percent of 2018 model year diesel engines (percentage based on the manufacturer's projected California sales volume of all diesel engines subject to this regulation), the OBD system shall detect a misfire malfunction when the percentage of misfire is equal to or exceeds five percent.

(A) Manufacturers shall evaluate the percentage of misfire in 1000 revolution increments.

(B) Subject to Executive Officer approval, a manufacturer may employ other revolution increments. The Executive Officer shall grant approval upon determining that the manufacturer has demonstrated that the strategy would be equally effective and timely in detecting misfire.

(2.2.3) A malfunction shall be detected if the percentage of misfire specified in section (e)(2.2.2) is exceeded regardless of the pattern of misfire events (e.g., random, equally spaced, continuous).

(2.2.4) For multiple cylinder misfire situations that result in a misfire rate greater than or equal to 50 percent of all engine firings, the OBD system shall only be required to detect a misfire malfunction for situations that are caused by a single component failure.

(2.2.5) Upon request by the manufacturer and upon determining that the manufacturer has submitted data and/or engineering evaluation that support the request, the Executive Officer shall revise the percentage of misfire malfunction criteria in section (e)(2.2.2) upward to exclude detection of misfire that cannot cause the engine's NMHC, CO, and NOx emissions to exceed 2.0 times the applicable standards and the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr.

(2.3) Monitoring Conditions:

(2.3.1) Except as provided in section (e)(2.3.2), the OBD system shall monitor for misfires identified in section (e)(2.2.1) during engine idle conditions at least once per driving cycle in which the monitoring conditions for misfire are met. A manufacturer shall submit monitoring conditions to the Executive Officer for approval. The Executive Officer shall approve manufacturer-defined monitoring conditions that are determined (based on manufacturer-submitted data and/or other engineering documentation) to: (i) be technically necessary to ensure robust detection of malfunctions (e.g., avoid false passes and false detection of malfunctions), (ii) require no more than 1000 cumulative engine revolutions, and (iii) do not require any single continuous idle operation of more than 15 seconds to make a determination that a malfunction is present (e.g., a decision can be made with data gathered during several idle operations of 15 seconds or less); or satisfy the requirements of (d)(3.1) with alternative engine operating conditions.

(2.3.2) Manufacturers may request Executive Officer approval to use alternate monitoring conditions (e.g., off-idle) in lieu of the monitoring conditions specified in section (e)(2.3.1). The Executive Officer shall approve alternate monitoring conditions that are determined (based on manufacturer-submitted data and/or other engineering documentation) to ensure equivalent robust detection of malfunctions and equivalent timeliness in detection of malfunctions.

(2.3.3) For misfires identified in section (e)(2.2.2):

(A) The OBD system shall continuously monitor for misfire under the following conditions:

(i) For 2013 through 2018 model year engines and 2019 and subsequent model year engines that are not included in the phase-in specified in section (e)(2.3.3)(A)(ii), under positive torque conditions between 20 percent and 75 percent of peak torque with engine speed up to 75 percent of the maximum engine speed.

(ii) For 20 percent of 2019 model year diesel engines, 50 percent of 2020 model year diesel engines, and 100 percent of 2021 model year diesel engines (percentage based on the manufacturer's projected California sales volume of all diesel engines subject to this regulation), under all positive torque engine speed conditions except within the following range: the engine operating region bound by the positive torque line (i.e., engine torque with transmission in neutral) and the two following points: engine speed of 50 percent of maximum engine speed with the engine torque at the positive torque line, and 100 percent of the maximum engine speed with the engine torque at 10 percent of peak torque above the positive torque line.

(B) If a monitoring system cannot detect all misfire patterns under all required engine speed and load conditions as required in section (e)(2.3.3)(A), the manufacturer may request Executive Officer approval to accept the monitoring system. In evaluating the manufacturer's request, the Executive Officer shall consider the following factors: the magnitude of the region(s) in which misfire detection is limited, the degree to which misfire detection is limited in the region(s) (i.e., the probability of detection of misfire events), the frequency with which said region(s) are expected to be encountered in-use, the type of misfire patterns for which misfire detection is troublesome, demonstration that the monitoring technology employed is not inherently incapable of detecting misfire under required conditions (i.e., compliance can be achieved on other engines), and the extent to which the most reliable monitoring method developed is unable to ensure robust detection of misfire in the region(s). The evaluation shall be based on the following misfire patterns: equally spaced misfire occurring on randomly selected cylinders, single cylinder continuous misfire, and paired cylinder (cylinders firing at the same crank angle) continuous misfire.

(C) A manufacturer may request Executive Officer approval to disable misfire monitoring or employ an alternate malfunction criterion when misfire cannot be distinguished from other effects. Upon determining that the manufacturer has presented documentation that demonstrates the disablement interval or period of use of an alternate malfunction criterion is limited only to that necessary for avoiding false detection, the Executive Officer shall approve the disablement or use of the alternate malfunction criterion. Such disablements may include but are not limited to events involving:

(i) rough road,

(ii) fuel cut,

(iii) gear changes for manual transmission vehicles,

(iv) traction control or other vehicle stability control activation such as anti-lock braking or other engine torque modifications to enhance vehicle stability,

(v) off-board control or intrusive activation of vehicle components or diagnostics during service or assembly plant testing,

(vi) intrusive diagnostics during portions that can significantly affect engine stability, or

(vii) infrequent regeneration events during portions that can significantly affect engine stability.

(2.4) MIL Illumination and Fault Code Storage:

(2.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(2.4.2) Additionally, for misfires identified in section (e)(2.2.2):

(A) Upon detection of the percentage of misfire specified in section (e)(2.2.2), the following criteria shall apply for MIL illumination and fault code storage:

(i) A pending fault code shall be stored no later than after the fourth exceedance of the percentage of misfire specified in section (e)(2.2.2) during a single driving cycle.

(ii) If a pending fault code is stored, the OBD system shall illuminate the MIL and store a confirmed/MIL-on fault code within 10 seconds if the percentage of misfire specified in section (e)(2.2.2) is again exceeded four times during: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to the engine conditions that occurred when the pending fault code was stored are encountered.

(iii) The pending fault code may be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without an exceedance of the specified percentage of misfire. The pending code may also be erased if similar conditions are not encountered during the next 80 driving cycles immediately following initial detection of the malfunction.

(B) Storage of freeze frame conditions.

(i) For 2013 through 2015 model year engines, the OBD system shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing a confirmed/MIL-on fault code and erasing a confirmed/previously MIL-on fault code. For 2016 and subsequent model year engines, a manufacturer shall store freeze frame conditions in conjunction with storing and erasing a pending fault code in accordance with section (d)(2.2.1)(D)(iii) or (d)(2.2.2)(D).

(ii) If freeze frame conditions are stored for a malfunction other than a misfire malfunction when a fault code is stored as specified in section (e)(2.4.2), the stored freeze frame information shall be replaced with freeze frame information regarding the misfire malfunction.

(C) Storage of misfire conditions for similar conditions determination. Upon detection of misfire under section (e)(2.4.2), the OBD system shall store the following engine conditions: engine speed, load, and warm-up status of the first misfire event that resulted in the storage of the pending fault code.

(D) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without an exceedance of the specified percentage of misfire.

(3) Exhaust Gas Recirculation (EGR) System Monitoring

(3.1) Requirement:

(3.1.1) The OBD system shall monitor the EGR system on engines so-equipped for low flow rate, high flow rate, and slow response malfunctions. For engines equipped with EGR coolers (e.g., heat exchangers), the OBD system shall monitor the cooler system for insufficient cooling malfunctions. The individual electronic components (e.g., actuators, valves, sensors) that are used in the EGR system shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(3.1.2) For engines with other charge control strategies that affect EGR flow (e.g., systems that modify EGR flow to achieve a desired fresh air flow rate instead of a desired EGR flow rate), the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for EGR systems under section (e)(3).

(3.2) Malfunction Criteria:

(3.2.1) Low Flow: The OBD system shall detect a malfunction of the EGR system prior to a decrease from the manufacturer's specified EGR flow rate that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the EGR system that causes a decrease in flow could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction when either the EGR system has reached its control limits such that it cannot increase EGR flow to achieve the commanded flow rate or, for non-feedback controlled EGR systems,

the EGR system has no detectable amount of EGR flow when EGR flow is expected.

(3.2.2) High Flow: The OBD system shall detect a malfunction of the EGR system, including a leaking EGR valve (i.e., exhaust gas flowing through the valve when the valve is commanded closed), prior to an increase from the manufacturer's specified EGR flow rate that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the EGR system that causes an increase in flow could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction when either the EGR system has reached its control limits such that it cannot reduce EGR flow to achieve the commanded flow rate or, for non-feedback controlled EGR systems, the EGR system has maximum detectable EGR flow when little or no EGR flow is expected.

(3.2.3) Slow Response: The OBD system shall detect a malfunction of the EGR system prior to any failure or deterioration in the EGR system response (e.g., capability to achieve the specified flow rate within a manufacturer-specified time) that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. The OBD system shall monitor the EGR system response under both increasing and decreasing EGR flow rates. For engines in which no failure or deterioration of the EGR system response could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction of the EGR system when no detectable response to a change in commanded or expected flow rate occurs.

(3.2.4) Feedback control: Except as provided for in section (e)(3.2.7), if the engine is equipped with feedback or feed-forward control of the EGR system (e.g., feedback control of flow, valve position, pressure differential across the valve via intake throttle or exhaust backpressure), the OBD system shall detect a malfunction:

(A) If the system fails to begin control within a manufacturer specified time interval;

(B) If a failure or deterioration causes open loop or default operation; or

(C) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(3.2.5) EGR Cooler Performance: The OBD system shall detect a malfunction of the EGR cooler system prior to a reduction from the manufacturer's specified cooling performance that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the

engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the EGR cooler system could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction when the system has no detectable amount of EGR cooling.

(3.2.6) EGR Catalyst Performance: For catalysts located in the EGR system on 2013 and subsequent model year engines and used to convert constituents to reduce emissions or protect or extend the durability of other emission-related components (e.g., to reduce fouling of an EGR cooler or valve):

(A) Except as provided for in section (e)(3.2.6)(B) below, the OBD system shall detect a malfunction when the catalyst has no detectable amount of constituent (e.g., hydrocarbons, soluble organic fractions) oxidation.

(B) Monitoring of the catalyst is not required if there is no measurable emission impact on the criteria pollutants (i.e., NMHC, CO, NOx, and PM) during any reasonable driving condition in which the catalyst is most likely to affect criteria pollutants.

(3.2.7) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (e)(3.2.4)(C) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on an engine with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(3.2.8) In lieu of detecting the malfunctions specified in sections (e)(3.2.4)(A) and (B) with an EGR system-specific monitor, the OBD system may monitor the individual parameters or components that are used as inputs for EGR system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (e)(3.2.4)(A) and (B).

(3.2.9) For purposes of determining the EGR cooler performance malfunction criteria in section (e)(3.2.5) for EGR cooler systems that consist of more than one cooler (e.g., a pre-cooler and a main cooler, two or more coolers in series), the manufacturer shall submit an EGR cooler system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description and location of each component, the monitoring strategy for each component and combination of components, and the method for determining the malfunction criteria of section (e)(3.2.5) including the deterioration/aging process. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world EGR cooler system component deterioration under normal and malfunctioning engine operating conditions and the effectiveness of the method used to determine the malfunction criteria of section (e)(3.2.5).

(3.3) Monitoring Conditions:

(3.3.1) Except as provided in section (e)(3.3.4), the OBD system shall monitor continuously for malfunctions identified in sections (e)(3.2.1), (3.2.2), and (e)(3.2.4) (i.e., EGR low and high flow, feedback control).

(3.3.2) Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(3.2.3) (i.e., slow response) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (e)(3.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(3.3.3) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(3.2.5) and (e)(3.2.6) (i.e., cooler performance and EGR catalyst performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (e)(3.2.5) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(3.3.4) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under specific conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions (e.g., disable EGR low flow monitoring when no or very little flow is commanded, disable EGR high and low flow monitoring when freezing may affect performance of the system). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating EGR system cannot be distinguished from a malfunctioning EGR system and that the disablement interval is limited only to that which is technically necessary.

(3.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(4) Boost Pressure Control System Monitoring

(4.1) Requirement:

(4.1.1) The OBD system shall monitor the boost pressure control system (e.g., turbocharger) on engines so-equipped for under and over boost malfunctions and slow response malfunctions. For engines equipped with charge air cooler systems, the OBD system shall monitor the charge air cooler system for cooling system performance malfunctions. The individual

electronic components (e.g., actuators, valves, sensors) that are used in the boost pressure control system shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(4.1.2) For engines with other charge control strategies that affect boost pressure (e.g., systems that modify boost pressure to achieve a desired air-fuel ratio instead of a desired boost pressure), the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for boost pressure control systems under section (e)(4).

(4.2) Malfunction Criteria:

(4.2.1) Underboost: The OBD system shall detect a malfunction of the boost pressure control system prior to a decrease from the manufacturer's commanded or expected boost pressure that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the boost pressure control system that causes a decrease in boost could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction when either the boost system has reached its control limits such that it cannot increase boost to achieve the commanded boost pressure or, for non-feedback controlled boost systems, the boost system has no detectable amount of boost when boost is expected.

(4.2.2) Overboost: The OBD system shall detect a malfunction of the boost pressure control system prior to an increase from the manufacturer's commanded or expected boost pressure that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the boost pressure control system that causes an increase in boost could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction when either the boost system has reached its control limits such that it cannot decrease boost to achieve the commanded boost pressure or, for non-feedback controlled boost systems, the boost system has no detectable amount of boost boost is expected.

(4.2.3) Slow response: when

(A) For 2010 through 2012 model year engines equipped with variable geometry turbochargers (VGT), the OBD system shall detect a malfunction prior to any failure or deterioration in the capability of the VGT system to achieve the commanded turbocharger geometry within a manufacturer-specified time that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM

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emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the VGT system response could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction of the VGT system when no detectable response to a change in commanded turbocharger geometry occurs.

(B) For 2013 and subsequent model year engines, the OBD system shall detect a malfunction prior to any failure or deterioration in the boost pressure control system response (e.g., capability to achieve the commanded or expected boost pressure within a manufacturer-specified time) that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the boost system response could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction of the boost system when no detectable response to a commanded or expected change in boost pressure occurs.

(4.2.4) Charge Air Undercooling: The OBD system shall detect a malfunction of the charge air cooling system prior to a decrease from the manufacturer's specified cooling rate that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr. For engines in which no failure or deterioration of the charge air cooling system that causes a decrease in cooling performance could result in an engine's emissions exceeding these levels, the OBD system shall detect a malfunction when the system has no detectable amount of charge air cooling.

(4.2.5) Feedback control: Except as provided for in section (e)(4.2.6), if the engine is equipped with feedback or feed-forward control of the boost pressure system (e.g., control of variable geometry turbocharger position, turbine speed, manifold pressure) the OBD system shall detect a malfunction:

(A) If the system fails to begin control within a manufacturer specified time interval;

(B) If a failure or deterioration causes open loop or default operation; or

(C) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(4.2.6) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (e)(4.2.5)(C) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the

control system, when operating as designed on an engine with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(4.2.7) In lieu of detecting the malfunctions specified in sections (e)(4.2.5)(A) and (B) with a boost pressure system-specific monitor, the OBD system may monitor the individual parameters or components that are used as inputs for boost pressure system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (e)(4.2.5)(A) and (B).

(4.2.8) For purposes of determining the charge air cooling performance malfunction criteria in section (e)(4.2.4) for charge air cooling systems that consist of more than one cooler (e.g., a pre-cooler and a main cooler, two or more coolers in series), the manufacturer shall submit a charge air cooling system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description and location of each component, the monitoring strategy for each component and combination of components, and the method for determining the malfunction criteria of section (e)(4.2.4) including the deterioration/aging process. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world charge air cooling system component deterioration under normal and malfunctioning engine operating conditions and the effectiveness of the method used to determine the malfunction criteria of section (e)(4.2.4).

(4.3) Monitoring Conditions:

(4.3.1) Except as provided in section (e)(4.3.4), the OBD system shall monitor continuously for malfunctions identified in sections (e)(4.2.1), (4.2.2), and (4.2.5) (i.e., over and under boost, feedback control).

(4.3.2) Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(4.2.3) (i.e., slow response) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (e)(4.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(4.3.3) Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(4.2.4) (i.e., charge air cooler performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (e)(4.2.4) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(4.3.4) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions (e.g., disable monitoring of underboost when commanded or expected boost pressure is very low). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(4.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(5) Non-Methane Hydrocarbon (NMHC) Converting Catalyst Monitoring

(5.1) Requirement: The OBD system shall monitor the NMHC converting catalyst(s) for proper NMHC conversion capability. For engines equipped with catalyzed PM filters that convert NMHC emissions, the catalyst function of the PM filter shall be monitored in accordance with the PM filter requirements in section (e)(8).

(5.2) Malfunction Criteria:

(5.2.1) For purposes of section (e)(5), each catalyst in a series configuration that converts NMHC shall be monitored either individually or in combination with others.

(5.2.2) Conversion Efficiency:

(A) For 2010 through 2012 model year engines, the OBD system shall detect an NMHC catalyst malfunction when the catalyst conversion capability decreases to the point that NMHC emissions exceed 2.0 times any of the applicable standards.

(B) For 2013 and subsequent model year engines, the OBD system shall detect an NMHC catalyst malfunction when the catalyst conversion capability decreases to the point that NMHC emissions exceed 2.0 times any of the applicable standards or NOx emissions exceed any of the applicable standards by more than 0.2 g/bhp-hr (e.g., cause emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr).

(C) If no failure or deterioration of the catalyst conversion capability could result in an engine's NMHC or NOx emissions exceeding the applicable malfunction criteria of section (e)(5.2.2), the OBD system shall detect a malfunction when the catalyst has no detectable amount of NMHC or NOx conversion capability.

(5.2.3) Other Aftertreatment Assistance Functions:

(A) For catalysts used to generate an exotherm to assist PM filter regeneration, the OBD system shall detect a malfunction when the catalyst is unable to generate a sufficient exotherm to achieve regeneration of the PM filter.

(B) For 2015 and subsequent model year engines, for catalysts used to generate a feedgas constituency to assist SCR systems (e.g., to increase NO_2 concentration upstream of an SCR system), the OBD system shall detect a malfunction when the catalyst is unable to generate the necessary feedgas constituents for proper SCR system operation. Catalysts are exempt from this monitoring if both of the following criteria are satisfied: (1) no malfunction of the catalyst's feedgas generation ability can cause emissions to increase by 15 percent or more of the applicable standard as measured from an applicable emission test cycle; and (2) no malfunction of the catalyst's feedgas generation ability can cause emissions to exceed the applicable standard as measured from an applicable emission test cycle.

(C) For catalysts located downstream of a PM filter and used to convert NMHC emissions during PM filter regeneration, the OBD system shall detect a malfunction when the catalyst has no detectable amount of NMHC conversion capability.

(D) For catalysts located downstream of an SCR system (e.g., to prevent ammonia slip), the OBD system shall detect a malfunction when the catalyst has no detectable amount of NMHC, CO, NOx, or PM conversion capability. Monitoring of the catalyst is not required if there is no measurable emission impact on the criteria pollutants (i.e., NMHC, CO, NOx, and PM) during any reasonable driving condition in which the catalyst is most likely to affect criteria pollutants (e.g., during conditions most likely to result in ammonia generation or excessive reductant delivery).

(5.2.4) Catalyst System Aging and Monitoring

(A) For purposes of determining the catalyst malfunction criteria in sections (e)(5.2.2) and (5.2.3) for individually monitored catalysts, the manufacturer shall use a catalyst deteriorated to the malfunction criteria using methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning engine operating conditions. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated.

(B) For purposes of determining the catalyst malfunction criteria in sections (e)(5.2.2) and (5.2.3) for catalysts monitored in combination with others, the manufacturer shall submit a catalyst system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the

description, emission control purpose, and location of each component, the monitoring strategy for each component and/or combination of components, and the method for determining the malfunction criteria of sections (e)(5.2.2) and (5.2.3) including the deterioration/aging process. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world catalyst system component deterioration under normal and malfunctioning engine operating conditions, the effectiveness of the method used to determine the malfunction criteria of section (e)(5.2), the ability of the component monitor(s) to pinpoint the likely area of malfunction and ensure the correct components are repaired/replaced in-use, and the ability of the component monitor(s) to accurately verify that each catalyst component is functioning as designed and as required in sections (e)(5.2.2) and (5.2.3).

(5.3) Monitoring Conditions:

(5.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(5.2.2) and (5.2.3) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in sections (e)(5.2.2) and (5.2.3) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(5.4) MIL Illumination and Fault Code Storage:

(5.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(5.4.2) The monitoring method for the catalyst(s) shall be capable of detecting all instances, except diagnostic self-clearing, when a catalyst fault code has been cleared but the catalyst has not been replaced (e.g., catalyst overtemperature histogram approaches are not acceptable).

(6) Oxides of Nitrogen (NOx) Converting Catalyst Monitoring

(6.1) Requirement: The OBD system shall monitor the NOx converting catalyst(s) for proper conversion capability. For engines equipped with selective catalytic reduction (SCR) systems or other catalyst systems that utilize an active/intrusive reductant injection (e.g., active lean NOx catalysts utilizing diesel fuel injection), the OBD system shall monitor the SCR or active/intrusive reductant injection system for proper performance. The individual electronic components (e.g., actuators, valves, sensors, heaters, pumps) in the SCR or active/intrusive reductant injection system shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(6.2) Malfunction Criteria: For purposes of section (e)(6), each catalyst in a series configuration that converts NOx shall be monitored either individually or in combination with others.

(6.2.1) Conversion Efficiency:

(A) For 2010 through 2012 model year engines:

(i) The OBD system shall detect a catalyst malfunction when the catalyst conversion capability decreases to the point that would cause an engine's NOx emissions to exceed any of the applicable standards by more than 0.4 g/bhp-hr (e.g., cause emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET).

(ii) If no failure or deterioration of the catalyst NOx conversion capability could result in an engine's NOx emissions exceeding any of the applicable standards by more than 0.4 g/bhp-hr, the OBD system shall detect a malfunction when the catalyst has no detectable amount of NOx conversion capability.

(B) For all 2013 model year engines and 2014 and 2015 model year engines that are not included in the phase-in specified in section (e)(6.2.1)(C):

(i) The OBD system shall detect a catalyst malfunction when the catalyst conversion capability decreases to the point that would cause an engine's emissions to exceed the applicable NOx standard by more than 0.4 g/bhp-hr (e.g., cause emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard.

(ii) If no failure or deterioration of the catalyst system NOx conversion capability could result in an engine's NOx or NMHC emissions exceeding the applicable malfunction criteria of section (e)(6.2.1)(B)(i), the OBD system shall detect a malfunction when the catalyst has no detectable amount of NOx or NMHC conversion capability.

(C) For at least 20 percent of 2014 model year diesel engines and at least 50 percent of 2015 model year diesel engines (percentage based on the manufacturer's projected California sales volume of all diesel engines subject to this regulation):

(i) The OBD system shall detect a catalyst malfunction when the catalyst conversion capability decreases to the point that would cause an engine's emissions to exceed the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause exhaust emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard.

(ii) If no failure or deterioration of the catalyst system NOx conversion capability could result in an engine's NOx or NMHC emissions exceeding the applicable malfunction criteria of section (e)(6.2.1)(C)(i), the OBD system shall detect a malfunction when the catalyst has no detectable amount of NOx or NMHC conversion capability.

(D) Except as provided for below in section (e)(6.2.1)(E), for 2016 and subsequent model year engines:

(i) The OBD system shall detect a catalyst malfunction when the catalyst conversion capability decreases to the point that would cause an engine's emissions to exceed the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard.

(ii) If no failure or deterioration of the catalyst system NOx conversion capability could result in an engine's NOx or NMHC emissions exceeding the applicable malfunction criteria of section (e)(6.2.1)(D)(i), the OBD system shall detect a malfunction when the catalyst has no detectable amount of NOx or NMHC conversion capability.

(E) In lieu of using the malfunction criteria in section (e)(6.2.1)(D), a manufacturer may continue to use the malfunction criteria in section (e)(6.2.1)(C) for any 2016 model year engine that was previously certified in the 2014 or 2015 model year to the malfunction criteria in section (e)(6.2.1)(C) and carried over to the 2016 model year.

(6.2.2) Selective Catalytic Reduction (SCR) or Other Active/Intrusive Reductant Injection System Performance:

(A) Reductant Delivery Performance:

(i) For 2010 through 2012 model year engines, the OBD system shall detect a malfunction prior to any failure or deterioration of the system to properly regulate reductant delivery (e.g., urea injection, separate injector fuel injection, post injection of fuel, air assisted injection/mixing) that would cause an engine's NOx emissions to exceed any of the applicable standards by more than 0.4 g/bhp-hr (e.g., cause emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET). If no failure or deterioration of the SCR system could result in an engine's NOx emissions exceeding any of the applicable standards by more than 0.4 g/bhp-hr, the OBD system shall detect a malfunction when the system has reached its control limits such that it is no longer able to deliver the desired quantity of reductant.

(ii) For all 2013 model year engines and 2014 and 2015 model year engines that are not included in the phase-in specified in section (e)(6.2.2)(A)(iii):

a. The OBD system shall detect a malfunction prior to any failure or deterioration of the system to properly regulate reductant delivery (e.g., urea injection, separate injector fuel injection, post injection of fuel, air assisted injection/mixing) that would cause an engine's emissions to exceed the applicable NOx standard by more than 0.4 g/bhp-hr (e.g., cause emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard.

b. If no failure or deterioration of the SCR system could result in an engine's NOx or NMHC emissions exceeding the applicable malfunction criteria of section (e)(6.2.2)(A)(ii)a., the OBD system shall detect a malfunction when the system has reached its control limits such that it is no longer able to deliver the desired quantity of reductant.

(iii) For at least 20 percent of all 2014 model year diesel engines and at least 50 percent of all 2015 model year diesel engines (percentage based on the manufacturer's projected California sales volume of all diesel engines subject to this regulation):

a. The OBD system shall detect a malfunction prior to any failure or deterioration of the system to properly regulate reductant delivery (e.g., urea injection, separate injector fuel injection, post injection of fuel, air assisted injection/mixing) that would cause an engine's emissions to exceed the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard.

b. If no failure or deterioration of the SCR system could result in an engine's NOx or NMHC emissions exceeding the applicable malfunction criteria of section (e)(6.2.2)(A)(iii)a., the OBD system shall detect a malfunction when the system has reached its control limits such that it is no longer able to deliver the desired quantity of reductant.

(iv) Except as provided for below in section (e)(6.2.2)(A)(v), for 2016 and subsequent model year engines, the OBD system shall detect a system malfunction prior to any failure or deterioration of the system to properly regulate reductant delivery (e.g., urea injection, separate injector fuel injection, post injection of fuel, air assisted injection/mixing) that would cause an engine's emissions to exceed the applicable NOx standard by

more than 0.2 g/bhp-hr (e.g., cause emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or 2.0 times the applicable NMHC standard. If no failure or deterioration of the SCR system could result in an engine's NOx or NMHC emissions exceeding the applicable malfunction criteria above, the OBD system shall detect a malfunction when the system has reached its control limits such that it is no longer able to deliver the desired quantity of reductant.

(v) In lieu of using the malfunction criteria in section (e)(6.2.2)(A)(iv), a manufacturer may continue to use the malfunction criteria in section (e)(6.2.2)(A)(iii) for any 2016 model year engine that was previously certified in the 2014 or 2015 model year to the malfunction criteria in section (e)(6.2.2)(A)(iii) and carried over to the 2016 model year.

(B) If the catalyst system uses a reductant other than the fuel used for the engine or uses a reservoir/tank for the reductant that is separate from the fuel tank used for the engine, the OBD system shall detect a malfunction when there is no longer sufficient reductant available to properly operate the reductant system (e.g., the reductant tank is empty).

(C) If the catalyst system uses a reservoir/tank for the reductant that is separate from the fuel tank used for the engine, the OBD system shall detect a malfunction when an improper reductant is used in the reductant reservoir/tank (e.g., the reductant tank is filled with something other than the reductant).

(D) Feedback control: Except as provided for in section (e)(6.2.2)(E), if the engine is equipped with feedback or feed-forward control of the reductant injection (e.g., pressure control), the OBD system shall detect a malfunction:

(i) If the system fails to begin control within a manufacturer specified time interval;

(ii) If a failure or deterioration causes open loop or default operation; or

(iii) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(E) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (e)(6.2.2)(D)(iii) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on an engine with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(F) In lieu of detecting the malfunctions specified in sections (e)(6.2.2)(D)(i) and (ii) with a reductant injection system-specific monitor, the OBD system may monitor the individual parameters or components that are used as inputs for reductant injection feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (e)(6.2.2)(D)(i) and (ii).

(6.2.3) Catalyst System Aging and Monitoring

(A) For purposes of determining the catalyst malfunction criteria in section (e)(6.2.1) for individually monitored catalysts, the manufacturer shall use a catalyst deteriorated to the malfunction criteria using methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning engine operating conditions. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated.

(B) For purposes of determining the catalyst malfunction criteria in section (e)(6.2.1) for catalysts monitored in combination with others, the manufacturer shall submit a catalyst system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description, emission control purpose, and location of each component, the monitoring strategy for each component and/or combination of components, and the method for determining the malfunction criteria of section (e)(6.2.1) including the deterioration/aging process. If the catalyst system contains catalysts in parallel (e.g., a two bank exhaust system where each bank has its own catalyst), the malfunction criteria shall be determined with the "parallel" catalysts equally deteriorated. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world catalyst system component deterioration under normal and malfunctioning engine operating conditions, the effectiveness of the method used to determine the malfunction criteria of section (e)(6.2.1), the ability of the component monitor(s) to pinpoint the likely area of malfunction and ensure the correct components are repaired/replaced in-use, and the ability of the component monitor(s) to accurately verify that each catalyst component is functioning as designed and as required in section (e)(6.2.1).

(6.3) Monitoring Conditions:

(6.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(6.2.1), (e)(6.2.2)(A), and (e)(6.2.2)(C) (i.e., catalyst efficiency, reductant delivery performance, and improper reductant) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (e)(6.2.1) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(6.3.2) Except as provided in section (e)(6.3.3), the OBD system shall monitor continuously for malfunctions identified in sections (e)(6.2.2)(B) and (D) (i.e., insufficient reductant, feedback control).

(6.3.3) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(6.4) MIL Illumination and Fault Code Storage:

(6.4.1) Except as provided below for reductant faults, general requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(6.4.2) If the OBD system is capable of discerning that a system fault is being caused by a empty reductant tank:

(A) The manufacturer may request Executive Officer approval to delay illumination of the MIL if the vehicle is equipped with an alternative indicator for notifying the vehicle operator of the malfunction. The Executive Officer shall approve the request upon determining the alternative indicator is of sufficient illumination and location to be readily visible under all lighting conditions and provides equivalent assurance that a vehicle operator will be promptly notified and that corrective action will be undertaken.

(B) If the vehicle is not equipped with an alternative indicator and the MIL illuminates, the MIL may be immediately extinguished and the corresponding fault codes erased once the OBD system has verified that the reductant tank has been properly refilled and the MIL has not been illuminated for any other type of malfunction.

(C) The Executive Officer may approve other strategies that provide equivalent assurance that a vehicle operator will be promptly notified and that corrective action will be undertaken.

(6.4.3) The monitoring method for the catalyst(s) shall be capable of detecting all instances, except diagnostic self-clearing, when a catalyst fault code has been cleared but the catalyst has not been replaced (e.g., catalyst overtemperature histogram approaches are not acceptable).

(7) NOx Adsorber Monitoring

(7.1) Requirement: The OBD system shall monitor the NOx adsorber(s) on engines so-equipped for proper performance. For engines equipped with active/intrusive injection (e.g., in-exhaust fuel and/or air injection) to achieve

desorption of the NOx adsorber(s), the OBD system shall monitor the active/intrusive injection system for proper performance. The individual electronic components (e.g., injectors, valves, sensors) that are used in the active/intrusive injection system shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(7.2) Malfunction Criteria:

(7.2.1) NOx adsorber capability:

(A) For 2010 through 2012 model year engines, the OBD system shall detect a NOx adsorber system malfunction when the NOx adsorber system capability decreases to the point that would cause an engine's NOx emissions to exceed any of the applicable standards by more than 0.3 g/bhp-hr (e.g., cause emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET). If no failure or deterioration of the NOx adsorber system capability could result in an engine's NOx emissions exceeding any of the applicable standards by more than 0.3 g/bhp-hr, the OBD system shall detect a malfunction when the system has no detectable amount of NOx adsorber capability.

(B) For 2013 and subsequent model year engines, the OBD system shall detect a NOx adsorber system malfunction when the NOx adsorber capability decreases to the point that would cause an engine's emissions to exceed the applicable NOx standards by more than 0.2 g/bhp-hr (e.g., cause emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET) or 2.0 times the applicable NMHC standard. If no failure or deterioration of the NOx adsorber capability could result in an engine's NOx or NMHC emissions exceeding the applicable malfunction criteria above, the OBD system shall detect a malfunction when the system has no detectable amount of NOx adsorber capability.

(7.2.2) For systems that utilize active/intrusive injection (e.g., in-cylinder post fuel injection, in-exhaust air-assisted fuel injection) to achieve desorption of the NOx adsorber, the OBD system shall detect a malfunction if any failure or deterioration of the injection system's ability to properly regulate injection causes the system to be unable to achieve desorption of the NOx adsorber.

(7.2.3) Feedback control: Except as provided for in section (e)(7.2.4), if the engine is equipped with feedback or feed-forward control of the NOx adsorber or active/intrusive injection system (e.g., feedback control of injection quantity, time), the OBD system shall detect a malfunction:

(A) If the system fails to begin control within a manufacturer specified time interval;

(B) If a failure or deterioration causes open loop or default operation; or

(C) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(7.2.4) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (e)(7.2.3)(C) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on an engine with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(7.2.5) In lieu of detecting the malfunctions specified in sections (e)(7.2.3)(A) and (B) with a NOx adsorber-specific monitor, the OBD system may monitor the individual parameters or components that are used as inputs for NOx adsorber or active/intrusive injection system feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (e)(7.2.3)(A) and (B).

(7.2.6) For purposes of determining the NOx adsorber system malfunction criteria in section (e)(7.2.1) for NOx adsorber systems that consist of more than one NOx adsorber (e.g., two or more adsorbers in series), the manufacturer shall submit a system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description and location of each component, the monitoring strategy for each component and/or combination of components, and the method for determining the malfunction criteria of section (e)(7.2.1) including the deterioration/aging process. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world NOx adsorber system component deterioration under normal and malfunctioning engine operating conditions, the effectiveness of the method used to determine the malfunction criteria of section (e)(7.2.1), the ability of the component monitor(s) to pinpoint the likely area of malfunction and ensure the correct components are repaired/replaced in-use, and the ability of the component monitor(s) to accurately verify that each NOx adsorber system component is functioning as designed and as required in section (e)(7.2.1).

(7.3) Monitoring Conditions:

(7.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(7.2.1) (i.e., adsorber capability) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in sections (e)(7.2.1) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(7.3.2) Except as provided in section (e)(7.3.3), the OBD system shall monitor continuously for malfunctions identified in sections (e)(7.2.2) and (7.2.3) (e.g., injection function, feedback control).

(7.3.3) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(7.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(8) Particulate Matter (PM) Filter Monitoring

(8.1) Requirement: The OBD system shall monitor the PM filter on engines so-equipped for proper performance. For engines equipped with active regeneration systems that utilize an active/intrusive injection (e.g., in-exhaust fuel injection, in-exhaust fuel/air burner), the OBD system shall monitor the active/intrusive injection system for proper performance. The individual electronic components (e.g., injectors, valves, sensors) that are used in the active/intrusive injection system shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(8.2) Malfunction Criteria:

(8.2.1) Filtering Performance:

(A) For 2010 through 2012 model year engines, the OBD system shall detect a malfunction prior to a decrease in the filtering capability of the PM filter (e.g., cracking) that would cause an engine's PM emissions to exceed either of the following thresholds, whichever is higher: 0.07 g/bhp-hr as measured from an applicable emission test cycle (i.e., FTP or SET); or the applicable standard plus 0.06 g/bhp-hr (e.g., 0.07 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr). If no failure or deterioration of the PM filtering performance could result in an engine's PM emissions exceeding these levels, the OBD system shall detect a malfunction when no detectable amount of PM filtering occurs.

(B) For all 2013 model year engines and 2014 and 2015 model year engines that are not included in the phase-in specified in section (e)(8.2.1)(C) the OBD system shall detect a malfunction prior to a decrease in the filtering capability of the PM filter that would cause an engine's PM emissions to exceed either of the following thresholds, whichever is higher: 0.05 g/bhp-hr as measured from an applicable emission test cycle (i.e., FTP or SET);

or the applicable standard plus 0.04 g/bhp-hr (e.g., 0.05 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr). If no failure or deterioration of the PM filtering performance could result in an engine's PM emissions exceeding these levels, the OBD system shall detect a malfunction when no detectable amount of PM filtering occurs.

(C) For 2014 through 2015 model year engines, the manufacturer shall meet one of the following two options below:

(i) For at least 20 percent of 2014 model year diesel engines and at least 20 percent of 2015 model year diesel engines (percentage based on the manufacturer's projected California sales volume of all diesel engines subject to this regulation), the OBD system shall use the malfunction criteria of section (e)(8.2.1)(B) without using the provisions of section (g)(5.1) to exclude specific failure modes.

(ii) For at least 50 percent of 2015 model year diesel engines (percentage based on the manufacturer's projected California sales volume of all diesel engines subject to this regulation), the OBD system shall detect a malfunction prior to a decrease in the filtering capability of the PM filter that would cause an engine's PM emissions to exceed either of the following thresholds, whichever is higher, without using the provisions of section (g)(5.1) to exclude specific failure modes: 0.03 g/bhp-hr as measured from an applicable emission test cycle (i.e., FTP or SET); or the applicable standard plus 0.02 g/bhp-hr (e.g., 0.03 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr). If no failure or deterioration of the PM filtering performance could result in an engine's PM emissions exceeding these levels, the OBD system shall detect a malfunction when no detectable amount of PM filtering occurs.

(D) Except as provided in section (e)(8.2.1)(E), for all 2016 and subsequent model year engines, the OBD system shall detect a malfunction prior to a decrease in the filtering capability of the PM filter that would cause an engine's PM emissions to exceed either of the following thresholds, whichever is higher: 0.03 g/bhp-hr as measured from an applicable emission test cycle (i.e., FTP or SET); or the applicable standard plus 0.02 g/bhp-hr (e.g., 0.03 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr). If no failure or deterioration of the PM filtering performance could result in an engine's PM emissions exceeding these levels, the OBD system shall detect a malfunction when no detectable amount of PM filtering occurs.

(E) In lieu of the malfunction criteria in section (e)(8.2.1)(D), a manufacturer may continue to use the malfunction criteria in section (e)(8.2.1)(C)(i) for any 2016 model year engine that was previously certified in the 2014 or 2015 model year to the malfunction criteria in section (e)(8.2.1)(C)(i) and carried over to the 2016 model year.

(F) For the phase-in schedules described in section (e)(8.2.1)(C) above, the manufacturer may not use an alternate phase-in schedule as defined in section (c) in lieu of the required phase-in schedules.

(8.2.2) Frequent Regeneration: The OBD system shall detect a malfunction when the PM filter regeneration occurs more frequently than (i.e., occurs more often than) the manufacturer's specified regeneration frequency to a level such that it would cause an engine's emissions to exceed the following:

(A) For 2010 through 2012 model year engines, 2.0 times the applicable NMHC standards.

(B) For 2013 and subsequent model year engines, 2.0 times the applicable NMHC standards or the applicable NOx standard by more than 0.2 g/bhp-hr (e.g., cause NOx emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr).

(C) If no failure or deterioration causes an increase in the PM filter regeneration frequency that could result in an engine's emissions exceeding the emission levels specified above, the OBD system shall detect a malfunction when the PM filter regeneration frequency exceeds the manufacturer's specified design limits for allowable regeneration frequency.

(8.2.3) Incomplete regeneration: The OBD system shall detect a regeneration malfunction when the PM filter does not properly regenerate under manufacturer-defined conditions where regeneration is designed to occur.

(8.2.4) Catalyzed PM Filter:

(A) NMHC conversion: For 2015 and subsequent model year engines with catalyzed PM filters that convert NMHC emissions:

(i) The OBD system shall monitor the catalyst function of the PM filter and detect a malfunction when the NMHC conversion capability decreases to the point that NMHC emissions exceed 2.0 times the applicable standards.

(ii) If no failure or deterioration of the NMHC conversion capability could result in an engine's NMHC emissions exceeding 2.0 times the applicable standards, the OBD system shall detect a malfunction when the system has no detectable amount of NMHC conversion capability.

(iii) Catalyzed PM filters are exempt from this monitoring if both of the following criteria are satisfied: (1) no malfunction of the catalyzed PM filter's NMHC conversion capability can cause emissions to increase by 15 percent or more of the applicable standard as measured from an applicable emission test cycle; and (2) no malfunction of the catalyzed PM filter's NMHC conversion capability can cause emissions to exceed the applicable standard as measured from an applicable emission test cycle.

(B) Feedgas generation: For 2016 and subsequent model year engines with catalyzed PM filters used to generate a feedgas constituency to assist SCR systems (e.g., to increase NO_2 concentration upstream of an SCR system), the OBD system shall detect a malfunction when the system is unable to generate the necessary feedgas constituents for proper SCR system operation. Catalyzed PM filters are exempt from this monitoring if both of the following criteria are satisfied: (1) no malfunction of the catalyzed PM filter's feedgas generation ability can cause emissions to increase by 15 percent or more of the applicable standard as measured from an applicable emission test cycle; and (2) no malfunction of the catalyzed PM filter's feedgas generation ability can cause emissions to exceed the applicable standard as measured from an applicable emission test cycle.

(8.2.5) Missing substrate: The OBD system shall detect a malfunction if either the PM filter substrate is completely destroyed, removed, or missing, or if the PM filter assembly is replaced with a muffler or straight pipe.

(8.2.6) Active/Intrusive Injection: For systems that utilize active/intrusive injection (e.g., in-cylinder post fuel injection, in-exhaust air-assisted fuel injection) to achieve regeneration of the PM filter, the OBD system shall detect a malfunction if any failure or deterioration of the injection system's ability to properly regulate injection causes the system to be unable to achieve regeneration of the PM filter.

(8.2.7) Feedback Control: Except as provided for in section (e)(8.2.8), if the engine is equipped with feedback or feed-forward control of the PM filter regeneration (e.g., feedback control of oxidation catalyst inlet temperature, PM filter inlet or outlet temperature, in-cylinder or in-exhaust fuel injection), the OBD system shall detect a malfunction:

(A) If the system fails to begin control within a manufacturer specified time interval;

(B) If a failure or deterioration causes open loop or default operation; or

(C) If the control system has used up all of the adjustment allowed by the manufacturer or reached its maximum authority and cannot achieve the target.

(8.2.8) A manufacturer may request Executive Officer approval to temporarily disable monitoring for the malfunction criteria specified in section (e)(8.2.7)(C) during conditions that a manufacturer cannot robustly distinguish between a malfunctioning system and a properly operating system. The Executive Officer shall approve the disablement upon the manufacturer submitting data and/or analysis demonstrating that the control system, when operating as designed on an engine with all emission controls working properly, routinely operates during these conditions with all of the adjustment allowed by the manufacturer used up.

(8.2.9) In lieu of detecting the malfunctions specified in sections (e)(8.2.7)(A) and (B) with a PM filter-specific monitor, the OBD system may monitor the individual parameters or components that are used as inputs for PM filter regeneration feedback control provided that the monitors detect all malfunctions that meet the criteria in sections (e)(8.2.7)(A) and (B).

(8.3) Monitoring Conditions:

(8.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(8.2.1) through (8.2.6) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in sections (e)(8.2.1) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(8.3.2) Except as provided in section (e)(8.3.3), the OBD system shall monitor continuously for malfunctions identified in section (e)(8.2.7) (i.e., PM filter feedback control).

(8.3.3) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(8.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(9) Exhaust Gas Sensor Monitoring

(9.1) Requirement:

(9.1.1) The OBD system shall monitor all exhaust gas sensors (e.g., oxygen, air-fuel ratio, NOx) used for emission control system feedback (e.g., EGR control/feedback, SCR control/feedback, NOx adsorber control/feedback) or as a monitoring device for proper output signal, activity, response rate, and any other parameter that can affect emissions.

(9.1.2) For engines equipped with heated exhaust gas sensors, the OBD system shall monitor the heater for proper performance.

(9.2) Malfunction Criteria:

(9.2.1) Air-Fuel Ratio Sensors:

(A) For sensors located upstream of the exhaust aftertreatment:

(i) Sensor performance faults: The OBD system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause an engine's NMHC, CO, or NOx emissions to exceed 2.0 times any of the applicable standards or the engine's PM emissions to exceed any of the applicable standards plus 0.02 g/bhp-hr.

(ii) Circuit faults: The OBD system shall detect malfunctions of the sensor caused by either a lack of circuit continuity or out-of-range values.

(iii) Feedback faults: The OBD system shall detect a malfunction of the sensor when a sensor failure or deterioration causes an emission control system (e.g., EGR, SCR, or NOx adsorber) to stop using that sensor as a feedback or feed-forward input (e.g., causes default or open-loop operation).

(iv) Monitoring capability: To the extent feasible, the OBD system shall detect a malfunction of the sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD system monitoring device (e.g., for catalyst, EGR, SCR, or NOx adsorber monitoring).

(B) For sensors located downstream of the exhaust aftertreatment:

(i) Sensor performance faults:

a. For 2010 through 2012 model year engines, the OBD system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause an engine's NMHC emissions to exceed 2.5 times any of the applicable standards, cause an engine's NOx emissions to exceed any of the applicable standards by more than 0.3 g/bhp-hr (e.g., cause emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET), or cause an engine's PM emissions to exceed (whichever is higher): 0.05 g/bhp-hr as measured from an applicable cycle emission test (i.e., FTP or SET); or any of the applicable standards by more than 0.04 g/bhp-hr (e.g., cause emissions to exceed 0.05 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr).

b. For 2013 and subsequent model year engines, the OBD system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause an engine's NMHC emissions to exceed 2.0 times any of the applicable standards,

cause an engine's NOx emissions to exceed any of the applicable standards by more than 0.2 g/bhp-hr (e.g., cause emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET), or cause an engine's PM emissions to exceed (whichever is higher): 0.03 g/bhp-hr as measured from an applicable cycle emission test (i.e., FTP or SET); or any of the applicable standards by more than 0.02 g/bhp-hr (e.g., cause emissions to exceed 0.03 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr).

(ii) Circuit faults: The OBD system shall detect malfunctions of the sensor caused by either a lack of circuit continuity or out-of-range values.

(iii) Feedback faults: The OBD system shall detect a malfunction of the sensor when a sensor failure or deterioration causes an emission control system (e.g., EGR, SCR, or NOx adsorber) to stop using that sensor as a feedback or feed-forward input (e.g., causes default or open-loop operation).

(iv) Monitoring capability: To the extent feasible, the OBD system shall detect a malfunction of the sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD system monitoring device (e.g., for catalyst, EGR, SCR, or NOx adsorber monitoring).

(9.2.2) NOx and PM sensors:

(A) Sensor performance faults:

(i) For 2010 through 2012 model year engines, the OBD system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause an engine's NOx emissions to exceed any of the applicable standards by more than 0.4 g/bhp-hr (e.g., cause emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET), or cause an engine's PM emissions to exceed (whichever is higher): 0.05 g/bhp-hr as measured from an applicable cycle emission test (i.e., FTP or SET); or any of the applicable standards by more than 0.04 g/bhp-hr (e.g., cause emissions to exceed 0.05 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr).

(ii) For all 2013 model year engines and 2014 and 2015 model year engines that are not included in the phase-in specified in section (e)(9.2.2)(A)(iii), the OBD system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that

would cause an engine's NOx emissions to exceed the applicable NOx standard by more than 0.4 g/bhp-hr (e.g., cause emissions to exceed 0.6 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or cause an engine's PM emissions to exceed (whichever is higher): 0.03 g/bhp-hr as measured from an applicable cycle emission test (i.e., FTP or SET); or any of the applicable standards by more than 0.02 g/bhp-hr (e.g., cause emissions to exceed 0.03 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr).

(iii) For at least 20 percent of 2014 model year diesel engines and at least 50 percent of 2015 model year diesel engines (percentage based on the manufacturer's projected California sales volume of all diesel engines subject to this regulation), the OBD system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause an engine's NOx emissions to exceed the applicable NOx standard by more than 0.3 g/bhp-hr (e.g., cause emissions to exceed 0.5 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test or cause an engine's PM emissions to exceed (whichever is higher): 0.03 g/bhp-hr as measured from an applicable cycle emission test (i.e., FTP or SET); or any of the applicable standards by more than 0.02 g/bhp-hr (e.g., cause emissions to exceed 0.03 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr).

(iv) Except as provided for below in section (e)(9.2.2)(A)(v), for 2016 and subsequent model year engines, the OBD system shall detect a malfunction prior to any failure or deterioration of the sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause an engine's NOx emissions to exceed the applicable NOx standards by more than 0.2 g/bhp-hr (e.g., cause emissions to exceed 0.4 g/bhp-hr if the exhaust emission standard is 0.2 g/bhp-hr) as measured from an applicable cycle emission test (i.e., FTP or SET), cause an engine's NMHC emissions to exceed 2.0 times the applicable NMHC standard, or cause an engine's PM emissions to exceed (whichever is higher): 0.03 g/bhp-hr as measured from an applicable cycle emission test (i.e., FTP or SET); or any of the applicable standards by more than 0.02 g/bhp-hr (e.g., cause emissions to exceed 0.03 g/bhp-hr if the exhaust emission standard is 0.01 g/bhp-hr).

(v) In lieu of using the malfunction criteria in section (e)(9.2.2)(A)(iv), a manufacturer may continue to use the malfunction criteria in section (e)(9.2.2)(A)(iii) for any 2016 model year engine that was previously certified in the 2014 or 2015 model year to the malfunction criteria in section (e)(9.2.2)(A)(iii) and carried over to the 2016 model year.

(B) Circuit faults: The OBD system shall detect malfunctions of the sensor caused by either a lack of circuit continuity or out-of-range values.

(C) Feedback faults: The OBD system shall detect a malfunction of the sensor when a sensor failure or deterioration causes an emission control system (e.g., EGR, SCR, or NOx adsorber) to stop using that sensor as a feedback or feed-forward input (e.g., causes default or open-loop operation).

(D) Monitoring capability: To the extent feasible, the OBD system shall detect a malfunction of the sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD system monitoring device (e.g., for catalyst, EGR, PM filter, SCR, or NOx adsorber monitoring).

(9.2.3) Other exhaust gas sensors:

(A) For other exhaust gas sensors, the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for air-fuel ratio sensors, NOx sensors, and PM sensors under sections (e)(9.2.1) and (e)(9.2.2).

(9.2.4) Sensor Heaters:

(A) The OBD system shall detect a malfunction of the heater performance when the current or voltage drop in the heater circuit is no longer within the manufacturer's specified limits for normal operation (i.e., within the criteria required to be met by the component vendor for heater circuit performance at high mileage). Subject to Executive Officer approval, other malfunction criteria for heater performance malfunctions may be used upon the Executive Officer determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate the monitoring reliability and timeliness to be equivalent to the stated criteria in section (e)(9.2.4)(A).

(B) The OBD system shall detect malfunctions of the heater circuit including open or short circuits that conflict with the commanded state of the heater (e.g., shorted to 12 Volts when commanded to 0 Volts (ground)).

(9.3) Monitoring Conditions:

(9.3.1) Exhaust Gas Sensors

(A) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(9.2.1)(A)(i), (9.2.1)(B)(i), (9.2.2)(A), and (9.2.2)(D) (e.g., sensor performance faults) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in sections (e)(9.2.1)(A)(i), (9.2.1)(B)(i), (9.2.2)(A), and for 2016 and subsequent model year engines, section (e)(9.2.2)(D),

shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(B) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (e)(9.2.1)(A)(iv) and (9.2.1)(B)(iv), (e.g., monitoring capability) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(C) Except as provided in section (e)(9.3.1)(D), monitoring for malfunctions identified in sections (e)(9.2.1)(A)(ii), (9.2.1)(A)(iii), (9.2.1)(B)(ii), (9.2.1)(B)(iii), (9.2.2)(B), and (9.2.2)(C) (i.e., circuit continuity and open-loop malfunctions) shall be conducted continuously.

(D) A manufacturer may request Executive Officer approval to disable continuous exhaust gas sensor monitoring when an exhaust gas sensor malfunction cannot be distinguished from other effects (e.g., disable out-of-range low monitoring during fuel cut conditions). The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(9.3.2) Sensor Heaters

(A) Manufacturers shall define monitoring conditions for malfunctions identified in section (e)(9.2.4)(A) (i.e., sensor heater performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(B) Monitoring for malfunctions identified in section (e)(9.2.4)(B) (i.e., circuit malfunctions) shall be conducted continuously.

(9.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2). To the extent feasible, the OBD system shall separately detect lack of circuit continuity and out-of-range faults as required under sections (e)(9.2.1)(A)(ii), (e)(9.2.1)(B)(ii), and (e)(9.2.2)(B) and store different fault codes for each distinct malfunction (e.g., out-of-range low, out-of-range high, open circuit). Manufacturers are not required to store separate fault codes for lack of circuit continuity faults that cannot be distinguished from other out-of-range circuit faults.

(10) Variable Valve Timing and/or Control (VVT) System Monitoring

(10.1) Requirement: The OBD system shall monitor the VVT system on engines so-equipped for target error and slow response malfunctions. The individual electronic components (e.g., actuators, valves, sensors) that are used in the VVT system shall be monitored in accordance with the comprehensive components requirements in section (g)(3).

(10.2) Malfunction Criteria:

(10.2.1) Target Error: The OBD system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve the commanded valve timing and/or control within a crank angle and/or lift tolerance that would cause an engine's NHMC, NOx, or CO emissions to exceed 2.0 times any of the applicable standards or an engine's PM emissions to exceed a threshold of the applicable standard plus 0.02 g/bhp-hr.

(10.2.2) Slow Response: The OBD system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve the commanded valve timing and/or control within a manufacturer-specified time that would cause an engine's NHMC, NOx, or CO emissions to exceed 2.0 times any of the applicable standards or an engine's PM emissions to exceed a threshold of the applicable standard plus 0.02 g/bhp-hr.

(10.2.3) For engines in which no failure or deterioration of the VVT system could result in an engine's emissions exceeding the thresholds of sections (e)(10.2.1) or (10.2.2), the OBD system shall detect a malfunction of the VVT system when proper functional response of the system to computer commands does not occur.

(10.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for VVT system malfunctions identified in section (e)(10.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (e)(10.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(10.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(11) Cold Start Emission Reduction Strategy Monitoring

(11.1) Requirement:

(11.1.1) For all 2013 and subsequent model year engines that incorporate a specific engine control strategy to reduce cold start emissions, the OBD system shall monitor the strategy to verify that it achieves the desired effect (e.g., to achieve accelerated catalyst light-off temperature) and monitor the commanded elements/components for proper function (e.g., injection timing, increased engine idle speed, increased engine load via intake or

exhaust throttle activation) while the control strategy is active to ensure proper operation of the control strategy.

(11.1.2) For an element/component associated with the cold start emission reduction control strategy under section (e)(11) that is also required to be monitored elsewhere in section (e) or (g) (e.g., fuel injection timing), the manufacturer shall use different diagnostics to distinguish faults detected under section (e)(11) (i.e., faults associated with the cold start strategy) from faults detected under sections other than section (e)(11) (i.e., faults not associated with the cold start strategy).

(11.2) Malfunction Criteria: The OBD system shall, to the extent feasible, detect a malfunction if either of the following occurs:

(11.2.1) Any single commanded element/component does not properly respond to the commanded action while the cold start strategy is active. For purposes of this section, "properly respond" is defined as when the element responds:

(A) by a robustly detectable amount by the monitor; and

(B) in the direction of the desired command; and

(C) above and beyond what the element/component would achieve on start-up without the cold start strategy active (e.g., if the cold start strategy commands a higher idle engine speed, a fault must be detected if there is no detectable amount of engine speed increase above what the system would achieve without the cold start strategy active);

(11.2.2) Any failure or deterioration of the cold start emission reduction control strategy that would cause an engine's NMHC, NOx, or CO emissions to exceed 2.0 times the applicable standards or the engine's PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr.

(11.2.3) For section (e)(11.2.2), to the extent feasible (without adding hardware for this purpose), the OBD system shall monitor the ability of the system to achieve the desired effect (e.g., strategies used to accelerate catalyst light-off by increasing catalyst inlet temperature shall verify the catalyst inlet temperature actually achieves the desired temperatures within an Executive Officer approved time interval after starting the engine) for failures that cause emissions to exceed the applicable emission levels specified in section (e)(11.2.2). For strategies where it is not feasible to be monitored as a system, the OBD system shall monitor the individual elements/components (e.g., increased engine speed, increased engine load from restricting an exhaust throttle) for failures that cause emissions to exceed the applicable emission levels specified in section (e)(11.2.2).

(11.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (e)(11.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(11.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(f) *Monitoring Requirements for Gasoline/Spark-Ignited Engines.*

(1) Fuel System Monitoring

(1.1) Requirement: The OBD system shall monitor the fuel delivery system to determine its ability to provide compliance with applicable standards.

(1.2) Malfunction Criteria:

(1.2.1) The OBD system shall detect a malfunction of the fuel delivery system when:

(A) The fuel delivery system is unable to maintain an engine's emissions at or below 1.5 times the applicable standards; or

(B) If equipped, the feedback control based on a secondary oxygen or exhaust gas sensor is unable to maintain an engine's emissions (except as a result of a malfunction specified in section (f)(1.2.1)(C)) at or below 1.5 times any of the applicable standards; or

(C) For 2014 and subsequent model year engines, an air-fuel ratio cylinder imbalance (e.g., the air-fuel ratio in one or more cylinders is different than the other cylinders due to a cylinder specific malfunction such as an intake manifold leak at a particular cylinder, fuel injector problem, an individual cylinder EGR runner flow delivery problem, an individual variable cam lift malfunction such that an individual cylinder is operating on the wrong cam lift profile, or other similar problems) occurs in one or more cylinders such that the fuel delivery system is unable to maintain an engine's emissions at or below: 3.0 times the applicable standards for the 2014 through 2016 model years; and 1.5 times the applicable FTP standards for all 2017 and subsequent model year engines.

(1.2.2) Except as provided for in section (f)(1.2.3) below, if the engine is equipped with adaptive feedback control, the OBD system shall detect a malfunction when the adaptive feedback control has used up all of the adjustment allowed by the manufacturer.

(1.2.3) If the engine is equipped with feedback control that is based on a secondary oxygen (or equivalent) sensor, the OBD system is not required to detect a malfunction of the fuel system solely when the feedback control based on a secondary oxygen sensor has used up all of the adjustment allowed by the manufacturer. However, if a failure or deterioration results in engine emissions that exceed the malfunction criteria in section (f)(1.2.1)(B), the OBD system is required to detect a malfunction.

(1.2.4) The OBD system shall detect a malfunction whenever the fuel control system fails to enter closed-loop operation within an Executive Officer-approved time interval after engine start. Executive Officer approval of the

time interval shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times.

(1.2.5) For engines that employ engine shutoff strategies that do not require the vehicle operator to restart the engine to continue driving (e.g., hybrid bus with engine shutoff at idle), the OBD system shall detect whenever the fuel control system fails to enter closed-loop operation within an Executive Officer-approved time interval after an engine restart. Executive Officer approval of the time interval shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times.

(1.3) Monitoring Conditions:

(1.3.1) Except as provided in section (f)(1.3.5), the OBD system shall monitor continuously for malfunctions identified in sections (f)(1.2.1)(A), (f)(1.2.1)(B), and (f)(1.2.2) (i.e., fuel delivery system, secondary feedback control, adaptive feedback control).

(1.3.2) Manufacturers shall define monitoring conditions for malfunctions identified in section (f)(1.2.1)(C) (i.e., air-fuel ratio cylinder imbalance malfunctions) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(1.3.3) Manufacturers shall define monitoring conditions for malfunctions identified in section (f)(1.2.4) in accordance with sections (d)(3.1).

(1.3.4) Manufacturers shall define monitoring conditions for malfunctions identified in section (f)(1.2.5) in accordance with sections (d)(3.1) with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).

(1.3.5) Manufacturers may request Executive Officer approval to temporarily disable continuous monitoring under conditions technically necessary to ensure robust detection of malfunctions and to avoid false passes and false indications of malfunctions (e.g., for temporary introduction of large amounts of purge vapor). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement interval is limited only to that which is technically necessary.

(1.4) MIL Illumination and Fault Code Storage: For malfunctions described under section (f)(1.2.1)(C) (i.e., air-fuel ratio cylinder imbalance malfunctions), general requirements for MIL illumination and fault code storage are set forth in section (d)(2). For all other fuel system malfunctions, the MIL illumination and fault code storage requirements are set forth in sections (f)(1.4.1) through (1.4.6) below.

(1.4.1) A pending fault code shall be stored immediately upon the fuel system exceeding the malfunction criteria established pursuant to section (f)(1.2).

(1.4.2) Except as provided below, if a pending fault code is stored, the OBD system shall immediately illuminate the MIL and store a confirmed fault code if a malfunction is again detected during either of the following two events: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to those that occurred when the pending fault code was stored are encountered.

(1.4.3) The pending fault code may be erased at the end of the next driving cycle in which similar conditions have been encountered without an exceedance of the specified fuel system malfunction criteria. The pending code may also be erased if similar conditions are not encountered during the 80 driving cycles immediately after the initial detection of a malfunction for which the pending code was set.

(1.4.4) Storage of freeze frame conditions.

(A) The OBD system shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing and erasing a confirmed fault code.

(B) If freeze frame conditions are stored for a malfunction other than a misfire (see section (f)(2)) or fuel system malfunction when a fault code is stored as specified in section (f)(1.4.1) or (f)(1.4.2) above, the stored freeze frame information shall be replaced with freeze frame information regarding the fuel system malfunction.

(1.4.5) Storage of fuel system conditions for determining similar conditions of operation.

(A) Upon detection of a fuel system malfunction under section (f)(1.2), the OBD system shall store the engine speed, load, and warm-up status of the first fuel system malfunction that resulted in the storage of the pending fault code.

(B) For fuel system faults detected using feedback control that is based on a secondary oxygen (or equivalent) sensor, the manufacturer may request Executive Officer approval to use an alternate definition of similar conditions in lieu of the definition specified in section (c). The Executive Officer shall approve the alternate definition upon the manufacturer providing data or analysis demonstrating that the alternate definition provides for equivalent robustness in detection of fuel system faults that vary in severity depending on engine speed, load, and/or warm-up status.

(1.4.6) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without a malfunction of the fuel system.

(2) Misfire Monitoring

(2.1) Requirement:

(2.1.1) The OBD system shall monitor the engine for misfire causing catalyst damage and misfire causing excess emissions.

(2.1.2) The OBD system shall identify the specific cylinder that is experiencing misfire. Manufacturers may request Executive Officer approval to store a general misfire fault code instead of a cylinder specific fault code under certain operating conditions. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that the misfiring cylinder cannot be reliably identified when the conditions occur.

(2.1.3) If more than one cylinder is misfiring, a separate fault code shall be stored indicating that multiple cylinders are misfiring except as allowed below. When identifying multiple cylinder misfire, the OBD system is not required to also identify each of the misfiring cylinders individually through separate fault codes. If more than 90 percent of the detected misfires occur in a single cylinder, the OBD system may elect to store the appropriate fault code indicating the specific misfiring cylinder in lieu of the multiple cylinder misfire fault code. If, however, two or more cylinders individually have more than 10 percent of the total number of detected misfires, a multiple cylinder fault code must be stored.

(2.2) Malfunction Criteria: The OBD system shall detect a misfire malfunction pursuant to the following:

(2.2.1) Misfire causing catalyst damage:

(A) Manufacturers shall determine the percentage of misfire evaluated in 200 revolution increments for each engine speed and load condition that would result in a temperature that causes catalyst damage. The manufacturer shall submit documentation to support this percentage of misfire as required in section (j)(2.5). For every engine speed and load condition that this percentage of misfire is determined to be lower than five percent, the manufacturer may set the malfunction criteria at five percent.

(B) Subject to Executive Officer approval, a manufacturer may employ a longer interval than 200 revolutions but only for determining, on a given driving cycle, the first misfire exceedance as provided in section (f)(2.4.1)(A) below. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or an engineering evaluation that

demonstrate that catalyst damage would not occur due to unacceptably high catalyst temperatures before the interval has elapsed.

(C) A misfire malfunction shall be detected if the percentage of misfire established in section (f)(2.2.1)(A) is exceeded. For multiple cylinder misfire situations that result in a misfire rate greater than or equal to 50 percent, the OBD system shall only be required to detect a misfire malfunction for situations that are caused by a single component failure.

(D) For purposes of establishing the temperature at which catalyst damage occurs as required in section (f)(2.2.1)(A), manufacturers may not define catalyst damage at a temperature more severe than what the catalyst system could be operated at for 10 consecutive hours and still meet the applicable standards.

(2.2.2) Misfire causing emissions to exceed 1.5 times the applicable standards:

(A) Manufacturers shall determine the percentage of misfire evaluated in 1000 revolution increments that would cause emissions from an emission durability demonstration engine to exceed 1.5 times any of the applicable standards if the percentage of misfire were present from the beginning of the test. To establish this percentage of misfire, the manufacturer shall utilize misfire events occurring at equally spaced, complete engine cycle intervals, across randomly selected cylinders throughout each 1000-revolution increment. If this percentage of misfire is determined to be lower than one percent, the manufacturer may set the malfunction criteria at one percent.

(B) Subject to Executive Officer approval, a manufacturer may employ other revolution increments. The Executive Officer shall grant approval upon determining that the manufacturer has demonstrated that the strategy would be equally effective and timely in detecting misfire.

(C) A malfunction shall be detected if the percentage of misfire established in section (f)(2.2.2)(A) is exceeded regardless of the pattern of misfire events (e.g., random, equally spaced, continuous).

(2.3) Monitoring Conditions:

(2.3.1) The OBD system shall continuously monitor for misfire under the following conditions:

(A) Except as provided for in section (f)(2.3.6) below, from no later than the end of the second crankshaft revolution after engine start,

(B) While under positive torque conditions during the rise time and settling time for engine speed to reach the desired idle engine speed at engine start-up (i.e., "flare-up" and "flare-down"), and

(C) Under all positive torque engine speeds and load conditions except within the following range: the engine operating region bound by the positive

torque line (i.e., engine load with the transmission in neutral), and the two following engine operating points: an engine speed of 3000 rpm with the engine load at the positive torque line, and the redline engine speed (defined in section (c)) with the engine's manifold vacuum at four inches of mercury lower than that at the positive torque line.

(2.3.2) If a monitoring system cannot detect all misfire patterns under all required engine speed and load conditions as required in section (f)(2.3.1) above, the manufacturer may request Executive Officer approval to accept the monitoring system. In evaluating the manufacturer's request, the Executive Officer shall consider the following factors: the magnitude of the region(s) in which misfire detection is limited, the degree to which misfire detection is limited in the region(s) (i.e., the probability of detection of misfire events), the frequency with which said region(s) are expected to be encountered in-use, the type of misfire patterns for which misfire detection is troublesome, and demonstration that the monitoring technology employed is not inherently incapable of detecting misfire under required conditions (i.e., compliance can be achieved on other engines). The evaluation shall be based on the following misfire patterns: equally spaced misfire occurring on randomly selected cylinders, single cylinder continuous misfire, and paired cylinder (cylinders firing at the same crank angle) continuous misfire.

(2.3.3) A manufacturer may request Executive Officer approval of a monitoring system that has reduced misfire detection capability during the portion of the first 1000 revolutions after engine start that a cold start emission reduction strategy that reduces engine torque (e.g., spark retard strategies) is active. The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated that the probability of detection is greater than or equal to 75 percent during the worst case condition (i.e., lowest generated torque) for a vehicle operated continuously at idle (park/neutral idle) on a cold start between 50 and 86 degrees Fahrenheit and that the technology cannot reliably detect a higher percentage of the misfire events during the conditions.

(2.3.4) A manufacturer may request Executive Officer approval to disable misfire monitoring or employ an alternate malfunction criterion when misfire cannot be distinguished from other effects.

(A) Upon determining that the manufacturer has presented documentation that demonstrates the disablement interval or period of use of an alternate malfunction criterion is limited only to that necessary for avoiding false detection, the Executive Officer shall approve the disablement or use of the alternate malfunction criterion for conditions involving:

(i) rough road,

(ii) fuel cut,

(iii) gear changes for manual transmission vehicles,

(iv) traction control or other vehicle stability control activation such as anti-lock braking or other engine torque modifications to enhance vehicle stability,

(v) off-board control or intrusive activation of vehicle components or diagnostics during service or assembly plant testing,

(vi) portions of intrusive evaporative system or EGR diagnostics that can significantly affect engine stability (i.e., while the purge valve is open during the vacuum pull-down of a evaporative system leak check but not while the purge valve is closed and the evaporative system is sealed or while an EGR diagnostic causes the EGR valve to be intrusively cycled on and off during positive torque conditions), or

(vii) engine speed, load, or torque transients due to throttle movements more rapid than occurs over the FTP cycle for the worst case engine within each engine family.

(B) Additionally, the Executive Officer will approve a manufacturer's request in accordance with sections (g)(5.3), (g)(5.4), and (g)(5.6) to disable misfire monitoring when the fuel level is 15 percent or less of the nominal capacity of the fuel tank, when PTO units are active, or while engine coolant temperature is below 20 degrees Fahrenheit. The Executive Officer will approve a request to continue disablement on engine starts when engine coolant temperature is below 20 degrees Fahrenheit at engine start until engine coolant temperature exceeds 70 degrees Fahrenheit.

(C) In general, the Executive Officer shall not approve disablement for conditions involving normal air conditioning compressor cycling from on-to-off or off-to-on, automatic transmission gear shifts (except for shifts occurring during wide open throttle operation), transitions from idle to off-idle, normal engine speed or load changes that occur during the engine speed rise time and settling time (i.e., "flare-up" and "flare-down") immediately after engine starting without any vehicle operator-induced actions (e.g., throttle stabs), or excess acceleration (except for acceleration rates that exceed the maximum acceleration rate obtainable at wide open throttle while the vehicle is in gear due to abnormal conditions such as slipping of a clutch).

(D) The Executive Officer may approve misfire monitoring disablement or use of an alternate malfunction criterion for any other condition on a case by case basis upon determining that the manufacturer has demonstrated that the request is based on an unusual or unforeseen circumstance and that it is applying the best available computer and monitoring technology.

(2.3.5) For engines with more than eight cylinders that cannot meet the requirements of section (f)(2.3.1), a manufacturer may request Executive Officer approval to use alternative misfire monitoring conditions. The Executive Officer shall approve the request upon determining that the

manufacturer has submitted data and/or an engineering evaluation that demonstrate that misfire detection throughout the required operating region cannot be achieved when employing proven monitoring technology (i.e., a technology that provides for compliance with these requirements on other engines) and provided misfire is detected to the fullest extent permitted by the technology. However, the Executive Officer may not grant the request if the misfire detection system is unable to monitor during all positive torque operating conditions encountered during an FTP cycle.

(2.3.6) For engines that employ engine shutoff strategies that do not require the vehicle operator to restart the engine to continue driving (e.g., hybrid bus with engine shutoff at idle), the OBD system shall monitor for misfire from no later than the end of the second crankshaft revolution after engine fueling begins for the initial start and after each time fueling resumes.

(2.4) MIL Illumination and Fault Code Storage:

(2.4.1) Misfire causing catalyst damage. Upon detection of the percentage of misfire specified in section (f)(2.2.1) above, the following criteria shall apply for MIL illumination and fault code storage:

(A) Pending fault codes

(i) A pending fault code shall be stored immediately if, during a single driving cycle, the specified percentage of misfire is exceeded three times when operating in the positive torque region encountered during an FTP cycle or is exceeded on a single occasion when operating at any other engine speed and load condition in the positive torque region defined in section (f)(2.3.1).

(ii) Immediately after a pending fault code is stored as specified in section (f)(2.4.1)(A)(i) above, the MIL shall blink once per second at all times while misfire is occurring during the driving cycle.

a. The MIL may be extinguished during those times when misfire is not occurring during the driving cycle.

b. If, at the time a misfire malfunction occurs, the MIL is already illuminated for a malfunction other than misfire, the MIL shall blink as previously specified in section (f)(2.4.1)(A)(ii) while misfire is occurring. If misfiring ceases, the MIL shall stop blinking but remain illuminated as required by the other malfunction.

(B) Confirmed fault codes

(i) If a pending fault code for exceeding the percentage of misfire set forth in section (f)(2.2.1) is stored, the OBD system shall immediately store a confirmed fault code if the percentage of misfire specified in section (f)(2.2.1) is again exceeded one or more times during either: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle;

or (b) on the next driving cycle in which similar conditions (see section (c)) to the engine conditions that occurred when the pending fault code was stored are encountered.

(ii) If a pending fault code for exceeding the percentage of misfire set forth in section (f)(2.2.2) is stored from a previous driving cycle, the OBD system shall immediately store a confirmed fault code if the percentage of misfire specified in section (f)(2.2.1) is exceeded one or more times regardless of the conditions encountered.

(iii) Upon storage of a confirmed fault code, the MIL shall blink as specified in subparagraph (f)(2.4.1)(A)(ii) above as long as misfire is occurring and the MIL shall remain continuously illuminated if the misfiring ceases.

(C) Erasure of pending fault codes

Pending fault codes shall be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without any exceedance of the specified percentage of misfire. The pending code may also be erased if similar driving conditions are not encountered during the next 80 driving cycles subsequent to the initial detection of a malfunction.

(D) Exemptions for engines with fuel shutoff and default fuel control. Notwithstanding sections (f)(2.4.1)(A) and (B) above, in engines that provide for fuel shutoff and default fuel control to prevent over fueling during catalyst damage misfire conditions, the MIL is not required to blink. Instead, the MIL may illuminate continuously in accordance with the requirements for continuous MIL illumination in sections (f)(2.4.1)(B)(iii) above upon detection of misfire, provided that the fuel shutoff and default control are activated as soon as misfire is detected. Fuel shutoff and default fuel control may be deactivated only to permit fueling outside of the misfire range. Manufacturers may also periodically, but not more than once every 30 seconds, deactivate fuel shutoff and default fuel control to determine if the specified catalyst damage percentage of misfire is still being exceeded. Normal fueling and fuel control may be resumed if the specified catalyst damage percentage of misfire is no longer being exceeded.

(E) Manufacturers may request Executive Officer approval of strategies that continuously illuminate the MIL in lieu of blinking the MIL during extreme catalyst damage misfire conditions (i.e., catalyst damage misfire occurring at all engine speeds and loads). Executive Officer approval shall be granted upon determining that the manufacturer employs the strategy only when catalyst damage misfire levels cannot be avoided during reasonable driving conditions and the manufacturer has demonstrated that the strategy will encourage operation of the vehicle in conditions that will minimize catalyst damage (e.g., at low engine speeds and loads).

(2.4.2) Misfire causing emissions to exceed 1.5 times the FTP standards. Upon detection of the percentage of misfire specified in section (f)(2.2.2), the following criteria shall apply for MIL illumination and fault code storage:

(A) Misfire within the first 1000 revolutions after engine start.

(i) A pending fault code shall be stored no later than after the first exceedance of the specified percentage of misfire during a single driving cycle if the exceedance occurs within the first 1000 revolutions after engine start (defined in section (c)) during which misfire detection is active.

(ii) If a pending fault code is stored, the OBD system shall illuminate the MIL and store a confirmed fault code within 10 seconds if an exceedance of the specified percentage of misfire is again detected in the first 1000 revolutions during any subsequent driving cycle, regardless of the conditions encountered during the driving cycle.

(iii) The pending fault code shall be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without an exceedance of the specified percentage of misfire. The pending code may also be erased if similar conditions are not encountered during the next 80 driving cycles immediately following the initial detection of the malfunction.

(B) Exceedances after the first 1000 revolutions after engine start.

(i) A pending fault code shall be stored no later than after the fourth exceedance of the percentage of misfire specified in section (f)(2.2.2) during a single driving cycle.

(ii) If a pending fault code is stored, the OBD system shall illuminate the MIL and store a confirmed fault code within 10 seconds if the percentage of misfire specified in section (f)(2.2.2) is again exceeded four times during: (a) the driving cycle immediately following the storage of the pending fault code, regardless of the conditions encountered during the driving cycle; or (b) on the next driving cycle in which similar conditions (see section (c)) to the engine conditions that occurred when the pending fault code was stored are encountered.

(iii) The pending fault code may be erased at the end of the next driving cycle in which similar conditions to the engine conditions that occurred when the pending fault code was stored have been encountered without an exceedance of the specified percentage of misfire. The pending code may also be erased if similar conditions are not encountered during the next 80 driving cycles immediately following initial detection of the malfunction.

(2.4.3) Storage of freeze frame conditions.

(A) The OBD system shall store and erase freeze frame conditions either in conjunction with storing and erasing a pending fault code or in conjunction with storing and erasing a confirmed fault code.

(B) If freeze frame conditions are stored for a malfunction other than a misfire or fuel system malfunction (see section (f)(1)) when a fault code is stored as specified in section (f)(2.4) above, the stored freeze frame information shall be replaced with freeze frame information regarding the misfire malfunction.

(2.4.4) Storage of misfire conditions for similar conditions determination. Upon detection of misfire under sections (f)(2.4.1) or (2.4.2), the OBD system shall store the following engine conditions: engine speed, load, and warm-up status of the first misfire event that resulted in the storage of the pending fault code.

(2.4.5) Extinguishing the MIL. The MIL may be extinguished after three sequential driving cycles in which similar conditions have been encountered without an exceedance of the specified percentage of misfire.

(3) Exhaust Gas Recirculation (EGR) System Monitoring

(3.1) Requirement: The OBD system shall monitor the EGR system on engines so-equipped for low and high flow rate malfunctions. The individual electronic components (e.g., actuators, valves, sensors) that are used in the EGR system shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(3.2) Malfunction Criteria:

(3.2.1) The OBD system shall detect a malfunction of the EGR system prior to a decrease from the manufacturer's specified EGR flow rate that would cause an engine's emissions to exceed 1.5 times any of the applicable standards. For engines in which no failure or deterioration of the EGR system that causes a decrease in flow could result in an engine's emissions exceeding 1.5 times any of the applicable standards, the OBD system shall detect a malfunction when the system has no detectable amount of EGR flow.

(3.2.2) The OBD system shall detect a malfunction of the EGR system prior to an increase from the manufacturer's specified EGR flow rate that would cause an engine's emissions to exceed 1.5 times any of the applicable standards. For engines in which no failure or deterioration of the EGR system that causes an increase in flow could result in an engine's emissions exceeding 1.5 times any of the applicable standards, the OBD system shall detect a malfunction when the system has reached its control limits such that it cannot reduce EGR flow.

(3.3) Monitoring Conditions:

(3.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(3.2) (i.e., flow rate) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (f)(3.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(3.3.2) Manufacturers may request Executive Officer approval to temporarily disable the EGR system check under conditions when monitoring may not be reliable (e.g., when freezing may affect performance of the system). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation which demonstrate that a reliable check cannot be made when these conditions exist.

(3.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(4) Cold Start Emission Reduction Strategy Monitoring

(4.1) Requirement:

(4.1.1) If an engine incorporates a specific engine control strategy to reduce cold start emissions, the OBD system shall monitor the commanded elements/components for proper function (e.g., increased engine idle speed, mass air flow, commanded ignition timing retard), other than secondary air, while the control strategy is active to ensure proper operation of the control strategy. Secondary air systems shall be monitored under the provisions of section (f)(5).

(4.1.2) For an element/component associated with the cold start emission reduction control strategy under section (f)(4) that is also required to be monitored elsewhere in section (f) or (g) (e.g., fuel injection timing), the manufacturer shall use different diagnostics to distinguish faults detected under section (f)(4) (i.e., faults associated with the cold start strategy) from faults detected under sections other than section (f)(4) (i.e., faults not associated with the cold start strategy).

(4.2) Malfunction Criteria:

(4.2.1) For 2010 through 2012 model year engines:

(A) The OBD system shall detect a malfunction prior to any failure or deterioration of the individual elements/components associated with the cold start emission reduction control strategy that would cause an engine's emissions to exceed 1.5 times the applicable standards. Manufacturers shall:

(i) Establish the malfunction criteria based on data from one or more representative engine(s).

(ii) Provide an engineering evaluation for establishing the malfunction criteria for the remainder of the manufacturer's product line. The Executive Officer shall waive the evaluation requirement each year if, in the judgment of the Executive Officer, technological changes do not affect the previously determined malfunction criteria.

(B) For components where no failure or deterioration of the element/component used for the cold start emission reduction strategy could result in an engine's emissions exceeding 1.5 times the applicable standards, the individual element/component shall be monitored for proper functional response in accordance with the malfunction criteria in section (g)(3.2) while the control strategy is active.

(4.2.2) For 2013 and subsequent model year engines, the OBD system shall, to the extent feasible, detect a malfunction if either of the following occurs:

(A) Any single commanded element/component does not properly respond to the commanded action while the cold start strategy is active. For elements/components involving spark timing (e.g., retarded spark timing), the monitor may verify final commanded spark timing in lieu of verifying actual delivered spark timing. For purposes of this section, "properly respond" is defined as when the element responds:

(i) by a robustly detectable amount; and

(ii) in the direction of the desired command; and

(iii) above and beyond what the element/component would achieve on start-up without the cold start strategy active (e.g., if the cold start strategy commands a higher idle engine speed, a fault must be detected if there is no detectable amount of engine speed increase above what the system would achieve without the cold start strategy active);

(B) Any failure or deterioration of the cold start emission reduction control strategy that would cause an engine's emissions to be equal to or above 1.5 times the applicable standards. For this requirement, the OBD system shall either monitor the combined effect of the elements/components of the system as a whole (e.g., measuring air flow and modeling overall heat into the exhaust) or the individual elements/components (e.g., increased engine speed, commanded final spark timing) for failures that cause engine emissions to exceed 1.5 times the applicable standards.

(4.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(4.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(4.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(5) Secondary Air System Monitoring

(5.1) Requirement:

(5.1.1) The OBD system on engines equipped with any form of secondary air delivery system shall monitor the proper functioning of the secondary air delivery system including all air switching valve(s). The individual electronic components (e.g., actuators, valves, sensors) in the secondary air system shall be monitored in accordance with the comprehensive component requirements in section (g)(3).

(5.1.2) For purposes of section (f)(5), "air flow" is defined as the air flow delivered by the secondary air system to the exhaust system. For engines using secondary air systems with multiple air flow paths/distribution points, the air flow to each bank (i.e., a group of cylinders that share a common exhaust manifold, catalyst, and control sensor) shall be monitored in accordance with the malfunction criteria in section (f)(5.2) unless complete blocking of air delivery to one bank does not cause a measurable increase in emissions.

(5.1.3) For purposes of section (f)(5), "normal operation" is defined as the condition when the secondary air system is activated during catalyst and/or engine warm-up following engine start. "Normal operation" does not include the condition when the secondary air system is intrusively turned on solely for the purpose of monitoring.

(5.2) Malfunction Criteria:

(5.2.1) Except as provided in section (f)(5.2.3), the OBD system shall detect a secondary air system malfunction prior to a decrease from the manufacturer's specified air flow during normal operation that would cause an engine's emissions to exceed 1.5 times any of the applicable standards.

(5.2.2) Except as provided in section (f)(5.2.4), the OBD system shall detect a secondary air system malfunction prior to an increase from the manufacturer's specified air flow during normal operation that would cause an engine's emissions to exceed 1.5 times any of the applicable standards.

(5.2.3) For engines in which no deterioration or failure of the secondary air system that causes a decrease in air flow would result in an engine's emissions exceeding 1.5 times any of the applicable standards, the OBD system shall detect a malfunction when no detectable amount of air flow is delivered during normal operation.

(5.2.4) For 2016 and subsequent model year engines in which no deterioration or failure of the secondary air system that causes an increase in air flow

would result in an engine's emissions exceeding 1.5 times any of the applicable standards, the OBD system shall detect a malfunction when the secondary air system has reached its control limits such that it cannot reduce air flow during normal operation.

(5.3) Monitoring Conditions:

(5.3.1) Manufacturers shall define the monitoring conditions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (f)(5.2) during normal operation of the secondary air system shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(5.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(6) Catalyst Monitoring

(6.1) Requirement: The OBD system shall monitor the catalyst system for proper conversion capability.

(6.2) Malfunction Criteria:

(6.2.1) The OBD system shall detect a catalyst system malfunction when the catalyst system's conversion capability decreases to the point that any of the following occurs:

(A) Non-Methane Hydrocarbon (NMHC) emissions exceed 1.75 times the applicable standards to which the engine has been certified.

(B) The average FTP test NMHC conversion efficiency of the monitored portion of the catalyst system falls below 50 percent (i.e., the cumulative NMHC emissions measured at the outlet of the monitored catalyst(s) are more than 50 percent of the cumulative engine-out emissions measured at the inlet of the catalyst(s)). With Executive Officer approval, manufacturers may use a conversion efficiency malfunction criteria of less than 50 percent if the catalyst system is designed such that the monitored portion of the catalyst system must be replaced along with an adjacent portion of the catalyst system sufficient to ensure that the total portion replaced will meet the 50 percent conversion efficiency criteria. Executive Officer approval shall be based on data and/or engineering evaluation demonstrating the conversion efficiency of the monitored portion and the total portion designed to be replaced, and the likelihood of the catalyst system design to ensure replacement of the monitored and adjacent portions of the catalyst system.

(C) Oxides of nitrogen (NOx) emissions exceed 1.75 times the applicable NOx standard to which the engine has been certified.

(6.2.2) For purposes of determining the catalyst system malfunction criteria in section (f)(6.2.1):

(A) The manufacturer shall use a catalyst system deteriorated to the malfunction criteria using methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning operating conditions.

(B) Except as provided below in section (f)(6.2.2)(C), the malfunction criteria shall be established by using a catalyst system with all monitored and unmonitored (downstream of the sensor utilized for catalyst monitoring) catalysts simultaneously deteriorated to the malfunction criteria.

(C) For engines using fuel shutoff to prevent over-fueling during misfire conditions (see section (f)(2.4.1)(D)), the malfunction criteria shall be established by using a catalyst system with all monitored catalysts simultaneously deteriorated to the malfunction criteria while unmonitored catalysts shall be deteriorated to the end of the engine's useful life.

(6.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(6.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (f)(6.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(6.4) MIL Illumination and Fault Code Storage:

(6.4.1) General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(6.4.2) The monitoring method for the catalyst(s) shall be capable of detecting when a catalyst fault code has been cleared (except OBD system self-clearing), but the catalyst has not been replaced (e.g., catalyst overtemperature histogram approaches are not acceptable).

(7) Evaporative System Monitoring

(7.1) Requirement: The OBD system shall verify purge flow from the evaporative system and shall monitor the complete evaporative system, excluding the tubing and connections between the purge valve and the intake manifold, for vapor leaks to the atmosphere. Individual components of the evaporative system (e.g. valves, sensors) shall be monitored in accordance with the comprehensive components requirements in section (g)(3) (e.g., for circuit continuity, out of range values, rationality, proper functional response). Vehicles not subject to evaporative emission standards shall be exempt from monitoring of the evaporative system. For alternate-fueled engines subject to evaporative emission standards, manufacturers shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the

request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for gasoline engines under section (f)(7).

(7.2) Malfunction Criteria:

(7.2.1) For purposes of section (f)(7), an "orifice" is defined as an O'Keefe Controls Co. precision metal "Type B" orifice with NPT connections with a diameter of the specified dimension (e.g., part number B-31-SS for a stainless steel 0.031 inch diameter orifice).

(7.2.2) The OBD system shall detect an evaporative system malfunction when any of the following conditions exist:

(A) No purge flow from the evaporative system to the engine can be detected by the OBD system; or

(B) The complete evaporative system contains a leak or leaks that cumulatively are greater than or equal to a leak caused by a 0.150 inch diameter orifice.

(7.2.3) A manufacturer may request the Executive Officer to revise the orifice size in section (f)(7.2.2)(B) if the most reliable monitoring method available cannot reliably detect a system leak of the magnitudes specified. The Executive Officer shall approve the request upon determining that the manufacturer has provided data and/or engineering analysis that demonstrate the need for the request.

(7.2.4) Upon request by the manufacturer and upon determining that the manufacturer has submitted data and/or engineering evaluation which support the request, the Executive Officer shall revise the orifice size in section (f)(7.2.2)(B) upward to exclude detection of leaks that cannot cause evaporative or running loss emissions to exceed 1.5 times the applicable evaporative emission standards.

(7.2.5) For engines that utilize more than one purge flow path (e.g., a turbo-charged engine with a low pressure purge line and a high pressure purge line), the OBD system shall verify the criteria of (f)(7.2.2)(A) (i.e., purge flow to the engine) for all purge flow paths. If a manufacturer demonstrates that blockage, leakage, or disconnection of one of the purge flow paths cannot cause a measurable emission increase during any reasonable in-use driving conditions, monitoring of that flow path is not required.

(7.3) Monitoring Conditions:

(7.3.1) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(7.2.2)(A) (i.e., purge flow) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(7.3.2) Manufacturers shall define the monitoring conditions for malfunctions identified in section (f)(7.2.2)(B) (i.e., 0.150 inch leak detection) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (f)(7.2.2)(B) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(7.3.3) Manufacturers may disable or abort an evaporative system monitor when the fuel tank level is over 85 percent of nominal tank capacity or during a refueling event.

(7.3.4) Manufacturers may request Executive Officer approval to execute the evaporative system monitor only on driving cycles determined by the manufacturer to be cold starts if the condition is needed to ensure reliable monitoring. The Executive Officer shall approve the request upon determining that data and/or an engineering evaluation submitted by the manufacturer demonstrate that a reliable check can only be made on driving cycles when the cold start criteria are satisfied. However, in making a decision, the Executive Officer will not approve conditions that exclude engine starts from being considered as cold starts solely on the basis that ambient temperature exceeds (i.e., indicates a higher temperature than) engine coolant temperature at engine start.

(7.3.5) Manufacturers may temporarily disable the evaporative purge system to perform an evaporative system leak check.

(7.4) MIL Illumination and Fault Code Storage:

(7.4.1) Except as provided below for fuel cap leaks, general requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(7.4.2) If the OBD system is capable of discerning that a system leak is being caused by a missing or improperly secured fuel cap:

(A) The manufacturer is not required to illuminate the MIL or store a fault code if the vehicle is equipped with an alternative indicator for notifying the vehicle operator of the malfunction. The alternative indicator shall be of sufficient illumination and location to be readily visible under all lighting conditions.

(B) If the vehicle is not equipped with an alternative indicator and the MIL illuminates, the MIL may be extinguished and the corresponding fault codes erased once the OBD system has verified that the fuel cap has been securely fastened and the MIL has not been illuminated for any other type of malfunction.

(C) The Executive Officer may approve other strategies that provide equivalent assurance that a vehicle operator will be promptly notified of a missing or improperly secured fuel cap and that corrective action will be undertaken.

(8) Exhaust Gas Sensor Monitoring

(8.1) Requirement:

(8.1.1) The OBD system shall monitor the output signal, response rate, and any other parameter which can affect emissions of all primary (fuel control) oxygen sensors (conventional switching sensors and wide range or universal sensors) for malfunction.

(8.1.2) The OBD system shall also monitor all secondary oxygen sensors (those used for fuel trim control or as a monitoring device) for proper output signal, activity, and response rate.

(8.1.3) For engines equipped with heated oxygen sensors, the OBD system shall monitor the heater for proper performance.

(8.1.4) For other types of sensors (e.g., hydrocarbon sensors, NOx sensors), the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring plan required for conventional sensors under section (f)(8).

(8.2) Malfunction Criteria:

(8.2.1) Primary Sensors:

(A) The OBD system shall detect a malfunction prior to any failure or deterioration of the oxygen sensor output voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) (including drift or bias corrected for by secondary sensors) that would cause an engine's emissions to exceed 1.5 times any of the applicable standards. For response rate (see section (c)), the OBD system shall detect asymmetric malfunctions (i.e., malfunctions that primarily affect only the lean-to-rich response rate or only the rich-to-lean response rate) and symmetric malfunctions (i.e., malfunctions that affect both the lean-to-rich and rich-to-lean response rates). As defined in section (c), response rate includes delays in the sensor to initially react to a change in exhaust gas composition as well as delays during the transition from a rich-to-lean (or lean-to-rich) sensor output. For 2013 and subsequent model year engines, the manufacturer shall submit data and/or engineering analysis to demonstrate that the calibration method used ensures proper detection of all symmetric and asymmetric response rate malfunctions as part of the certification application.

(B) The OBD system shall detect malfunctions of the oxygen sensor caused by either a lack of circuit continuity or out-of-range values.

(C) The OBD system shall detect a malfunction of the oxygen sensor when a sensor failure or deterioration causes the fuel system to stop using that sensor as a feedback input (e.g., causes default or open-loop operation) or causes the fuel system to fail to enter closed-loop operation within a manufacturer-specified time interval.

(D) The OBD system shall detect a malfunction of the oxygen sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, or other characteristics are no longer sufficient for use as an OBD system monitoring device (e.g., for catalyst monitoring).

(8.2.2) Secondary Sensors:

(A) The OBD system shall detect a malfunction prior to any failure or deterioration of the oxygen sensor voltage, resistance, impedance, current, response rate, amplitude, offset, or other characteristic(s) that would cause an engine's emissions to exceed 1.5 times any of the applicable standards.

(B) The OBD system shall detect malfunctions of the oxygen sensor caused by a lack of circuit continuity.

(C) Sufficient sensor performance for other monitors.

(i) The OBD system shall detect a malfunction of the oxygen sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD system monitoring device (e.g., for catalyst monitoring). For this requirement, "sufficient" is defined as the capability of the worst performing acceptable sensor to detect the best performing unacceptable other monitored system or component (e.g., catalyst).

(ii) For systems where it is not technically feasible to satisfy the criteria of section (f)(8.2.2)(C)(i) completely, the OBD system shall, at a minimum, detect a slow rich-to-lean response malfunction during a fuel shut-off event (e.g., deceleration fuel cut event) on all 2013 and subsequent model year engines. The rich-to-lean response check shall monitor both the sensor response time from a rich condition (e.g., 0.7 Volts) prior to the start of fuel shut-off to a lean condition (e.g., 0.1 Volts) expected during fuel shut-off conditions and the sensor transition time in the intermediate sensor range (e.g., from 0.55 Volts to 0.3 Volts).

(iii) Additionally, for systems where it is not technically feasible to satisfy the criteria in section (f)(8.2.2)(C)(i), prior to certification of 2013 model year engines, the manufacturer must submit a comprehensive plan to the Executive Officer demonstrating the manufacturer's efforts to minimize any gap remaining between the worst performing acceptable sensor and a sufficient sensor. The plan should include quantification of the gap and supporting documentation for efforts to close the gap including sensor monitoring improvements, other system component monitor improvements (e.g., changes to make the catalyst monitor less

sensitive to oxygen sensor response), and sensor specification changes, if any. The Executive Officer shall approve the plan upon determining the submitted information supports the necessity of the gap and the plan demonstrates that the manufacturer is taking reasonable efforts to minimize or eliminate the gap in a timely manner.

(D) The OBD system shall detect malfunctions of the oxygen sensor caused by out-of-range values.

(E) The OBD system shall detect a malfunction of the oxygen sensor when a sensor failure or deterioration causes the fuel system (e.g., fuel control) to stop using that sensor as a feedback input (e.g., causes default or open-loop operation).

(8.2.3) Sensor Heaters:

(A) The OBD system shall detect a malfunction of the heater performance when the current or voltage drop in the heater circuit is no longer within the manufacturer's specified limits for normal operation (i.e., within the criteria required to be met by the component vendor for heater circuit performance at high mileage). Subject to Executive Officer approval, other malfunction criteria for heater performance malfunctions may be used upon the Executive Officer determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate the monitoring reliability and timeliness to be equivalent to the stated criteria in section (f)(8.2.3)(A).

(B) The OBD system shall detect malfunctions of the heater circuit including open or short circuits that conflict with the commanded state of the heater (e.g., shorted to 12 Volts when commanded to 0 Volts (ground)).

(8.3) Monitoring Conditions:

(8.3.1) Primary Sensors

(A) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (f)(8.2.1)(A) and (D) (e.g., proper response rate) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in sections (f)(8.2.1)(A) and (D) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(B) Except as provided in section (f)(8.3.1)(C), monitoring for malfunctions identified in sections (f)(8.2.1)(B) and (C) (i.e., circuit continuity, out-of-range, and open-loop malfunctions) shall be conducted continuously.

(C) A manufacturer may request Executive Officer approval to disable continuous exhaust gas sensor monitoring when an exhaust gas sensor malfunction cannot be distinguished from other effects (e.g., disable out-of-range low monitoring during fuel cut conditions). The Executive Officer shall approve the disablement upon determining that the manufacturer has

submitted test data and/or documentation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(8.3.2) Secondary Sensors

(A) Manufacturers shall define monitoring conditions for malfunctions identified in sections (f)(8.2.2)(A) and (C) (e.g., proper sensor activity) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For all 2013 and subsequent model year engines meeting the monitoring requirements of section (f)(8.2.2)(C)(i) or (ii), for purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in sections (f)(8.2.2)(A) and (C) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(B) Except as provided in section (f)(8.3.2)(C), monitoring for malfunctions identified in sections (f)(8.2.2)(B), (D), and (E) (i.e., open circuit, out-of-range malfunctions, open-loop malfunctions) shall be conducted continuously.

(C) A manufacturer may request Executive Officer approval to disable continuous exhaust gas sensor monitoring when an oxygen sensor malfunction cannot be distinguished from other effects (e.g., disable out-of-range low monitoring during fuel cut conditions). The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(8.3.3) Sensor Heaters

(A) Manufacturers shall define monitoring conditions for malfunctions identified in section (f)(8.2.3)(A) (i.e., sensor heater performance) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(B) Monitoring for malfunctions identified in section (f)(8.2.3)(B) (i.e., circuit malfunctions) shall be conducted continuously.

(8.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2). To the extent feasible, the OBD system shall separately detect lack of circuit continuity and out-of-range faults as required under sections (f)(8.2.1)(B), (f)(8.2.2)(B), and (f)(8.2.2)(D) and store different fault codes for each distinct malfunction (e.g., out-of-range low, out-of-range high, open circuit). Manufacturers are not required to store separate fault codes for lack of circuit continuity faults that cannot be distinguished from other out-of-range circuit faults.

(9) Variable Valve Timing and/or Control (VVT) System Monitoring

(9.1) Requirement: The OBD system shall monitor the VVT system on engines so-equipped for target error and slow response malfunctions. The individual electronic components (e.g., actuators, valves, sensors) that are used in the VVT system shall be monitored in accordance with the comprehensive components requirements in section (g)(3).

(9.2) Malfunction Criteria:

(9.2.1) Target Error: The OBD system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve the commanded valve timing and/or control within a crank angle and/or lift tolerance that would cause an engine's emissions to exceed 1.5 times any of the applicable standards.

(9.2.2) Slow Response: The OBD system shall detect a malfunction prior to any failure or deterioration in the capability of the VVT system to achieve the commanded valve timing and/or control within a manufacturer-specified time that would cause an engine's emissions to exceed 1.5 times any of the applicable standards for gasoline engines.

(9.2.3) For engines in which no failure or deterioration of the VVT system could result in an engine's emissions exceeding 1.5 times any of the applicable standards, the OBD system shall detect a malfunction of the VVT system when proper functional response of the system to computer commands does not occur.

(9.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for VVT system malfunctions identified in section (f)(9.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2). For purposes of tracking and reporting as required in section (d)(3.2.1), all monitors used to detect malfunctions identified in section (f)(9.2) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

(9.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(g) *Monitoring Requirements For All Engines.*

(1) Engine Cooling System Monitoring

(1.1) Requirement:

(1.1.1) The OBD system shall monitor the thermostat on engines so-equipped for proper operation.

(1.1.2) The OBD system shall monitor the engine coolant temperature (ECT) sensor for circuit continuity, out-of-range values, and rationality faults.

(1.1.3) For engines that use a system other than the cooling system and ECT sensor (e.g., oil temperature, cylinder head temperature) for an indication of engine operating temperature for emission control purposes (e.g., to modify spark or fuel injection timing or quantity), the manufacturer shall submit a monitoring plan to the Executive Officer for approval. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and an engineering evaluation that demonstrate that the monitoring plan is as reliable and effective as the monitoring required for the engine cooling system under section (g)(1).

(1.2) Malfunction Criteria:

(1.2.1) Thermostat

(A) The OBD system shall detect a thermostat malfunction if, within an Executive Officer-approved time interval after engine start, any of the following conditions occur:

(i) The coolant temperature does not reach the highest temperature required by the OBD system to enable other diagnostics;

(ii) The coolant temperature does not reach a warmed-up temperature within 20 degrees Fahrenheit of the manufacturer's nominal thermostat regulating temperature. Subject to Executive Officer approval, a manufacturer may utilize lower temperatures for this criterion upon the Executive Officer determining that the manufacturer has demonstrated that the fuel, spark timing, and/or other coolant temperature-based modifications to the engine control strategies would not cause an emission increase of 50 or more percent of any of the applicable standards (e.g., 50 degree Fahrenheit emission test).

(B) For 2016 and subsequent model year engines, the OBD system shall detect a thermostat fault if, after the coolant temperature has reached the temperatures indicated in sections (g)(1.2.1)(A)(i) and (ii), the coolant temperature drops below the temperature indicated in section (g)(1.2.1)(A)(i).

(C) Executive Officer approval of the time interval after engine start under section (g)(1.2.1)(A) above shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times.

(D) For monitoring of malfunctions under section (g)(1.2.1)(A), with Executive Officer approval, a manufacturer may use alternate malfunction criteria and/or monitoring conditions (see section (g)(1.3)) that are a function of temperature at engine start on engines that do not reach the temperatures specified in the malfunction criteria when the thermostat is functioning

properly. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data that demonstrate that a properly operating system does not reach the specified temperatures, that the monitor is capable of meeting the specified malfunction criteria at engine start temperatures greater than 50 degrees Fahrenheit, and that the possibility for cooling system malfunctions to go undetected and disable other OBD monitors is minimized to the extent technically feasible.

(E) A manufacturer may request Executive Officer approval to be exempted from the requirements of thermostat monitoring. Executive Officer approval shall be granted upon determining that the manufacturer has demonstrated that a malfunctioning thermostat cannot cause a measurable increase in emissions during any reasonable driving condition nor cause any disablement of other monitors.

(1.2.2) ECT Sensor

(A) Circuit Continuity. The OBD system shall detect a malfunction when a lack of circuit continuity or out-of-range values occur.

(B) Time to Reach Closed-Loop/Feedback Enable Temperature.

(i) The OBD system shall detect a malfunction if the ECT sensor does not achieve the highest stabilized minimum temperature which is needed for closed-loop/feedback control of all emission control systems (e.g., fuel system, EGR system) within an Executive Officer-approved time interval after engine start.

(ii) The time interval shall be a function of starting ECT and/or a function of intake air temperature. Executive Officer approval of the time interval shall be granted upon determining that the data and/or engineering evaluation submitted by the manufacturer supports the specified times.

(iii) Manufacturers are exempted from the requirements of section (g)(1.2.2)(B) if the manufacturer does not utilize ECT to enable closed-loop/feedback control of any emission control system.

(C) Stuck in Range Below the Highest Minimum Enable Temperature. To the extent feasible when using all available information, the OBD system shall detect a malfunction if the ECT sensor inappropriately indicates a temperature below the highest minimum enable temperature required by the OBD system to enable other diagnostics (e.g., an OBD system that requires ECT to be greater than 140 degrees Fahrenheit to enable a diagnostic must detect malfunctions that cause the ECT sensor to inappropriately indicate a temperature below 140 degrees Fahrenheit). Manufacturers are exempted from this requirement for temperature regions in which the monitors required under sections (g)(1.2.1) or (g)(1.2.2)(B) will detect ECT sensor malfunctions as defined in section (g)(1.2.2)(C).

(D) Stuck in Range Above the Lowest Maximum Enable Temperature.

(i) To the extent feasible when using all available information, the OBD system shall detect a malfunction if the ECT sensor inappropriately indicates a temperature above the lowest maximum enable temperature required by the OBD system to enable other diagnostics (e.g., an OBD system that requires ECT to be less than 90 degrees Fahrenheit at engine start to enable a diagnostic must detect malfunctions that cause the ECT sensor to inappropriately indicate a temperature above 90 degrees Fahrenheit).

(ii) Manufacturers are exempted from this requirement for temperature regions in which the monitors required under sections (g)(1.2.1), (g)(1.2.2)(B), or (g)(1.2.2)(C) (i.e., ECT sensor or thermostat malfunctions) will detect ECT sensor malfunctions as defined in section (g)(1.2.2)(D) or in which the MIL will be illuminated under the requirements of sections (d)(2.2.1)(E) or (d)(2.2.2)(E) for default mode operation (e.g., overtemperature protection strategies).

(iii) Manufacturers are exempted from the requirements of section (g)(1.2.2)(D) for temperature regions where the temperature gauge indicates a temperature in the red zone (engine overheating zone) for vehicles that have a temperature gauge (not a warning light) on the instrument panel and utilize the same ECT sensor for input to the OBD system and the temperature gauge.

(1.3) Monitoring Conditions:

(1.3.1) Thermostat

(A) Manufacturers shall define the monitoring conditions for malfunctions identified in section (g)(1.2.1)(A) in accordance with section (d)(3.1) except as provided for in section (g)(1.3.1)(E). Additionally, except as provided for in sections (g)(1.3.1)(B) through (E), monitoring for malfunctions identified in section (g)(1.2.1)(A) shall be conducted once per driving cycle on every driving cycle in which the ECT sensor indicates, at engine start, a temperature lower than the temperature established as the malfunction criteria in section (g)(1.2.1)(A).

(B) Manufacturers shall define the monitoring conditions for malfunctions identified in section (g)(1.2.1)(B) in accordance with section (d)(3.1) with the exception that monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle.

(C) Manufacturers may disable thermostat monitoring at ambient engine temperatures below 20 degrees Fahrenheit.

(D) Manufacturers may request Executive Officer approval to suspend or disable thermostat monitoring if the vehicle is subjected to conditions which could lead to false diagnosis (e.g., vehicle operation at idle for more than 50 percent of the warm-up time, engine block heater operation).– With respect to disablement on driving cycles solely due to warm ECT at engine

start conditions, the manufacturer shall disable the monitor during driving cycles where the ECT at engine start is within 35 degrees Fahrenheit of the thermostat malfunction threshold temperature determined under section (g)(1.2.1)(A) (e.g., if the malfunction threshold temperature is 160 degrees Fahrenheit, the monitor shall be disabled if the ECT at engine start is above 125 degrees Fahrenheit).

(E) Notwithstanding section (g)(1.3.1)(D), manufacturers may request Executive Officer approval to enable thermostat monitoring during a portion of the driving cycles where the ECT at engine start is warmer than 35 degrees Fahrenheit below the thermostat malfunction threshold temperature determined under section (g)(1.2.1)(A) (e.g., if the malfunction threshold temperature is 160 degrees Fahrenheit, the manufacturer may request approval to have the monitor enabled for a portion of the ECT at engine start region between 125 and 160 degrees Fahrenheit). The Executive Officer shall approve the request upon determining that the manufacturer has submitted test data and/or engineering evaluation that demonstrate that the monitor is able to robustly detect thermostat malfunctions (e.g., cannot result in false passes or false indications of malfunctions) on driving cycles where it is enabled.

(F) With respect to defining enable conditions that are encountered during the FTP cycle as required in (d)(3.1.1) for malfunctions identified in section (g)(1.2.1)(A), the FTP cycle shall refer to on-road driving following the FTP cycle in lieu of testing on an engine dynamometer.

(1.3.2) ECT Sensor

(A) Except as provided below in section (g)(1.3.2)(E), monitoring for malfunctions identified in section (g)(1.2.2)(A) (i.e., circuit continuity and out-of-range) shall be conducted continuously.

(B) Manufacturers shall define the monitoring conditions for malfunctions identified in section (g)(1.2.2)(B) in accordance with section (d)(3.1). Additionally, except as provided for in section (g)(1.3.2)(D), monitoring for malfunctions identified in section (g)(1.2.2)(B) shall be conducted once per driving cycle on every driving cycle in which the ECT sensor indicates a temperature lower than the closed-loop enable temperature at engine start (i.e., all engine start temperatures greater than the ECT sensor out-of-range low temperature and less than the closed-loop enable temperature).

(C) Manufacturers shall define the monitoring conditions for malfunctions identified in sections (g)(1.2.2)(C) and (D) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(D) Manufacturers may suspend or delay the time to reach closed-loop enable temperature diagnostic if the vehicle is subjected to conditions which could lead to false diagnosis (e.g., vehicle operation at idle for more than 50 to 75 percent of the warm-up time).

(E) A manufacturer may request Executive Officer approval to disable continuous ECT sensor monitoring when an ECT sensor malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or engineering evaluation that demonstrate a properly functioning sensor cannot be distinguished from a malfunctioning sensor and that the disablement interval is limited only to that necessary for avoiding false detection.

(1.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(2) Crankcase Ventilation (CV) System Monitoring

(2.1) Requirement: The OBD system shall monitor the CV system on engines so-equipped for system integrity. Engines not subject to crankcase emission control requirements shall be exempt from monitoring of the CV system.

(2.2) Malfunction Criteria:

(2.2.1) For the purposes of section (g)(2), "CV system" is defined as any form of crankcase ventilation system, regardless of whether it utilizes positive pressure or whether it vents to the atmosphere, the intake, or the exhaust. "CV valve" is defined as any form of valve orifice, and/or filter/separator used to restrict, control, or alter the composition (e.g., remove oil vapor or particulate matter) of the crankcase vapor flow. Further, any additional external CV system tubing or hoses used to equalize crankcase pressure or to provide a ventilation path between various areas of the engine (e.g., crankcase and valve cover) are considered part of the CV system "between the crankcase and the CV valve" and subject to the malfunction criteria in section (g)(2.2.2) below.

(2.2.2) Except as provided below, the OBD system shall detect a malfunction of the CV system when a disconnection of the system occurs between either the crankcase and the CV valve, or between the CV valve and the intake ducting.

(2.2.3) If disconnection in the system results in a rapid loss of oil or other overt indication of a CV system malfunction such that the vehicle operator is certain to respond and have the vehicle repaired, the Executive Officer shall exempt the manufacturer from detection of that disconnection.

(2.2.4) The Executive Officer shall exempt a manufacturer from detecting a disconnection between the crankcase and the CV valve upon determining that the disconnection cannot be made without first disconnecting a monitored portion of the system (e.g., the CV system is designed such that the CV valve is fastened directly to the crankcase in a manner which makes it significantly more difficult to remove the valve from the crankcase

rather than disconnect the line between the valve and the intake manifold/ducting (taking aging effects into consideration)) and the line between the valve and the intake ducting is monitored for disconnection. The manufacturer shall file a request and submit data and/or engineering evaluation in support of the exemption.

(2.2.5) Subject to Executive Officer approval, system designs that utilize tubing between the valve and the crankcase shall be exempted from the monitoring requirement for detection of disconnection between the CV valve and the crankcase. The manufacturer shall file a request and submit data and/or engineering evaluation in support of the request. The Executive Officer shall approve the request upon determining that the connections between the valve and the crankcase are: (1) resistant to deterioration or accidental disconnection, (2) significantly more difficult to disconnect than the line between the valve and the intake manifold/ducting, and (3) not subject to disconnection per manufacturer's maintenance, service, and/or repair procedures for non-CV system repair work.

(2.2.6) The Executive Officer shall exempt a manufacturer from detecting a disconnection between the CV valve and the intake manifold upon determining that the disconnection (1) causes the vehicle to stall immediately during idle operation; or (2) is unlikely to occur due to a CV system design that is integral to the induction system (e.g., machined passages rather than tubing or hoses). The manufacturer shall file a request and submit data and/or engineering evaluation in support of the exemption.

(2.2.7) For engines certified on an engine dynamometer having an open CV system (i.e., a system that releases crankcase emissions to the atmosphere without routing them to the intake ducting or to the exhaust upstream of the aftertreatment), the manufacturer shall submit a plan for Executive Officer approval of the monitoring strategy, malfunction criteria, and monitoring conditions prior to OBD certification. Executive Officer approval shall be based on the effectiveness of the monitoring strategy to (i) monitor the performance of the CV system to the extent feasible with respect to the malfunction criteria in section (g)(2.2.1) through (g)(2.2.4) and the monitoring conditions required by the diagnostic, and (ii) monitor the ability of the CV system to control crankcase vapor emitted to the atmosphere relative to the manufacturer's design and performance specifications for a properly functioning system (e.g., if the system is equipped with a filter and/or separator to reduce crankcase emissions to the atmosphere, the OBD system shall monitor the integrity of the filter and/or function of the separator).

(2.3) Monitoring Conditions: Manufacturers shall define the monitoring conditions for malfunctions identified in section (g)(2.2) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(2.4) MIL Illumination and Fault Code Storage: General requirements for MIL illumination and fault code storage are set forth in section (d)(2). The stored fault code need not specifically identify the CV system (e.g., a fault code for idle speed control or fuel system monitoring can be stored) if the manufacturer demonstrates that additional monitoring hardware would be necessary to make this identification, and provided the manufacturer's diagnostic and repair procedures for the detected malfunction include directions to check the integrity of the CV system.

(3) Comprehensive Component Monitoring

(3.1) Requirement:

(3.1.1) Except as provided in sections (g)(3.1.4), (g)(3.1.5), (g)(3.1.6), and (g)(4), the OBD system shall monitor for malfunction any electronic powertrain component/system not otherwise described in sections (e)(1) through (g)(2) that either provides input to (directly or indirectly) or receives commands from the on-board computer(s), and: (1) can affect emissions during any reasonable in-use driving condition, or (2) is used as part of the diagnostic strategy for any other monitored system or component.

(A) Input Components: Input components required to be monitored may include the crank angle sensor, knock sensor, throttle position sensor, cam position sensor, intake air temperature sensor, boost pressure sensor, manifold pressure sensor, mass air flow sensor, exhaust temperature sensor, exhaust pressure sensor, fuel pressure sensor, fuel composition sensor (e.g. flexible fuel vehicles), and electronic components used to comply with any applicable engine idling requirements of title 13, CCR section 1956.8.

(B) Output Components/Systems: Output components/systems required to be monitored may include the idle speed control system, fuel injectors, glow plug system, variable length intake manifold runner systems, supercharger or turbocharger electronic components, heated fuel preparation systems, and the wait-to-start lamp on diesel applications.

(3.1.2) For purposes of criteria (1) in section (g)(3.1.1) above, the manufacturer shall determine whether an engine input or output component/system can affect emissions. If the Executive Officer reasonably believes that a manufacturer has incorrectly determined that a component/system cannot affect emissions, the Executive Officer shall require the manufacturer to provide emission data showing that the component/system, when malfunctioning and installed in a suitable test vehicle, does not have an emission effect. The Executive Officer may request emission data for any reasonable driving condition.

(3.1.3) Manufacturers shall monitor for malfunction electronic powertrain input or output components/systems associated with an electronic transfer case,

electronic power steering system, transmission (except as provided below in section (g)(3.1.6)), or other components that are driven by the engine and not related to the control of fueling, air handling, or emissions only if the component or system is used as part of the diagnostic strategy for any other monitored system or component.

(3.1.4) Except as specified for hybrid vehicles in section (g)(3.1.5), manufacturers shall monitor for malfunction electronic powertrain input or output components/systems associated with components that only affect emissions by causing additional electrical load to the engine and are not related to the control of fueling, air handling, or emissions only if the component or system is used as part of the diagnostic strategy for any other monitored system or component.

(3.1.5) Except as provided in section (d)(7.6), for hybrid vehicles, manufacturers shall submit a plan to the Executive Officer for approval of the hybrid components determined by the manufacturer to be subject to monitoring in section (g)(3.1.1). In general, the Executive Officer shall approve the plan if it includes monitoring of all components/systems used as part of the diagnostic strategy for any other monitored system or component, monitoring of all energy input devices to the electrical propulsion system, monitoring of battery and charging system performance, monitoring of electric motor performance, and monitoring of regenerative braking performance.

(3.1.6) For OBD systems that receive vehicle speed information from a transmission control unit and use vehicle speed as part of the diagnostic strategy for any other OBD monitored system or component:

(A) The OBD system shall monitor the vehicle speed information to the extent feasible in accordance with the requirements of section (g)(3);

(B) The OBD system shall detect a fault and illuminate the MIL when the OBD system is unable to properly receive the vehicle speed information; and

(C) If the transmission control unit monitors the vehicle speed information and indicates an error of the information to the OBD system (e.g., valid vehicle speed data is no longer available), the OBD system shall handle the error indication as a default mode of operation subject to the MIL illumination requirements under section (d)(2.2).

(3.2) Malfunction Criteria:

(3.2.1) Input Components:

(A) The OBD system shall detect malfunctions of input components caused by a lack of circuit continuity, out-of-range values, and, where feasible, rationality faults. To the extent feasible, the rationality fault diagnostics shall verify that a sensor output is neither inappropriately high nor inappropriately low (i.e., shall be "two-sided" diagnostics).

(B) To the extent feasible, the OBD system shall separately detect and store different fault codes that distinguish rationality faults from lack of circuit continuity and out-of-range faults. For input component lack of circuit continuity and out-of-range faults, the OBD system shall, to the extent feasible, separately detect and store different fault codes for each distinct malfunction (e.g., out-of-range low, out-of-range high, open circuit). The OBD system is not required to store separate fault codes for lack of circuit continuity faults that cannot be distinguished from other out-of-range circuit faults.

(C) For input components that are used to activate alternate strategies that can affect emissions (e.g., AECDs, engine shutdown systems or strategies to meet NOx idling standards required by title 13, CCR section 1956.8), the OBD system shall detect rationality malfunctions that cause the system to erroneously activate or deactivate the alternate strategy. To the extent feasible when using all available information, the rationality fault diagnostics shall detect a malfunction if the input component inappropriately indicates a value that activates or deactivates the alternate strategy. For example, if an alternate strategy requires the intake air temperature to be greater than 120 degrees Fahrenheit to activate, the OBD system shall detect malfunctions that cause the intake air temperature sensor to inappropriately indicate a temperature above 120 degrees Fahrenheit.

(D) For input components that are directly or indirectly used for any emission control strategies that are not covered under sections (e), (f), and (g)(1) (e.g., exhaust temperature sensors used for a control strategy that regulates SCR catalyst inlet temperature within a target window), the OBD system shall detect rationality malfunctions that prevent the component from correctly sensing any condition necessary for the strategy to operate in its intended manner. These malfunctions include faults that inappropriately prevent or delay the activation of the emission control strategy, cause the system to erroneously exit the emission control strategy, or where the control strategy has used up all of the adjustments or authority allowed by the manufacturer and is still unable to achieve the desired condition. The Executive Officer may waive detection of specific malfunctions upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that reliable detection of the malfunction is technically infeasible or would require additional hardware.

(E) For engines that require precise alignment between the camshaft and the crankshaft, the OBD system shall monitor the crankshaft position sensor(s) and camshaft position sensor(s) to verify proper alignment between the camshaft and crankshaft in addition to monitoring the sensors for circuit continuity and rationality malfunctions. Proper alignment monitoring between a camshaft and a crankshaft shall only be required in cases where both are equipped with position sensors. For engines equipped with VVT

systems and a timing belt or chain, the OBD system shall detect a malfunction if the alignment between the camshaft and crankshaft is off by one or more cam/crank sprocket cogs (e.g., the timing belt/chain has slipped by one or more teeth/cogs). If a manufacturer demonstrates that a single tooth/cog misalignment cannot cause a measurable increase in emissions during any reasonable driving condition, the OBD system shall detect a malfunction when the minimum number of teeth/cogs misalignment needed to cause a measurable emission increase has occurred.

(3.2.2) Output Components/Systems:

(A) The OBD system shall detect a malfunction of an output component/system when proper functional response of the component and system to computer commands does not occur. If a functional check is not feasible, the OBD system shall detect malfunctions of output components/systems caused by a lack of circuit continuity or circuit fault (e.g., short to ground or high voltage). For output component lack of circuit continuity faults and circuit faults, the OBD system is not required to store different fault codes for each distinct malfunction (e.g., open circuit, shorted low). Manufacturers are not required to activate an output component/system when it would not normally be active for the purposes of performing functional monitoring of output components/systems as required in section (g)(3).

(B) The idle control system shall be monitored for proper functional response to computer commands.

(i) For gasoline engines using monitoring strategies based on deviation from target idle speed, a malfunction shall be detected when either of the following conditions occur:

a. The idle speed control system cannot achieve the target idle speed within 200 revolutions per minute (rpm) above the target speed or 100 rpm below the target speed. The Executive Officer shall allow larger engine speed tolerances upon determining that a manufacturer has submitted data and/or an engineering evaluation which demonstrate that the tolerances can be exceeded without a malfunction being present.

b. The idle speed control system cannot achieve the target idle speed within the smallest engine speed tolerance range required by the OBD system to enable any other monitors.

(ii) For diesel engines, a malfunction shall be detected when any of the following conditions occur:

a. The idle control system cannot achieve or maintain the idle speed within +/-50 percent of the manufacturer-specified target or desired engine speed.

b. The idle control system cannot achieve the target or desired idle speed within the smallest engine speed tolerance range required by the OBD system to enable any other monitors.

c. For 2013 and subsequent model year engines, the idle control system cannot achieve the fueling quantity within the smallest fueling quantity tolerance range required by the OBD system to enable any other monitors.

d. For 2013 and subsequent model year engines, the idle control system cannot achieve the target idle speed with a fuel injection quantity within +/-50 percent of the fuel quantity necessary to achieve the target idle speed for a properly functioning engine and the known operating conditions.

(C) Glow plugs/intake air heater systems shall be monitored for proper functional response to computer commands and for circuit continuity faults. The glow plug/intake air heater circuit(s) shall be monitored for proper current and voltage drop. The Executive Officer shall approve other monitoring strategies based on manufacturer's data and/or engineering analysis demonstrating equally reliable and timely detection of malfunctions. Except as provided below, the OBD system shall detect a malfunction when a single glow plug no longer operates within the manufacturer's specified limits for normal operation. If a manufacturer demonstrates that a single glow plug failure cannot cause a measurable increase in emissions during any reasonable driving condition, the OBD system shall detect a malfunction for the minimum number of glow plugs needed to cause an emission increase. Further, to the extent feasible on existing engine designs (without adding additional hardware for this purpose) and on all 2013 and subsequent model year engines, the stored fault code shall identify the specific malfunctioning glow plug(s).

(D) The wait-to-start lamp circuit shall be monitored for malfunctions that cause the lamp to fail to illuminate when commanded on (e.g., burned out bulb).

(E) For output components/systems that are directly or indirectly used for any emission control strategies that are not covered under sections (e), (f), and (g)(1) (e.g., an intake throttle used for a control strategy that adjusts intake throttle position to regulate SCR catalyst inlet temperature within a target window), the OBD system shall detect functional malfunctions that prevent the component/system from achieving the desired functional response necessary for the strategy to operate in its intended manner. These malfunctions include faults that inappropriately prevent or delay the activation of the emission control strategy, cause the system to erroneously exit the emission control strategy, or where the control strategy has used up all of the adjustments or authority allowed by the manufacturer and is still unable to achieve the desired condition. The Executive Officer may waive detection of specific malfunctions upon determining that the

manufacturer has submitted data and/or an engineering evaluation that demonstrate that reliable detection of the malfunction is technically infeasible or would require additional hardware.

(F) For 2015 and subsequent model year engines that utilize fuel control system components (e.g., injectors, fuel pump) that have tolerance compensation features implemented in hardware or software during production or repair procedures (e.g., individually coded injectors for flow characteristics that are programmed into an electronic control unit to compensate for injector to injector tolerances, fuel pumps that use in-line resistors to correct for differences in fuel pump volume output), the components shall be monitored to ensure the proper compensation is being used.

(i) Except as provided in section (g)(3.2.2)(F)(ii) below, the system shall detect a fault if the compensation being used by the control system does not match the compensation designated for the installed component (e.g., the flow characteristic coding designated on a specific injector does not match the compensation being used by the fuel control system for that injector). If a manufacturer demonstrates that a single component (e.g., injector) using the wrong compensation cannot cause a measurable increase in emissions during any reasonable driving condition, the manufacturer shall detect a malfunction for the minimum number of components using the wrong compensation needed to cause an emission increase. Further, the stored fault code shall identify the specific component that does not match the compensation.

(ii) Monitoring of the fuel control system components under section (g)(3.2.2)(F)(i) is not required if the manufacturer demonstrates that both of the following criteria are satisfied: (1) no fault of the components' tolerance compensation features (e.g., wrong compensation being used) could cause emissions to increase by 15 percent or more of the applicable standard as measured from an applicable emission test cycle; and (2) no fault of the components' tolerance compensation features can cause emissions to exceed the applicable standard as measured from an applicable emission test cycle. For purposes of determining if the emission criteria above are met, the manufacturers shall request Executive Officer approval of the test plan for which the emission impact will be determined. The test plan shall include the combination of failed components and the degree of mismatch (e.g., wrong compensation) used as well as the test procedure and emission test cycles used to demonstrate the emission impact, including the necessary preconditioning cycles used by the system to correct or adapt for any mismatch and mitigate the emission impact. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or engineering analysis that demonstrate that the conditions necessary for the system to correct or adapt will readily occur in a timely manner during in-use operation

and that the test conditions represent worst case emissions from typical in-use service actions when considering the distribution and variance of the compensation values and parts (e.g., replacement of one or more plus-one-sigma injectors with minus-one-sigma injectors without updating of the compensation value).

(3.3) Monitoring Conditions:

(3.3.1) Input Components:

(A) Except as provided in section (g)(3.3.1)(C), input components shall be monitored continuously for proper range of values and circuit continuity.

(B) For rationality monitoring (where applicable) manufacturers shall define the monitoring conditions for detecting malfunctions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that rationality monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).

(C) A manufacturer may request Executive Officer approval to disable continuous input component proper range of values or circuit continuity monitoring when a malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the manufacturer has submitted test data and/or documentation that demonstrate a properly functioning input component cannot be distinguished from a malfunctioning input component and that the disablement interval is limited only to that necessary for avoiding false detection.

(3.3.2) Output Components/Systems:

(A) Except as provided in section (g)(3.3.2)(D), monitoring for circuit continuity and circuit faults shall be conducted continuously.

(B) Except as provided in section (g)(3.3.2)(C), for functional monitoring, manufacturers shall define the monitoring conditions for detecting malfunctions in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements).

(C) For the idle control system, manufacturers shall define the monitoring conditions for functional monitoring in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements), with the exception that functional monitoring shall occur every time the monitoring conditions are met during the driving cycle in lieu of once per driving cycle as required in section (d)(3.1.2).

(D) A manufacturer may request Executive Officer approval to disable continuous output component circuit continuity or circuit fault monitoring when a malfunction cannot be distinguished from other effects. The Executive Officer shall approve the disablement upon determining that the

manufacturer has submitted test data and/or documentation that demonstrate a properly functioning output component cannot be distinguished from a malfunctioning output component and that the disablement interval is limited only to that necessary for avoiding false detection.

(3.4) MIL Illumination and Fault Code Storage:

(3.4.1) Except as provided in sections (g)(3.4.2) and (3.4.4) below, general requirements for MIL illumination and fault code storage are set forth in section (d)(2).

(3.4.2) Exceptions to general requirements for MIL illumination. MIL illumination is not required in conjunction with storing a confirmed or MIL-on fault code for any comprehensive component if:

(A) the component or system, when malfunctioning, could not cause engine emissions to increase by 15 percent or more of the FTP standard during any reasonable driving condition; and

(B) the component or system is not used as part of the diagnostic strategy for any other monitored system or component.

(3.4.3) For purposes of determining the emission increase in section (g)(3.4.2)(A), the manufacturer shall request Executive Officer approval of the test cycle/vehicle operating conditions for which the emission increase will be determined. Executive Officer approval shall be granted upon determining that the manufacturer has submitted data and/or engineering evaluation that demonstrate that the testing conditions represent in-use driving conditions where emissions are likely to be most affected by the malfunctioning component. For purposes of determining whether the specified percentages in section (g)(3.4.2)(A) are exceeded, if the approved testing conditions are comprised of an emission test cycle with an exhaust emission standard, the measured increase shall be compared to a percentage of the exhaust emission standard (e.g., if the increase is equal to or more than 15 percent of the exhaust emission standard for that test cycle). If the approved testing conditions are comprised of a test cycle or vehicle operating condition that does not have an exhaust emission standard, the measured increase shall be calculated as a percentage of the baseline test (e.g., if the increase from a back-to-back test sequence between normal and malfunctioning condition is equal to or more than 15 percent of the baseline test results from the normal condition).

(3.4.4) For malfunctions required to be detected by section (g)(3.2.2)(B)(ii)d. (idle control fuel injection quantity faults), the stored fault code is not required to specifically identify the idle control system (e.g., a fault code for cylinder fuel injection quantity imbalance or combustion quality monitoring can be stored).

(4) Other Emission Control System Monitoring

(4.1) Requirement: For other emission control systems that are: (1) not identified or addressed in sections (e)(1) through (g)(3) (e.g., hydrocarbon traps, homogeneous charge compression ignition (HCCI) control systems), or (2) identified or addressed in section (g)(3) but not corrected or compensated for by an adaptive control system (e.g., swirl control valves), manufacturers shall submit a plan for Executive Officer approval of the monitoring strategy, malfunction criteria, and monitoring conditions prior to introduction on a production engine. Executive Officer approval shall be based on the effectiveness of the monitoring strategy, the malfunction criteria utilized, the monitoring conditions required by the diagnostic, and, if applicable, the determination that the requirements of section (g)(4.2) and (g)(4.3) below are satisfied.

(4.2) For engines that utilize emission control systems that alter intake air flow or cylinder charge characteristics by actuating valve(s), flap(s), etc. in the intake air delivery system (e.g., swirl control valve systems), the manufacturers, in addition to meeting the requirements of section (g)(4.1) above, may elect to have the OBD system monitor the shaft to which all valves in one intake bank are physically attached in lieu of monitoring the intake air flow, cylinder charge, or individual valve(s)/flap(s) for proper functional response. For non-metal shafts or segmented shafts, the monitor shall verify all shaft segments for proper functional response (e.g., by verifying the segment or portion of the shaft furthest from the actuator properly functions). For systems that have more than one shaft to operate valves in multiple intake banks, manufacturers are not required to add more than one set of detection hardware (e.g., sensor, switch) per intake bank to meet this requirement.

(4.3) For emission control strategies that are not covered under sections (e), (f), and (g)(1) (e.g., a control strategy that regulates SCR catalyst inlet temperatures within a target window), Executive Officer approval shall be based on the effectiveness of the plan in detecting malfunctions that prevent the strategy from operating in its intended manner. These malfunctions include faults that inappropriately prevent or delay the activation of the emission control strategy, faults that cause the system to erroneously exit the emission control strategy, and faults where the control strategy has used up all of the adjustments or authority allowed by the manufacturer and is still unable to achieve the desired condition. The Executive Officer may waive detection of specific malfunctions upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that reliable detection of the malfunction is technically infeasible or would require additional hardware.

(5) Exceptions to Monitoring Requirements

(5.1) Upon request of a manufacturer or upon the best engineering judgment of ARB, the Executive Officer may revise the emission threshold for any monitor

in sections (e) through (g) if the most reliable monitoring method developed requires a higher threshold to prevent false indications of a malfunction. Additionally, except as specified in section (e)(8.2.1)(C), for 2010 through 2015 model year engines, the Executive Officer may revise the PM filter malfunction criteria of section (e)(8.2.1) to exclude detection of specific failure modes (e.g., partially melted substrates) if the most reliable monitoring method developed requires the exclusion of specific failure modes to prevent false indications of a malfunction.

(5.2) For 2010 through 2012 model year diesel engines, in determining the malfunction criteria for diesel engine monitors in sections (e)(1), (3), (4), (5), (8.2.2), (9.2.1)(A), and (e)(10), the manufacturer shall use a threshold of 2.5 times any of the applicable NMHC, CO, or NOx standards in lieu of 2.0 times any of the applicable standards.

(5.3) Manufacturers may request Executive Officer approval to disable an OBD system monitor at ambient temperatures below 20 degrees Fahrenheit (low ambient temperature conditions may be determined based on intake air or engine coolant temperature at engine start) or at elevations above 8000 feet above sea level. The Executive Officer shall approve the request upon determining that the manufacturer has provided data and/or an engineering evaluation that demonstrate that monitoring during the conditions would be unreliable. A manufacturer may further request, and the Executive Officer shall approve, that an OBD system monitor be disabled at other ambient temperatures upon determining that the manufacturer has demonstrated with data and/or an engineering evaluation that misdiagnosis would occur at the ambient temperatures because of its effect on the component itself (e.g., component freezing).

(5.4) Manufacturers may request Executive Officer approval to disable monitoring systems that can be affected by low fuel level or running out of fuel (e.g., misfire detection) when the fuel level is 15 percent or less of the nominal capacity of the fuel tank. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring at the fuel levels would be unreliable and the OBD system is able to detect a malfunction if the component(s) used to determine fuel level erroneously indicates a fuel level that causes the disablement.

(5.5) Manufacturers may disable monitoring systems that can be affected by vehicle battery or system voltage levels.

(5.5.1) For monitoring systems affected by low vehicle battery or system voltages, manufacturers may disable monitoring systems when the battery or system voltage is below 11.0 Volts. Manufacturers may request Executive Officer approval to utilize a voltage threshold higher than 11.0 Volts to disable system monitoring. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring at the voltages

would be unreliable and that either operation of a vehicle below the disablement criteria for extended periods of time is unlikely or the OBD system monitors the battery or system voltage and will detect a malfunction at the voltage used to disable other monitors.

(5.5.2) For monitoring systems affected by high vehicle battery or system voltages, manufacturers may request Executive Officer approval to disable monitoring systems when the battery or system voltage exceeds a manufacturer-defined voltage. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or an engineering evaluation that demonstrate that monitoring above the manufacturer-defined voltage would be unreliable and that either the electrical charging system/alternator warning light is illuminated (or voltage gauge is in the "red zone") or the OBD system monitors the battery or system voltage and will detect a malfunction at the voltage used to disable other monitors.

(5.6) A manufacturer may request Executive Officer approval to disable monitors that can be affected by PTO activation on engines or vehicles designed to accommodate the installation of PTO units (as defined in section (c)).

(5.6.1) Except as allowed in section (g)(5.6.2) below, a manufacturer may request Executive Officer approval to disable an affected monitor provided disablement occurs only while the PTO unit is active and the OBD readiness status (specified under section (h)(4.1)) and PTO activation time are appropriately tracked and erased as described in this section. The Executive Officer shall approve the request for disablement based on the manufacturer's demonstration that the affected monitor cannot robustly detect malfunctions (e.g., cannot avoid false passes or false indications of malfunctions) while the PTO unit is active. The OBD system shall track the cumulative engine runtime with PTO active and clear OBD readiness status (i.e., set all monitors to indicate "not complete") no later than the start of the next ignition cycle if 750 minutes of cumulative engine runtime with PTO active has occurred since the last time the affected monitor has determined the component or system monitored by the affected monitor is or is not malfunctioning (i.e., has completed). The PTO timer shall pause whenever PTO changes from active to not active and resume counting when PTO is re-activated. The timer shall be reset to zero after the affected monitor has completed and no later than the start of the next ignition cycle. Once the PTO timer has reached 750 minutes and the OBD readiness status has been cleared, the PTO timer may not cause the OBD system to clear the readiness status again until after the PTO timer has reset to zero (after the monitor has completed) and again reached 750 minutes.

(5.6.2) For 2010 through 2012 model year engines, in lieu of requesting Executive Officer approval for disabling an affected monitor according to section (g)(5.6.1) above, a manufacturer may disable affected monitors, provided disablement occurs only while the PTO unit is active, and the OBD

readiness status is cleared by the on-board computer (i.e., all monitors set to indicate "not complete") while the PTO unit is activated. If the disablement occurs, the readiness status may be restored to its state prior to PTO activation when the disablement ends.

(5.7) The OBD system is not required to monitor an electronic powertrain component/system if the following criteria are met when the ambient temperature is above 20 degrees Fahrenheit: (1) a malfunction of the component does not affect emissions during any reasonable driving condition, (2) a malfunction of the component does not affect the diagnostic strategy for any other monitored component or system, and (3) the ambient temperature is determined based on a temperature sensor monitored by the OBD system (e.g., IAT sensor). The manufacturer shall determine whether a component/system meets these criteria. If the Executive Officer reasonably believes that a manufacturer has incorrectly determined that a component/system meets these criteria, the Executive Officer shall require the manufacturer to provide emission and/or other diagnostic data showing that the component/system, when malfunctioning and installed in a suitable test vehicle, does not have an effect on emissions or other diagnostic strategies. The Executive Officer may request emission data for any reasonable driving condition at ambient temperatures above 20 degrees Fahrenheit.

(5.8) Whenever the requirements in section (e), (f), or (g) of this regulation require a manufacturer to meet a specific phase-in schedule:

(5.8.1) Except as provided for in section (g)(5.8.3) below for the diesel NOx converting catalyst and NOx and PM sensor phase-ins and in section (e)(8.2.1) for the PM filter monitor phase-in, manufacturers may use an alternate phase-in schedule in lieu of the phase-in schedule set forth in sections (e), (f), or (g) if the alternate phase-in schedule provides for equivalent compliance volume as defined in section (c).

(5.8.2) Small volume manufacturers may use an alternate phase-in schedule in accordance with section (g)(5.8.1) in lieu of the required phase-in schedule or may use a different schedule as follows:

(A) For the diesel misfire monitor phase-in schedule in section (e)(2.2.2), the manufacturer may meet the requirement on all engines by the 2018 model year in lieu of meeting the specific phase-in requirements for the 2016 and 2017 model years.

(B) For the diesel misfire monitor phase-in schedule in section (e)(2.3.3), the manufacturer may meet the monitoring conditions requirements of section (e)(2.3.3)(A)(i) on all engines subject to (e)(2.2.2) through the 2020 model year and the monitoring conditions requirements of section (e)(2.3.3)(A)(ii) on all 2021 and subsequent model year engines in lieu of the specific phase-in requirements in section (e)(2.3.3)(A) for the 2019 and 2020 model years.

(C) For the diesel NOx converting catalyst monitor phase-in schedules in section (e)(6), the manufacturer may use the malfunction criteria in sections (e)(6.2.1)(B) and (e)(6.2.2)(A)(ii) for all 2014 and 2015 model year engines in lieu of the malfunction criteria and required phase-in schedule in sections (e)(6.2.1)(C) and (e)(6.2.2)(A)(iii).

(D) For the diesel PM filter monitor phase-in schedule in section (e)(8), the manufacturer may use the malfunction criteria in section (e)(8.2.1)(B) for all 2014 and 2015 model year engines in lieu of the malfunction criteria and required phase-in schedule in section (e)(8.2.1)(C).

(E) For the diesel NOx sensor phase-in schedules in section (e)(9), the manufacturer may use the malfunction criteria in section (e)(9.2.2)(A)(ii) for all 2014 and 2015 model year engines in lieu of the malfunction criteria and required phase-in schedule in section (e)(9.2.2)(A)(iii).

(5.8.3) In lieu of meeting the diesel NOx converting catalyst and NOx and PM sensor phase-ins set forth in sections (e)(6.2.1), (e)(6.2.2), and (e)(9.2.2), a manufacturer may request Executive Officer approval to use a manufacturer-defined phase-in for each requirement. The Executive Officer shall approve the manufacturer-defined phase-in if it meets the following criteria:

(A) For the requirements in sections (e)(6.2.1)(C), (e)(6.2.2)(A)(iii), and (e)(9.2.2)(A)(iii) (i.e., requiring a NOx threshold of +0.3 g/bhp-hr):

(i) The phase-in shall provide for a compliance volume of engines certified to the +0.3 g/bhp-hr NOx threshold that is equivalent to the volume of the required phase-in set forth in each of the above-referenced sections (i.e., the phase-in of 20 percent of 2014 model year diesel engines and 50 percent of 2015 model year diesel engines). The compliance volume shall be calculated in accordance with the calculation methodology in the definition of "alternate phase-in" in section (c) (i.e., (20*2 years) + (50*1 year) = 90 for the required phase-in). The compliance volume shall be considered equivalent if the calculated total is equal to or greater than 90.

(ii) The calculated compliance volume for the manufacturer-defined phase-in may not include engines meeting the +0.3 g/bhp-hr NOx threshold requirement earlier than the 2013 model year.

(iii) For the 2013 through 2017 model years, engines meeting the requirements in sections (e)(6.2.1)(D), (e)(6.2.2)(A)(iv), and (e)(9.2.2)(A)(iv) (i.e., requiring a NOx threshold of +0.2 g/bhp-hr) shall also be considered as meeting the +0.3 g/bhp-hr NOx threshold requirement and included in the calculated compliance volume and shall not be subtracted from the calculated compliance volume.

(iv) For the 2016 model year, if the proposed phase-in results in a combined percentage of engines meeting the +0.3 g/bhp-hr and the

+0.2 g/bhp-hr thresholds being less than 50 percent of all diesel engines, the manufacturer shall subtract those engines that do not meet the above thresholds in both the 2015 and 2016 model years from the required percentage of 50 percent when calculating the compliance volume according to the calculation methodology in the definition of "alternate phase-in" section (c).

(v) All engines shall meet either the +0.3 g/bhp-hr NOx threshold or the +0.2 g/bhp-hr NOx threshold no later than the 2017 model year.

(B) For the requirements in sections (e)(6.2.1)(D), (e)(6.2.2)(A)(iv), and (e)(9.2.2)(A)(iv) (i.e., requiring a NOx threshold of +0.2 g/bhp-hr):

(i) The phase-in shall provide for a compliance volume of engines certified to the +0.2 g/bhp-hr NOx threshold that is equivalent to the volume of the required phase-in set forth in each of the above-referenced sections (i.e., 100 percent of 2016 model year diesel engines). The compliance volume shall be calculated in accordance with the calculation methodology in the definition of "alternate phase-in" in section (c) (i.e., (100*1 year) = 100 for the required phase-in). The compliance volume shall be considered equivalent if the calculated total is equal to or greater than 100.

(ii) The calculated compliance volume for the manufacturer-defined phase-in shall not include engines meeting the +0.2 g/bhp-hr NOx threshold requirement earlier than the 2015 model year.

(iii) For the 2016 model year only, engines meeting the NOx threshold of +0.3 g/bhp-hr and carried over from the 2014 or 2015 model year per sections (e)(6.2.1)(E), (e)(6.2.2)(A)(v), and (e)(9.2.2)(A)(v) shall also be considered as meeting the +0.2 g/bhp-hr NOx threshold requirement and included in the calculated compliance volume and shall not be subtracted from the calculated compliance volume.

(iv) If the phase-in includes engines that do not meet the +0.2 g/bhp-hr NOx threshold in the 2017 model year, the manufacturer shall subtract those engines that do not meet the threshold in the 2016 and 2017 model years (except as allowed for the 2016 model year in section (g)(5.8.3)(B)(iii) above) from the required percentage of 100 percent when calculating the compliance volume according to the calculation methodology in the definition of "alternate phase-in" section (c).

(v) All engines shall meet the +0.2 g/bhp-hr NOx threshold no later than the 2018 model year.

(5.9) Whenever the requirements in sections (e) through (g) of this regulation require monitoring "to the extent feasible", the manufacturer shall submit its proposed monitor(s) for Executive Officer approval. The Executive Officer shall approve the proposal upon determining that the proposed monitor(s) meets the criteria of "to the extent feasible" by considering the best available monitoring technology to the extent that it is known or should have been

known to the manufacturer and given the limitations of the manufacturer's existing hardware, the extent and degree to which the monitoring requirements are met in full, the limitations of monitoring necessary to prevent significant errors of commission and omission, and the extent to which the manufacturer has considered and pursued alternative monitoring concepts to meet the requirements in full. The manufacturer's consideration and pursuit of alternative monitoring concepts shall include evaluation of other modifications to the proposed monitor(s), the monitored components themselves, and other monitors that use the monitored components (e.g., altering other monitors to lessen the sensitivity and reliance on the component or characteristic of the component subject to the proposed monitor(s)).

(h) *Standardization Requirements.*

(1) Reference Documents:

The following Society of Automotive Engineers (SAE) and International Organization of Standards (ISO) documents are incorporated by reference into this regulation:

(1.1) SAE J1930 "Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms – Equivalent to ISO/TR 15031-2", October 2008 (SAE J1930).

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

(1.2) SAE J1962 "Diagnostic Connector – Equivalent to ISO/DIS 15031-3: December 14, 2001", April 2002 (SAE J1962).

(1.3) SAE J1978 "OBD II Scan Tool – Equivalent to ISO/DIS 15031-4: December 14, 2001", April 2002 (SAE J1978).

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

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

(1.5) SAE J2012 "Diagnostic Trouble Code Definitions", December 2007 (SAE J2012).

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

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

(1.7) SAE J1939 consisting of:

(1.7.1) J1939 Recommended Practice for a Serial Control and Communications

Vehicle Network, April 2011;

(1.7.2) J1939/1 On-Highway Equipment Control and Communication Network May 2011;

(1.7.3) J1939/11 Physical Layer, 250K bits/s, Twisted Shielded Pair, September 2006;

(1.7.4) J1939/13 Off-Board Diagnostic Connector, October 2011;

(1.7.5) J1939/15 Reduced Physical Layer, 250K bits/sec, UN-Shielded Twisted Pair (UTP), August 2008;

(1.7.6) J1939/21 Data Link Layer, December 2010;

(1.7.7) J1939/31 Network Layer, May 2010;

(1.7.8) J1939/71 Vehicle Application Layer (Through May 2010), March 2011;

(1.7.9) J1939/73 Application Layer—Diagnostics, February 2010;

(1.7.10) J1939/81 Network Management, June 2011; and

(1.7.11) J1939/84 OBD Communications Compliance Test Cases For Heavy Duty Components and Vehicles, December 2010.

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

(1.9) SAE J1699-3 "Vehicle OBD II Compliance Test Cases", December 2009 (SAE J1699-3).

(1.10) SAE J2534-1 "Recommended Practice for Pass-Thru Vehicle Programming", December 2004 (SAE J2534-1).

(2) Diagnostic Connector:

A standard data link connector conforming to SAE J1962 or SAE J1939-13 specifications (except as specified in section (h)(2.3)) shall be incorporated in each vehicle.

(2.1) For the 2010 through 2012 model year engines:

(2.1.1) The connector shall be located in the driver's side foot-well region of the vehicle interior in the area bound by the driver's side of the vehicle and the driver's side edge of the center console (or the vehicle centerline if the vehicle does not have a center console) and at a location no higher than the bottom of the steering wheel when in the lowest adjustable position. The connector may not be located on or in the center console (i.e., neither on the horizontal faces near the floor-mounted gear selector, parking brake lever, or cup-holders nor on the vertical faces near the car stereo, climate system, or navigation system controls).

(2.1.2) The location of the connector shall be capable of being easily identified and accessed (e.g., to connect an off-board tool). For vehicles equipped with a driver's side door, the connector shall be capable of being easily identified and accessed by a technician standing (or "crouched") on the ground outside the driver's side of the vehicle with the driver's side door open.

(2.2) For 2013 and subsequent model year engines:

(2.2.1) The connector shall be located in the driver's side foot-well region of the vehicle interior in the area bound by the driver's side of the vehicle and the foot pedal closest to the driver's side of the vehicle (left most pedal in a left hand drive vehicle) excluding a foot-activated emergency brake if equipped (e.g., typically the brake pedal for an automatic transmission equipped vehicle or the clutch pedal for a manual transmission equipped vehicle) and at a location no higher than the bottom of the steering wheel when in the lowest adjustable position.

(2.2.2) The connector shall be mounted in an uncovered location and may not be covered with or located behind any form of panel, access door, or storage device (e.g., fuse panel cover, hinged door, ashtray, coinbox) that requires opening or removal to access the connector. The connector may be equipped with a dust cap in the shape and size of the diagnostic connector for environmental protection purposes but the dust cap must be removable by hand without the use of any tools and be labeled "OBD" to aid technicians in identifying the connector.

(2.2.3) The connector shall be mounted in a manner that allows vehicle operation and driving (e.g., does not interfere with use of driver controls such as the clutch, brake, and accelerator pedal) while a scan tool is connected to the vehicle.

(2.3) The location of the connector shall be capable of being easily identified and accessed (e.g., to connect an off-board tool). For vehicles equipped with a driver's side door, the connector shall be capable of being easily identified and accessed by a technician standing (or "crouched") on the ground outside the driver's side of the vehicle with the driver's side door open.

(2.4) If the ISO 15765-4 protocol (see section (h)(3)) is used for the required OBD standardized functions, the connector shall meet the "Type A" specifications of SAE J1962. Any pins in the connector that provide electrical power shall be properly fused to protect the integrity and usefulness of the connector for diagnostic purposes and may not exceed 20.0 Volts DC regardless of the nominal vehicle system or battery voltage (e.g., 12V, 24V, 42V).

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(2.5) If the SAE J1939 protocol (see section (h)(3)) is used for the required OBD standardized functions, the connector shall meet the "Type 1" or "Type 2" specifications of SAE J1939-13 if the 250 kbps baud rate of J1939 is used and the "Type 2" specifications of J1939-13 if the 500 kbps baud rate of J1939 is used. Any pins in the connector that provide electrical power shall be properly fused to protect the integrity and usefulness of the connector for diagnostic purposes.

(2.6) Manufacturers may equip vehicles with additional diagnostic connectors for manufacturer-specific purposes (i.e., purposes other than the required OBD functions). However, if the additional connector conforms to the "Type A" specifications of SAE J1962 or the specifications of SAE J1939-13:

(2.6.1) For 2010 through 2015 model year engines, if the additional connector is located in the vehicle interior near the required connector of section (h)(2), the connector(s) must be clearly labeled to identify which connector is used to access the standardized OBD information required in section (h).

(2.6.2) For 2016 and subsequent model year engines, the additional connector may not be in the location specified in section (h)(2.2.1).

(3) Communications to a Scan Tool:

All OBD control modules (e.g., engine, auxiliary emission control module) on a single vehicle shall use the same protocol for communication of required emission-related messages from on-board to off-board network communications to a scan tool meeting SAE J1978 specifications or designed to communicate with an SAE J1939 network. Engine manufacturers shall not alter normal operation of the engine emission control system due to the presence of off-board test equipment accessing information required by section (h). The OBD system shall use one of the following standardized protocols:

(3.1) ISO 15765-4. All required emission-related messages using this protocol shall use a 500 kbps baud rate.

(3.2) SAE J1939. This protocol may only be used on vehicles with diesel engines (including diesel engines converted to alternate-fueled engines). For 2010 through 2015 model year engines, all required emission-related messages using this protocol on an individual vehicle shall use either the 250 kbps or the 500 kbps baud rate. The 250 kbps baud rate may not be used on 2016 or subsequent model year engines.

(4) Required Emission Related Functions:

The following standardized functions shall be implemented in accordance with the specifications in SAE J1979 or SAE J1939 to allow for access to the required information by a scan tool meeting SAE J1978 specifications or designed to

communicate with an SAE J1939 network:

(4.1) Readiness Status: In accordance with SAE J1979/J1939-73 specifications, the OBD system shall indicate "complete" or "not complete" since the fault memory was last cleared for each of the installed monitored components and systems identified in sections (e)(1) through (f)(9), and (g)(3) except (e)(11) and (f)(4).

(4.1.1) The readiness status for the following component/system readiness bits shall always indicate "complete":

(A) Diesel misfire (section (e)(2)) for engines without a separate monitor designed to detect misfires identified in section (e)(2.2.1) and subject to the monitoring conditions of sections (e)(2.3.1) and (e)(2.3.2);

(B) Gasoline misfire (section (f)(2)); and

(C) Diesel and gasoline comprehensive component (section (g)(3)).

(4.1.2) For 2010 through 2015 model year engines, for components and systems not listed in section (h)(4.1.1) above, the readiness status shall immediately indicate "complete" upon the respective monitor(s) (except those monitors specified under section (h)(4.1.7) below) determining that the component or system is not malfunctioning. The readiness status for a component or system shall also indicate "complete" if after the requisite number of decisions necessary for determining MIL status has been fully executed, the monitor indicates a malfunction for the component or system.

(4.1.3) For 2016 and subsequent model year engines, for components and systems not listed in section (h)(4.1.1) above, the readiness status for each component/system readiness bit listed below shall immediately indicate "complete" if any of the following conditions occur: (1) all the respective supported monitors listed below for each component/system have fully executed and determined that the component or system is not malfunctioning, or (2) at least one of the monitors listed below for each component/system has determined that the component or system is malfunctioning after the requisite number of decisions necessary for determining the MIL status have been fully executed, regardless of whether or not the other monitors listed have been fully executed:

(A) Diesel Fuel System: sections (e)(1.2.1), (e)(1.2.2), and (e)(1.2.3)

(B) Diesel Misfire: section (e)(2.2.1) for engines with a separate monitor designed to detect misfires identified in section (e)(2.2.1) and subject to the monitoring conditions of sections (e)(2.3.1) and (e)(2.3.2)

(C) Diesel EGR/VVT: sections (e)(3.2.1), (e)(3.2.2), (e)(3.2.3), (e)(3.2.5), (e)(3.2.6), and (e)(10.2)

(D) Diesel Boost Pressure Control System: sections (e)(4.2.1), (e)(4.2.2), (e)(4.2.3), and (e)(4.2.4)

(E) Diesel NMHC Converting Catalyst: sections (e)(5.2.2) and (e)(5.2.3)(A)

(F) Diesel NOx Converting Catalyst: section (e)(6.2.1)

(G) Diesel NOx Aftertreatment: sections (e)(7.2.1) and (e)(7.2.2)

(H) Diesel PM Filter: sections (e)(8.2.1), (e)(8.2.2), (e)(8.2.5), and (e)(8.2.6)

(I) Diesel Exhaust Gas Sensor: sections (e)(9.2.1)(A)(i), (e)(9.2.1)(A)(iv), (e)(9.2.1)(B)(i), (e)(9.2.1)(B)(iv), (e)(9.2.2)(A), (e)(9.2.2)(D), and (e)(9.2.3)(A)

(J) Gasoline Fuel System: section (f)(1.2.1)(C)

(K) Gasoline EGR/VVT: sections (f)(3.2.1), (f)(3.2.2), (f)(9.2.1), (f)(9.2.2), and (f)(9.2.3)

(L) Gasoline Secondary Air System: sections (f)(5.2.1), (f)(5.2.2), (f)(5.2.3), and (f)(5.2.4)

(M) Gasoline Catalyst: section (f)(6.2.1)

(N) Gasoline Evaporative System: sections (f)(7.2.2)(A) and (f)(7.2.2)(B)

(O) Gasoline Oxygen Sensor: sections (f)(8.2.1)(A), (f)(8.2.1)(D), (f)(8.2.2)(A), and (f)(8.2.2)(C)

(4.1.4) For 2016 and subsequent model year engines, for monitors that detect faults of more than one major emission-related component (e.g., a single monitor that is used to detect both oxygen sensor faults that are tied to the oxygen sensor readiness bit and air-fuel ratio cylinder imbalance faults that are tied to the fuel system readiness bit), the manufacturer shall include the monitor only in the readiness status for the component/system that the monitor is primarily calibrated, intended, or expected in-use to detect faults of.

(4.1.5) Except for the readiness bits listed under section (h)(4.1.1) above, the readiness status for each of the monitored components or systems shall indicate "not complete" whenever fault memory has been cleared or erased by a means other than that allowed in section (d)(2). Normal vehicle shut down (i.e., key off, engine off) may not cause the readiness status to indicate "not complete".

(4.1.6) If the manufacturer elects to additionally indicate readiness status through the MIL in the key on, engine off position as provided for in section (d)(2.1.3), the readiness status shall be indicated in the following manner: If the readiness status for all monitored components or systems is "complete", the MIL shall continuously illuminate in the key on, engine off position for at least 15 seconds as required by section (d)(2.1.2). If the readiness status for one or more of the monitored components or systems is "not complete", after 15-20 seconds of operation in the key on, engine off position with the MIL illuminated continuously as required by section (d)(2.1.2), the MIL shall blink once per second for 5-10 seconds. The data stream value for MIL status (section (h)(4.2)) shall indicate "commanded

off" during this sequence unless the MIL has also been "commanded on" for a detected fault.

(4.1.7) Manufacturers are not required to use the following monitors in determining the readiness status for the specific component or system:

(A) Circuit and out-of-range monitors that are required to be continuous;

(B) Gasoline and diesel exhaust gas sensor feedback monitors specified in sections (e)(9.2.1)(A)(iii), (e)(9.2.1)(B)(iii), (e)(9.2.2)(C), (f)(8.2.1)(C), and (f)(8.2.2)(E);

(C) Diesel feedback control monitors specified in sections (e)(1.2.4), (e)(3.2.4), (e)(4.2.5), (e)(6.2.2)(D), (e)(7.2.3), and (e)(8.2.7);

(D) Gasoline fuel system monitors specified in sections (f)(1.2.1)(A), (f)(1.2.1)(B), (f)(1.2.2), (f)(1.2.4), and (f)(1.2.5).

(4.2) Data Stream: The following signals shall be made available on demand through the standardized data link connector in accordance with SAE J1979/J1939 specifications. The actual signal value shall always be used instead of a default or limp home value.

(4.2.1) For all gasoline engines:

(A) Calculated load value, engine coolant temperature, engine speed, vehicle speed, time elapsed since engine start; and

(B) Absolute load, fuel level (if used to enable or disable any other diagnostics), barometric pressure (directly measured or estimated), engine control module system voltage, commanded equivalence ratio; and

(C) Number of stored confirmed fault codes, catalyst temperature (if directly measured or estimated for purposes of enabling the catalyst monitor(s)), monitor status (i.e., disabled for the rest of this driving cycle, complete this driving cycle, or not complete this driving cycle) since last engine shut-off for each monitor used for readiness status, distance traveled (or engine run time for engines not utilizing vehicle speed information) while MIL activated, distance traveled (or engine run time for engines not utilizing vehicle speed information) since fault memory last cleared, and number of warm-up cycles since fault memory last cleared, OBD requirements to which the engine is certified (e.g., California OBD, EPA OBD, European OBD, non-OBD) and MIL status (i.e., commanded-on or commanded-off).

(4.2.2) For all diesel engines:

(A) Calculated load (engine torque as a percentage of maximum torque available at the current engine speed), driver's demand engine torque (as a percentage of maximum engine torque), actual engine torque (as a percentage of maximum engine torque), reference engine maximum torque, reference maximum engine torque as a function of engine speed (suspect parameter numbers (SPN) 539 through 543 defined by SAE

J1939 within parameter group number (PGN) 65251 for engine configuration), engine coolant temperature, engine oil temperature (if used for emission control or any OBD diagnostics), engine speed, time elapsed since engine start;

(B) Fuel level (if used to enable or disable any other diagnostics), vehicle speed (if used for emission control or any OBD diagnostics), barometric pressure (directly measured or estimated), engine control module system voltage;

(C) Number of stored confirmed/MIL-on fault codes, monitor status (i.e., disabled for the rest of this driving cycle, complete this driving cycle, or not complete this driving cycle) since last engine shut-off for each monitor used for readiness status, distance traveled (or engine run time for engines not utilizing vehicle speed information) while MIL activated, distance traveled (or engine run time for engines not utilizing vehicle speed information) since fault memory last cleared, number of warm-up cycles since fault memory last cleared, OBD requirements to which the engine is certified (e.g., California OBD, California OBD-child rating (i.e., for engines subject to (d)(7.1.2) or (d)(7.2.3)) EPA OBD, European OBD, non-OBD), MIL status (i.e., commanded-on or commanded-off);

(D) NOx NTE control area status (i.e., inside control area, outside control area, inside manufacturer-specific NOx NTE carve-out area, or deficiency active area), PM NTE control area status (i.e., inside control area, outside control area, inside manufacturer-specific PM NTE carve-out area, or deficiency active area);

(E) For 2013 and subsequent model year engines, normalized trigger for PM filter regeneration (SPN 5466 defined by SAE J1939 for 2016 and subsequent model year engines), PM filter regeneration status (SPN 3700 defined by SAE J1939 for 2016 and subsequent model year engines); and

(F) For 2013 and subsequent model year engines, average distance (or engine run time for engines not utilizing vehicle speed information) between PM filter regenerations.

(G) For 2016 and subsequent model year engines, fuel rate (mg/stroke), engine torque (including fan or accessory torque), and modeled exhaust flow (mass/time).

(H) For purposes of the calculated load and torque parameters in section (h)(4.2.2)(A) and the torque, fuel rate, and modeled exhaust flow parameters in section (h)(4.2.2)(G), manufacturers shall report the most accurate values that are calculated within the applicable electronic control unit (e.g., the engine control module). "Most accurate values", in this context, shall be of sufficient accuracy, resolution, and filtering to be used for the purposes of in-use emission testing with the engine still in a vehicle (e.g., using portable emission measurement equipment).

(4.2.3) For all engines so equipped:

(A) Absolute throttle position, relative throttle position, fuel control system status (e.g., open loop, closed loop), fuel trim, fuel pressure, ignition timing advance, fuel injection timing, intake air/manifold temperature, engine intercooler temperature, manifold absolute pressure, air flow rate from mass air flow sensor, secondary air status (upstream, downstream, or atmosphere), ambient air temperature, commanded purge valve duty cycle/position, commanded EGR valve duty cycle/position, actual EGR valve duty cycle/position, EGR error between actual and commanded, PTO status (active or not active), redundant absolute throttle position (for electronic throttle or other systems that utilize two or more sensors), absolute pedal position, redundant absolute pedal position, commanded throttle motor position, fuel rate, boost pressure, commanded/target boost pressure, turbo inlet air temperature, fuel rail pressure, commanded fuel rail pressure, PM filter inlet pressure, PM filter inlet temperature, PM filter outlet pressure, PM filter outlet temperature, PM filter delta pressure, exhaust pressure sensor output, exhaust gas temperature sensor output, injection control pressure, commanded injection control pressure, turbocharger/turbine speed, variable geometry turbo position, commanded variable geometry turbo position, turbocharger compressor inlet temperature, turbocharger compressor inlet pressure, turbocharger turbine inlet temperature, turbocharger turbine outlet temperature, wastegate valve position, glow plug lamp status;

(B) For 2013 and subsequent model year engines, EGR temperature, variable geometry turbo control status (e.g., open loop, closed loop), reductant level (e.g., urea tank fill level), alcohol fuel percentage, type of fuel currently being used, NOx adsorber regeneration status, NOx adsorber deSOx status, hybrid battery pack remaining charge;

(C) Oxygen sensor output, air/fuel ratio sensor output, NOx sensor output, evaporative system vapor pressure; and

(D) For 2013 and subsequent model year engines, PM sensor output and distance traveled while low/empty SCR reductant driver warning/inducement active.

(E) For 2016 and subsequent model year engines, reductant quality sensor output and corrected NOx sensor output (e.g., raw sensor signal corrected for estimated ammonia concentrations or auto-zero calculations and used by the applicable electronic control unit).

(4.3) Freeze Frame:

(4.3.1) "Freeze frame" information required to be stored pursuant to sections (d)(2.2.1)(D), (d)(2.2.2)(D), (e)(1.4.2)(D), (e)(2.4.2)(B), (f)(1.4.4), and (f)(2.4.3) shall be made available on demand through the standardized data link connector in accordance with SAE J1979/J1939-73 specifications.

(4.3.2) "Freeze frame" conditions must include the fault code which caused the data to be stored and all of the signals required in sections (h)(4.2.1)(A) and (4.2.2)(A). Freeze frame conditions shall also include all of the signals required on the engine in sections (h)(4.2.1)(B), (4.2.2)(B), (4.2.2)(E), (4.2.3)(A), and (4.2.3)(B) that are used for diagnostic or control purposes in the specific diagnostic or emission-critical powertrain control unit that stored the fault code.

(4.3.3) Only one frame of data is required to be recorded. Manufacturers may choose to store additional frames provided that at least the required frame can be read by a scan tool meeting SAE J1978 specifications or designed to communicate with an SAE J1939 network.

(4.4) Fault Codes:

(4.4.1) For vehicles using the ISO 15765-4 protocol for the standardized functions required in section (h):

(A) For all monitored components and systems, stored pending, confirmed, and permanent fault codes shall be made available through the diagnostic connector in a standardized format in accordance with SAE J1979 specifications. Standardized fault codes conforming to SAE J2012 shall be employed.

(B) The stored fault code shall, to the fullest extent possible, pinpoint the likely cause of the malfunction. To the extent feasible, manufacturers shall use separate fault codes for every diagnostic where the diagnostic and repair procedure or likely cause of the failure is different. In general, rationality and functional diagnostics shall use different fault codes than the respective circuit continuity diagnostics. Additionally, input component circuit continuity diagnostics shall use different fault codes for distinct malfunctions (e.g., out-of-range low, out-of-range high, open circuit).

(C) Manufacturers shall use appropriate SAE-defined fault codes of SAE J2012 (e.g., P0xxx, P2xxx) whenever possible. With Executive Officer approval, manufacturers may use manufacturer-defined fault codes in accordance with SAE J2012 specifications (e.g., P1xxx). Factors to be considered by the Executive Officer for approval shall include the lack of available SAE-defined fault codes, uniqueness of the diagnostic or monitored component, expected future usage of the diagnostic or component, and estimated usefulness in providing additional diagnostic and repair information to service technicians. Manufacturer-defined fault codes shall be used consistently (i.e., the same fault code may not be used to represent two different failure modes) across a manufacturer's entire product line.

(D) A pending or confirmed fault code (as required in sections (d) and (e) through (g)) shall be stored and available to an SAE J1978 scan tool within 10 seconds after a diagnostic has determined that a malfunction has

occurred. A permanent fault code shall be stored and available to an SAE J1978 scan tool no later than the end of an ignition cycle (including electronic control unit shutdown) in which the corresponding confirmed fault code causing the MIL to be illuminated has been stored.

(E) Pending fault codes:

(i) Pending fault codes for all components and systems (including continuously and non-continuously monitored components) shall be made available through the diagnostic connector in accordance with SAE J1979 specifications (e.g., Mode/Service $07).

(ii) A pending fault code(s) shall be stored and available through the diagnostic connector for all currently malfunctioning monitored component(s) or system(s), regardless of the MIL illumination status or confirmed fault code status (e.g., even after a pending fault has matured to a confirmed fault code and the MIL is illuminated, a pending fault code shall be stored and available if the most recent monitoring event indicates the component is malfunctioning).

(iii) Manufacturers using alternate statistical protocols for MIL illumination as allowed in section (d)(2.2.1)(C) shall submit to the Executive Officer a protocol for setting pending fault codes. The Executive Officer shall approve the proposed protocol upon determining that, overall, it is equivalent to the requirements in sections (h)(4.4.1)(E)(i) and (ii) and that it effectively provides service technicians with a quick and accurate indication of a pending failure.

(F) Permanent fault codes:

(i) Permanent fault codes for all components and systems shall be made available through the diagnostic connector in a standardized format that distinguishes permanent fault codes from both pending fault codes and confirmed fault codes.

(ii) A confirmed fault code shall be stored as a permanent fault code no later than the end of the ignition cycle and subsequently at all times that the confirmed fault code is commanding the MIL on (e.g., for currently failing systems but not during the 40 warm-up cycle self-healing process described in section (d)(2.3.1)(B)).

(iii) Permanent fault codes shall be stored in NVRAM and may not be erasable by any scan tool command (generic or enhanced) or by disconnecting power to the on-board computer.

(iv) Permanent fault codes may not be erased when the control module containing the permanent fault code is reprogrammed unless the readiness bits (refer to section (h)(4.1)) for all monitored components and systems in all modules that reported supported readiness for a

readiness bit other than the comprehensive components readiness bit are set to "not complete" in conjunction with the reprogramming event.

(v) The OBD system shall have the ability to store a minimum of four current confirmed fault codes as permanent fault codes in NVRAM. If the number of confirmed fault codes currently commanding the MIL on exceeds the maximum number of permanent fault codes that can be stored, the OBD system shall store the earliest detected confirmed fault codes as permanent fault codes. If additional confirmed fault codes are stored when the maximum number of permanent fault codes is already stored in NVRAM, the OBD system may not replace any existing permanent fault code with the additional confirmed fault codes.

(4.4.2) For vehicles using the SAE J1939 protocol for the standardized functions required in section (h):

(A) For all monitored components and systems, stored pending, MIL-on, and previously MIL-on fault codes shall be made available through the diagnostic connector in a standardized format in accordance with SAE J1939 specifications (i.e., Diagnostic Message (DM) 6, DM12, and DM23). Standardized fault codes conforming to SAE J1939 shall be employed.

(B) The stored fault code shall, to the fullest extent possible, pinpoint the likely cause of the malfunction. To the extent feasible, manufacturers shall use separate fault codes for every diagnostic where the diagnostic and repair procedure or likely cause of the failure is different. In general, rationality and functional diagnostics shall use different fault codes than the respective circuit continuity diagnostics. Additionally, input component circuit continuity diagnostics shall use different fault codes for distinct malfunctions (e.g., out-of-range low, out-of-range high, open circuit).

(C) Manufacturers shall use appropriate SAE-defined fault codes of SAE J939 whenever possible. With Executive Officer approval, manufacturers may use manufacturer-defined fault codes in accordance with SAE J1939 specifications. Factors to be considered by the Executive Officer for approval shall include the lack of available SAE-defined fault codes, uniqueness of the diagnostic or monitored component, expected future usage of the diagnostic or component, and estimated usefulness in providing additional diagnostic and repair information to service technicians. Manufacturer-defined fault codes shall be used consistently (i.e., the same fault code may not be used to represent two different failure modes) across a manufacturer's entire product line.

(D) A pending or MIL-on fault code (as required in sections (d), (e), and (g)) shall be stored and available to an SAE J1939 scan tool within 10 seconds after a diagnostic has determined that a malfunction has occurred. A permanent fault code shall be stored and available to an SAE J1939 scan tool no later than the end of an ignition cycle (including electronic control

unit shutdown) in which the corresponding MIL-on fault code causing the MIL to be illuminated has been stored.

(E) Pending fault codes:

(i) Pending fault codes for all components and systems (including continuously and non-continuously monitored components) shall be made available through the diagnostic connector in accordance with SAE J1939 specifications (i.e., DM6).

(ii) Manufacturers using alternate statistical protocols for MIL illumination as allowed in section (d)(2.2.2)(C) shall submit to the Executive Officer a protocol for setting pending fault codes. The Executive Officer shall approve the proposed protocol upon determining that, overall, it is equivalent to the requirements in sections (h)(4.4.2)(E)(i) and that it effectively provides service technicians with a quick and accurate indication of a pending failure.

(F) Permanent fault codes:

(i) Permanent fault codes for all components and systems shall be made available through the diagnostic connector in a standardized format that distinguishes permanent fault codes from pending fault codes, MIL-on fault codes, and previously MIL-on fault codes.

(ii) A MIL-on fault code shall be stored as a permanent fault code no later than the end of the ignition cycle and subsequently at all times that the MIL-on fault code is commanding the MIL on (e.g., for currently failing systems).

(iii) Permanent fault codes shall be stored in NVRAM and may not be erasable by any scan tool command (generic or enhanced) or by disconnecting power to the on-board computer.

(iv) Permanent fault codes may not be erased when the control module containing the permanent fault codes is reprogrammed unless the readiness bits (refer to section (h)(4.1)) for all monitored components and systems in all modules that reported supported readiness for a readiness bit other than the comprehensive components readiness bit are set to "not complete" in conjunction with the reprogramming event.

(v) The OBD system shall have the ability to store a minimum of four current MIL-on fault codes as permanent fault codes in NVRAM. If the number of MIL-on fault codes currently commanding the MIL on exceeds the maximum number of permanent fault codes that can be stored, the OBD system shall store the earliest detected MIL-on fault codes as permanent fault codes. If additional MIL-on fault codes are stored when the maximum number of permanent fault codes is already stored in NVRAM, the OBD system may not replace any existing permanent fault code with the additional MIL-on fault codes.

(4.5) Test Results:

(4.5.1) Except as provided in section (h)(4.5.7), for all monitored components and systems identified in sections (e)(1) through (f)(9), results of the most recent monitoring of the components and systems and the test limits established for monitoring the respective components and systems shall be stored and available through the data link in accordance with the standardized format specified in SAE J1979 for the ISO 15765-4 protocol or SAE J1939.

(4.5.2) The test results shall be reported such that properly functioning components and systems (e.g., "passing" systems) do not store test values outside of the established test limits. Test limits shall include both minimum and maximum acceptable values and shall be defined so that a test result equal to either test limit is a "passing" value, not a "failing" value.

(4.5.3) The test results shall be standardized such that the name of the monitored component (e.g., catalyst bank 1) can be identified by a generic scan tool and the test results and limits can be scaled and reported with the appropriate engineering units by a generic scan tool.

(4.5.4) The test results shall be stored until updated by a more recent valid test result or the fault memory of the OBD system computer is cleared.

(4.5.5) If the OBD system fault memory is cleared:

(A) For vehicles using the ISO 15765-4 protocol for the standardized functions required in section (h), all test results shall report values of zero for the test result and test limits. The test results shall be updated once the applicable monitor has run and has valid test results and limits to report.

(B) For vehicles using the SAE J1939 protocol for the standardized functions required in section (h):

(i) For 2010 through 2015 model year engines, all test results shall either (a) report values of zero for the test results and test limits, or (b) report values corresponding to 'test not complete' in accordance with SAE J1939-73 specifications. The test results shall be updated once the applicable monitor has run and has valid test results and limits to report.

(ii) For 2016 and subsequent model year engines, all test results shall report values corresponding to 'test not complete' in accordance with SAE J1939-73 specifications. The test results shall be updated once the applicable monitor has run and has valid test results and limits to report.

(4.5.6) All test results and test limits shall always be reported. The OBD system shall store and report unique test results for each separate diagnostic.

(4.5.7) The requirements of section (h)(4.5) do not apply to gasoline fuel system monitors specified under sections (f)(1.2.1)(A), (f)(1.2.1)(B), (f)(1.2.2),

(f)(1.2.4), and (f)(1.2.5), exhaust gas sensor monitors specified under sections (e)(9.2.1)(A)(iii), (e)(9.2.1)(B)(iii), (e)(9.2.2)(C), (f)(8.2.1)(C), and (f)(8.2.2)(E), cold start emission reduction strategy monitors, circuit and out-of-range monitors that are required to be continuous, and diesel feedback control monitors specified under sections (e)(1.2.4), (e)(3.2.4), (e)(4.2.5), (e)(6.2.2)(D), (e)(7.2.3), and (e)(8.2.7).

(4.6) Software Calibration Identification:

(4.6.1) Except as provided for in section (h)(4.6.3), on all vehicles, a single software calibration identification number (CAL ID) for each diagnostic or emission critical control unit(s) shall be made available through the standardized data link connector in accordance with the SAE J1979/J1939 specifications.

(4.6.2) A unique CAL ID shall be used for every emission-related calibration and/or software set having at least one bit of different data from any other emission-related calibration and/or software set. Control units coded with multiple emission or diagnostic calibrations and/or software sets shall indicate a unique CAL ID for each variant in a manner that enables an off-board device to determine which variant is being used by the vehicle. Control units that utilize a strategy that will result in MIL illumination if the incorrect variant is used (e.g., control units that contain variants for manual and automatic transmissions but will illuminate the MIL if the variant selected does not match the type of transmission on the vehicle) are not required to use unique CAL IDs.

(4.6.3) Manufacturers may request Executive Officer approval to respond with more than one CAL ID per diagnostic or emission critical powertrain control unit. Executive Officer approval of the request shall be based on the method used by the manufacturer to ensure each control unit will respond to a generic scan tool with the CAL IDs in order of highest to lowest priority with regards to areas of the software most critical to emission and OBD system performance.

(4.7) Software Calibration Verification Number:

(4.7.1) All vehicles shall use an algorithm to calculate a single calibration verification number (CVN) that verifies the on-board computer software integrity for each diagnostic or emission critical electronic control unit. The CVN shall be made available through the standardized data link connector in accordance with the SAE J1979/J1939 specifications. The CVN shall be capable of being used to determine if the emission-related software and/or calibration data are valid and applicable for that vehicle and CAL ID.

(4.7.2) One CVN shall be made available for each CAL ID made available. For diagnostic or emission critical powertrain control units with more than one CAL ID, each CVN shall be output to a generic scan tool in the same order

as the CAL IDs are output to the generic scan tool to allow the scan tool to match each CVN to the corresponding CAL ID.

(4.7.3) Manufacturers shall submit information for Executive Officer approval of the algorithm used to calculate the CVN. Executive Officer approval of the algorithm shall be based on the complexity of the algorithm and the determination that the same CVN is difficult to achieve with modified calibration values.

(4.7.4) The CVN shall be calculated at least once per ignition cycle and stored until the CVN is subsequently updated. The stored CVN value may not be erased when fault memory is erased by a generic scan tool in accordance with SAE J1979/J1939 specifications or during normal vehicle shut down (i.e., key off, engine off).

(4.7.5) When a CVN request message is received by the on-board computer, the stored CVN value shall be made available through the data link connector to a generic scan tool. Except as provided for below, the on-board computer may not use delayed timing in sending the CVN and may not respond with a message indicating that the CVN value is not currently available. If the CVN request message is received immediately following erasure of the stored CVN value (i.e., within the first 120 seconds of engine operation after a reprogramming event or a non-volatile memory clear or within the first 120 seconds of engine operation after a volatile memory clear or battery disconnect), the on-board computer may respond with one or more messages directing the scan tool to wait or resend the request message after the delay. Such messages and delays shall conform to the specifications for transmitting CVN data contained in SAE J1979 or J1939, whichever applies.

(4.7.6) For purposes of Inspection and Maintenance (I/M) testing, manufacturers shall make the CVN and CAL ID combination information available for all vehicles in a standardized electronic format that allows for off-board verification that the CVN is valid and appropriate for a specific vehicle and CAL ID. The standardized electronic format is detailed in Attachment F of ARB Mail-Out #MSC 09-22, July 7, 2009, incorporated by reference. Manufacturers shall submit the CVN and CAL ID information to the Executive Officer not more than 25 days after the close of a calendar quarter.

(4.8) Vehicle and Engine Identification Numbers:

(4.8.1) All vehicles shall have the vehicle identification number (VIN) available in a standardized format through the standardized data link connector in accordance with SAE J1979/J1939 specifications. Only one electronic control unit per vehicle shall report the VIN to an SAE J1978/J1939 scan tool.

(4.8.2) All 2013 and subsequent model year engines shall have the engine serial number (ESN) available in a standardized format through the standardized data link connector. Only one electronic control unit per vehicle shall report the ESN to an SAE J1978/J1939 scan tool.

(4.8.3) If the VIN or ESN is reprogrammable, in conjunction with reprogramming of the VIN or the ESN, the OBD system shall erase all emission-related diagnostic information identified in section (h)(4.10.1) in all control modules that reported supported readiness for a readiness bit other than the comprehensive components readiness bit.

(4.9) ECU Name: For 2013 and subsequent model year engines, the name of each electronic control unit that responds to an SAE J1978/J1939 scan tool with a unique address or identifier shall be communicated in a standardized format in accordance with SAE J1979/J1939 (e.g., ECUNAME in Service/Mode $09, InfoType $0A in SAE J1979).

(4.10) Erasure of Emission-Related Diagnostic Information:

(4.10.1) For purposes of section (h)(4.10), "emission-related diagnostic information" includes all the following:

(A) Readiness status (section (h)(4.1))

(B) Data stream information (section (h)(4.2)) including number of stored confirmed/MIL-on fault codes, distance traveled while MIL activated, number of warm-up cycles since fault memory last cleared, and distance traveled since fault memory last cleared.

(C) Freeze frame information (section (h)(4.3))

(D) Pending, confirmed, MIL-on, and previously MIL-on fault codes (section (h)(4.4.))

(E) Test results (section (h)(4.5))

(4.10.2) For all vehicles, the emission-related diagnostic information shall be erased if commanded by a scan tool (generic or enhanced) and may be erased if the power to the on-board computer is disconnected. Except as provided for in sections (h)(4.4.1)(F)(iv), (h)(4.4.2)(F)(iv), and (h)(4.8.3), if any of the emission-related diagnostic information is commanded to be erased by a scan tool (generic or enhanced), all emission-related diagnostic information from all diagnostic or emission critical control units shall be erased. The OBD system may not allow a scan tool to erase a subset of the emission-related diagnostic information (e.g., the OBD system may not allow a scan tool to erase only one of three stored fault codes or only information from one control unit without erasing information from the other control unit(s)).

(5) Tracking Requirements:

(5.1) In-use Performance Ratio Tracking Requirements:

(5.1.1) For each monitor required in sections (e) through (g) to separately report an in-use performance ratio, manufacturers shall implement software algorithms to report a numerator and denominator in the standardized format specified below and in accordance with the SAE J1979/J1939 specifications.

(5.1.2) Numerical Value Specifications:

(A) For the numerator, denominator, general denominator, and ignition cycle counter:

(i) Each number shall have a minimum value of zero and a maximum value of 65,535 with a resolution of one.

(ii) Each number shall be reset to zero only when a non-volatile random access memory (NVRAM) reset occurs (e.g., reprogramming event) or, if the numbers are stored in keep-alive memory (KAM), when KAM is lost due to an interruption in electrical power to the control module (e.g., battery disconnect). Numbers may not be reset to zero under any other circumstances including when a scan tool command to clear fault codes or reset KAM is received.

(iii) If either the numerator or denominator for a specific component reaches the maximum value of 65,535 ±2, both numbers shall be divided by two before either is incremented again to avoid overflow problems.

(iv) If the ignition cycle counter reaches the maximum value of 65,535 ±2, the ignition cycle counter shall rollover and increment to zero on the next ignition cycle to avoid overflow problems.

(v) If the general denominator reaches the maximum value of 65,535 ±2, the general denominator shall rollover and increment to zero on the next driving cycle that meets the general denominator definition to avoid overflow problems.

(vi) If a vehicle is not equipped with a component (e.g., oxygen sensor bank 2, secondary air system), the corresponding numerator and denominator for that specific component shall always be reported as zero.

(B) For the ratio:

(i) The ratio shall have a minimum value of zero and a maximum value of 7.99527 with a resolution of 0.000122.

(ii) A ratio for a specific component shall be considered to be zero whenever the corresponding numerator is equal to zero and the

corresponding denominator is not zero.

(iii) A ratio for a specific component shall be considered to be the maximum value of 7.99527 if the corresponding denominator is zero or if the actual value of the numerator divided by the denominator exceeds the maximum value of 7.99527.

(5.2) Engine Run Time Tracking Requirements:

(5.2.1) For all gasoline and diesel engines, manufacturers shall implement software algorithms to individually track and report in a standardized format the engine run time while being operated in the following conditions:

(A) Total engine run time;

(B) Total idle run time (with "idle" defined as accelerator pedal released by driver, engine speed greater than or equal to 50 to 150 rpm below the normal warmed-up idle speed (as determined in the drive position for vehicles equipped with an automatic transmission), PTO not active, and either vehicle speed less than or equal to one mile per hour or engine speed less than or equal to 200 rpm above normal warmed-up idle), and;

(C) Total run time with PTO active;

(D) For 2013 and subsequent model year diesel engines only:

(i) total run time with EI-AECD #1active;

(ii) total run time with EI-AECD #2 active; and so on up to

(iii) total run time with EI-AECD #n active.

(5.2.2) Numerical Value Specifications: For each counter specified in section (h)(5.2.1):

(A) Each number shall conform to the standardized format specified in SAE J1979/J1939.

(B) Each number shall be reset to zero only when a non-volatile memory reset occurs (e.g., reprogramming event). Numbers may not be reset to zero under any other circumstances including when a scan tool (generic or enhanced) command to clear fault codes or reset KAM is received.

(C) If any of the individual counters reach the maximum value, all counters shall be divided by two before any are incremented again to avoid overflow problems.

(5.2.3) Specifications of EI-AECDs

(A) For purposes of section (h)(5.2.3), the following terms shall be defined as follows:

(i) "Purpose" is defined as the objective of the EI-AECD when it is activated (e.g., EGR valve protection);

(ii) "Action" is defined as a specific component/element act that is commanded when the EI-AECD is activated (e.g., EGR system is derated);

(iii) "Parameter" is defined as a component/element (e.g., ECT, oil temperature) used to determine when to activate the EI-AECD; and

(iv) "Condition" is defined as the specific characteristic/state exhibited by the parameter (e.g., ECT above 100 degrees Celsius) that triggers activation of the EI-AECD.

(B) Each unique combination of action, parameter, and condition within a purpose shall be tracked as a separate EI-AECD and increment the timer(s) at all times the condition necessary to activate the EI-AECD is present.

(i) For EI-AECDs that implement an action of variable degree based on the varying characteristics of a parameter (e.g., derate EGR more aggressively as engine oil temperature continues to increase), the EI-AECD shall be tracked by incrementing two separate timers within a single EI-AECD (e.g., EI-AECD #1 timer 1 and EI-AECD #1 timer 2) as follows:

a. The first of the two timers shall be incremented whenever the EI-AECD is commanding some amount of reduced emission control effectiveness up to but not including 75 percent of the maximum reduced emission control effectiveness that the EI-AECD is capable of commanding during in-use vehicle or engine operation. For example, an overheat protection strategy that progressively derates EGR and eventually shuts off EGR as oil temperature increases would accumulate time for the first timer from the time derating of EGR begins up to the time that EGR is derated 75 percent. As a second example, an overheat protection strategy that advances fuel injection timing progressively up to a maximum advance of 15 degrees crank angle as the engine coolant temperature increases would accumulate time for the first timer from the time advance is applied up to the time that advance reaches 11.25 degrees (75 percent of the maximum 15 degrees).

b. The second of the two timers shall be incremented whenever the EI-AECD is commanding 75 percent or more of the maximum reduced emission control effectiveness that the EI-AECD is capable of commanding during in-use vehicle or engine operation. For example, the second timer for the first example EI-AECD identified in section (h)(5.2.3)(B)(i) would accumulate time from the time that EGR is derated 75 percent up to and including when EGR is completely shut off. For the second example EI-AECD identified in section (h)(5.2.3)(B)(i), the second timer would accumulate time from the time fuel injection timing advance is at 11.25 degrees up to

and including the maximum advance of 15 degrees.

(C) A manufacturer may request Executive Officer approval to combine multiple unique actions, parameters, and/or conditions to be tracked within a single EI-AECD. The manufacturer shall submit a plan for combining, tracking, and incrementing the EI-AECD to the Executive Officer for approval. Executive Officer approval of the plan shall be based on the effectiveness and the equivalence of the incrementing plan to determine the amount of EI-AECD activity per condition relative to the measure of EI-AECD activity under section (h)(5.2.3)(B).

(D) For EI-AECDs that are activated solely due to elevation, the timer shall be incremented only for the portion of EI-AECD activation when the elevation is below 8000 feet (e.g., the timer for an EI-AECD that is activated when the elevation is above 5000 feet shall be incremented only when the EI-AECD is active and the elevation is below 8000 feet).

(E) For EI-AECDs that are initially activated due to engine warm-up and are subsequently reactivated after the engine has warmed up, the timer shall be incremented only when the EI-AECD is active after the initial engine warm-up (e.g., an EI-AECD that turns off an emission control at low engine coolant temperature would not increment the timer during initial warm-up but would increment the timer if coolant temperature subsequently dropped below the low temperature and reactivated the EI-AECD later in the drive cycle).

(F) If more than one EI-AECD is currently active, the timers for both EI-AECDs shall accumulate time, regardless if there is overlap or redundancy in the commanded action (e.g., two different EI-AECDs independently but simultaneously commanding EGR off shall both accumulate time in their respective timers).

(i) *Monitoring System Demonstration Requirements for Certification.*

(1) General.

(1.1) Certification requires that manufacturers submit emission test data from one or more durability demonstration test engines (test engines).

(1.2) The Executive Officer may approve other demonstration protocols if the manufacturer can provide comparable assurance that the malfunction criteria are chosen based on meeting the malfunction criteria requirements and that the timeliness of malfunction detection is within the constraints of the applicable monitoring requirements.

(1.3) For flexible fuel engines capable of operating on more than one fuel or fuel combinations, the manufacturer shall submit a plan for providing emission test data to the Executive Officer for approval. The Executive Officer shall approve the plan if it is determined to be representative of expected in-use fuel or fuel combinations and provides accurate and timely evaluation of the monitored

systems.

(2) Selection of Test Engines:

(2.1) Prior to submitting any applications for certification for a model year, a manufacturer shall notify the Executive Officer of the engine families and engine ratings within each family planned for that model year. The Executive Officer will then select the engine family(ies) and the specific engine rating within the engine family(ies) that the manufacturer shall use as demonstration test engines to provide emission test data. The selection of test vehicles for production vehicle evaluation, as specified in section (l)(2), may take place during this selection process.

(2.2) Number of test engines:

(2.2.1) For the 2010 model year, a manufacturer shall provide emission test data of a test engine from the OBD parent rating.

(2.2.2) For the 2011 and 2012 model years, a manufacturer certifying one to seven engine families in a model year shall provide emission test data of a test engine from one OBD child rating. A manufacturer certifying eight or more engine families in a model year shall provide emission test data of test engines from two OBD child ratings. The Executive Officer may waive the requirement for submittal of data of one or more of the test engines if data have been previously submitted for all of the OBD parent and OBD child ratings.

(2.2.3) For the 2013 and subsequent model years, a manufacturer certifying one to five engine families in a model year shall provide emission test data of a test engine from one engine rating. A manufacturer certifying six to ten engine families in a model year shall provide emission test data from test engines from two engine ratings. A manufacturer certifying eleven or more engine families in a model year shall provide emission test data of test engines from three engine ratings. The Executive Officer may waive the requirement for submittal of data of one or more of the test engines if data have been previously submitted for all of the engine ratings.

(2.2.4) For a given model year, a manufacturer may elect to provide emission data of test engines from more engine ratings than required by section (i)(2.2.1) through (2.2.3). For each additional engine rating tested in that given model year, the Executive Officer shall reduce the number of engine ratings required for testing in one future model year under sections (i)(2.2.2) through (2.2.3) by one.

(2.3) Aging and data collection of diesel test engines:

(2.3.1) For 2010 through 2012 model year test engines, a manufacturer shall use an engine aged for a minimum of 125 hours plus exhaust aftertreatment emission controls aged by an accelerated aging process to be representative of full useful life. Manufacturers are required to submit for

Executive Officer approval a description of the accelerated aging process and/or supporting data. The Executive Officer shall approve the process upon determining that the submitted description and/or data demonstrate that the process ensures that deterioration of the exhaust aftertreatment emission controls is stabilized sufficiently such that it is representative of the manufacturer's best estimates for the performance of the emission control at the end of the useful life. The Executive Officer may not require manufacturers to provide actual in-use or high mileage data to verify or validate that the aging is equivalent to full useful life for purposes of section (i)(2.3.1).

(2.3.2) For 2013 through 2015 model year test engines:

(A) A manufacturer shall collect emission and deterioration data from an actual high mileage system(s) (consisting of the engine, engine emission controls, and aftertreatment) to validate its accelerated aging process. The manufacturer shall collect the data from a 2010 or newer model year system that is the most representative of system designs planned for the 2013 model year and has a minimum actual mileage of full useful life or 185,000 miles, whichever is lower. The manufacturer shall collect and report the data to ARB prior to the end of 2011. The manufacturer shall submit a plan for system selection, procurement, and data collection to the Executive Officer for approval prior to proceeding with the data collection. The Executive Officer shall approve the plan upon determining that the submitted description will result in the manufacturer gathering data necessary to quantify emission performance and deterioration of the system elements in a manner that will allow comparison to deterioration and performance levels achieved with the manufacturer's accelerated aging process.

(B) For testing of 2013 through 2015 model year engines, a manufacturer shall use a system (engine, engine emission controls, and aftertreatment) aged by an accelerated aging process to be representative of full useful life. Manufacturers are required to submit for Executive Officer approval a description of the accelerated aging process and supporting data. The Executive Officer shall approve the process upon determining that the submitted description and data demonstrate that the aging process will result in a system representative of the manufacturer's best estimates of the system performance at full useful life and that the manufacturer has utilized the data collected under section (i)(2.3.2)(A) to validate the correlation of the aging process to actual high mileage systems up to a minimum of full useful life or 185,000 miles.

(2.3.3) For 2016 and subsequent model year test engines:

(A) A manufacturer shall collect emission and deterioration data from an actual high mileage system(s) (consisting of the engine, engine emission controls, and aftertreatment) to validate its accelerated aging process. The manufacturer shall collect the data from a 2010 or newer model year

system that is the most representative of system designs planned for the 2016 model year and has a minimum actual mileage of full useful life. The manufacturer shall collect and report the data to ARB prior to the end of 2014. The manufacturer shall submit a plan for system selection, procurement, and data collection to the Executive Officer for approval prior to proceeding with the data collection. The Executive Officer shall approve the plan upon determining that the submitted description will result in the manufacturer gathering data necessary to quantify emission performance and deterioration of the system elements in a manner that will allow comparison to deterioration and performance levels achieved with the manufacturer's accelerated aging process.

(B) For testing of 2016 and subsequent model year engines, a manufacturer shall use a system (engine, engine emission controls, and aftertreatment) aged by an accelerated aging process to be representative of full useful life. Manufacturers are required to submit for Executive Officer approval a description of the accelerated aging process and supporting data. The Executive Officer shall approve the process upon determining that the submitted description and data demonstrate that the aging process will result in a system representative of the manufacturer's best estimates of the system performance at full useful life and that the manufacturer has utilized the data collected under section (i)(2.3.3)(A) to validate the correlation of the aging process to actual high mileage systems up to a minimum of full useful life.

(2.4) Aging of gasoline engines: For the test engine(s), a manufacturer shall use a certification emission durability test engine(s) system (i.e., consisting of the engine, engine emission controls, and aftertreatment), a representative high mileage engine(s) system, or an engine(s) system aged to the end of the full useful life using an ARB-approved alternative durability procedure (ADP).

(3) Required Testing:

Except as provided below, the manufacturer shall perform single-fault testing based on the applicable test with the following components/systems set at their malfunction criteria limits as determined by the manufacturer for meeting the requirements of sections (e), (f), and (g) or sections (d)(7.1.2) and (d)(7.2.3) for extrapolated OBD systems.

(3.1) Required testing for Diesel/Compression Ignition Engines:

(3.1.1) Fuel System: The manufacturer shall perform a separate test for each malfunction limit established by the manufacturer for the fuel system parameters (e.g., fuel pressure, injection timing) and calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in sections (e)(1.2.1) through (e)(1.2.3). When performing a test for a specific parameter, the fuel system shall be operating at the malfunction criteria limit for the applicable parameter only. All other parameters shall be with normal characteristics. In conducting the fuel system demonstration tests,

the manufacturer may use computer modifications to cause the fuel system to operate at the malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction.

(3.1.2) Misfire Monitoring: For 2013 model year engines subject to section (e)(2.2.5), the manufacturer shall perform a test at the malfunction limit specified in section (e)(2.2.5). A misfire demonstration test is not required for diesel engines not subject to section (e)(2.2.5).

(3.1.3) EGR System: The manufacturer shall perform a test at each flow, slow response, and cooling limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in sections (e)(3.2.1) through (3.2.3) and (e)(3.2.5). In conducting the EGR cooler performance demonstration test, the EGR cooler(s) being evaluated shall be deteriorated to the applicable malfunction criteria using methods established by the manufacturer in accordance with section (e)(3.2.9). In conducting the EGR system slow response demonstration tests, the manufacturer may use computer modifications to cause the EGR system to operate at the malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction or that there is no reasonably feasible method to induce a hardware malfunction.

(3.1.4) Boost Pressure Control System: The manufacturer shall perform a test at each boost, response, and cooling limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in sections (e)(4.2.1) through (4.2.3) and (e)(4.2.4). In conducting the charge air undercooling demonstration test, the charge air cooler(s) being evaluated shall be deteriorated to the applicable malfunction limit established by the manufacturer in section (e)(4.2.4) using methods established by the manufacturer in accordance with section (e)(4.2.8).

(3.1.5) NMHC Catalyst: The manufacturer shall perform a separate test for each monitored NMHC catalyst(s) that is used for a different purpose (e.g., oxidation catalyst upstream of a PM filter, NMHC catalyst used downstream of an SCR catalyst). The catalyst(s) being evaluated shall be deteriorated to the applicable malfunction limit(s) established by the manufacturer and calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in section (e)(5.2.2)(A) and (e)(5.2.2)(B) using methods established by the manufacturer in accordance with section (e)(5.2.4). For each monitored NMHC catalyst(s), the manufacturer shall also demonstrate that the OBD system will detect a catalyst malfunction with the catalyst at its maximum level of deterioration (i.e., the substrate(s) completely removed from the catalyst container or "empty" can). Emission data are not required for the empty can demonstration.

(3.1.6) NOx Catalyst: The manufacturer shall perform a separate test for each monitored NOx catalyst(s) that is used for a different purpose (e.g., passive

lean NOx catalyst, SCR catalyst). The catalyst(s) being evaluated shall be deteriorated to the applicable malfunction limit(s) established by the manufacturer and calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in sections (e)(6.2.1) and (e)(6.2.2)(A) using methods established by the manufacturer in accordance with section (e)(6.2.3). For each monitored NOx catalyst(s), the manufacturer shall also demonstrate that the OBD system will detect a catalyst malfunction with the catalyst at its maximum level of deterioration (i.e., the substrate(s) completely removed from the catalyst container or "empty" can). Emission data are not required for the empty can demonstration.

(3.1.7) NOx Adsorber: The manufacturer shall perform a test using a NOx adsorber(s) deteriorated to the malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in section (e)(7.2.1). The manufacturer shall also demonstrate that the OBD system will detect a NOx adsorber malfunction with the NOx adsorber at its maximum level of deterioration (i.e., the substrate(s) completely removed from the container or "empty" can). Emission data are not required for the empty can demonstration.

(3.1.8) PM Filter: The manufacturer shall perform a test using a PM filter(s) deteriorated to each applicable malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in sections (e)(8.2.1), (e)(8.2.2), and (e)(8.2.4)(A). The manufacturer shall also demonstrate that the OBD system will detect a PM filter malfunction with the filter at its maximum level of deterioration (i.e., the filter(s) completely removed from the filter container or "empty" can). Emission data are not required for the empty can demonstration.

(3.1.9) Exhaust Gas Sensor: The manufacturer shall perform a test for each exhaust gas sensor parameter at each malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in sections (e)(9.2.1)(A)(i), (e)(9.2.1)(B)(i)a. through b., and (e)(9.2.2)(A)(i) through (ii). When performing a test, all exhaust gas sensors used for the same purpose (e.g., for the same feedback control loop, for the same control feature on parallel exhaust banks) shall be operating at the malfunction criteria limit for the applicable parameter only. All other exhaust gas sensor parameters shall be with normal characteristics.

(3.1.10) VVT System: The manufacturer shall perform a test at each target error limit and slow response limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) in sections (e)(10.2.1) and (e)(10.2.2). In conducting the VVT system demonstration tests, the manufacturer may use computer modifications to cause the VVT system to operate at the malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction.

(3.1.11) Cold Start Emission Reduction Strategy: The manufacturer shall perform

a test at the malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the standard) for the system or for each component monitored according to section (e)(11.2.2).

(3.1.12) For each of the testing requirements of section (i)(3.1), if the manufacturer has established that only a functional check is required because no failure or deterioration of the specific tested system could result in an engine's emissions exceeding the emission threshold malfunction criteria (e.g., 2.0 times any of the applicable standards), the manufacturer is not required to perform a demonstration test; however the manufacturer is required to provide the data and/or engineering analysis used to determine that only a functional test of the system(s) is required.

(3.2) Required testing for Gasoline/Spark-Ignited Engines:

(3.2.1) Fuel System:

(A) For engines with adaptive feedback based on the primary fuel control sensor(s), the manufacturer shall perform a test with the adaptive feedback based on the primary fuel control sensor(s) at the rich limit(s) and a test at the lean limit(s) established by the manufacturer and calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in section (f)(1.2.1)(A). For purposes of fuel system testing, the fault(s) induced may result in a uniform distribution of fuel and air among the cylinders. Non-uniform distribution of fuel and air used to induce a fault may not cause misfire.

(B) For engines with feedback based on a secondary fuel control sensor(s) and subject to the malfunction criteria in section (f)(1.2.1)(B), the manufacturer shall perform a test with the feedback based on the secondary fuel control sensor(s) at the rich limit(s) and a test at the lean limit(s) established by the manufacturer and calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in section (f)(1.2.1)(B).

(C) For engines subject to the malfunction criteria in section (f)(1.2.1)(C) (monitoring of air-fuel ratio cylinder imbalance faults), the manufacturer shall perform a test at the malfunction limit(s) calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in section (f)(1.2.1)(C). The manufacturer shall perform the test at the rich limit and another test at the lean limit with a fault induced on the worst case cylinder for each limit. The manufacturer shall submit data and/or analysis demonstrating that a fault of the cylinder(s) will result in the worst case emissions for each malfunction limit.

(D) For other fuel metering or control systems, the manufacturer shall perform a test at the criteria limit(s).

(E) In conducting the fuel system demonstration tests, the manufacturer may use computer modifications to cause the fuel system to operate at the

malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction.

(3.2.2) Misfire: The manufacturer shall perform a test at the malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in section (f)(2.2.2).

(3.2.3) EGR System: The manufacturer shall perform a test at each flow limit calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in sections (f)(3.2.1) and (f)(3.2.2).

(3.2.4) Cold Start Emission Reduction Strategy: The manufacturer shall perform a test at the malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) for each component monitored according to section (f)(4.2.1)(A) or (f)(4.2.2)(B).

(3.2.5) Secondary Air System: The manufacturer shall perform a test at each flow limit calibrated to the emission threshold malfunction criteria in sections (f)(5.2.1) and (f)(5.2.2).

(3.2.6) Catalyst: The manufacturer shall perform a test using a catalyst system deteriorated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in section (f)(6.2.1) using methods established by the manufacturer in accordance with section (f)(6.2.2). The manufacturer shall also demonstrate that the OBD system will detect a catalyst system malfunction with the catalyst system at its maximum level of deterioration (i.e., the substrate(s) completely removed from the catalyst container or "empty" can). Emission data are not required for the empty can demonstration.

(3.2.7) Exhaust Gas Sensor:

(A) The manufacturer shall perform a test with all primary oxygen sensors (conventional switching sensors and wide range or universal sensors) used for fuel control simultaneously possessing a response rate deteriorated to the malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in section (f)(8.2.1)(A). For conventional switching sensors, the manufacturer shall perform a test for each of the following malfunctions (1) the single worst case response rate malfunction among all symmetric and asymmetric patterns required by section (f)(8.2.1)(A), and (2) the worst case asymmetric response rate malfunction that results in delays during transitions from rich-to-lean or lean-to-rich sensor output. For wide range or universal sensors, the manufacturer shall perform a test for each of the following malfunctions: (1) the single worst case response rate malfunction among all symmetric and asymmetric patterns required by section (f)(8.2.1)(A), and (2) the symmetric response rate malfunction that results in delays during transitions from rich-to-lean and lean-to-rich sensor output. For systems

where the same response rate pattern meets the criteria of (1) and (2) above, only one demonstration test is required. For the response rate patterns not tested, the manufacturer is required to provide the data and/or engineering analysis used to determine that the tested response pattern for criterion (1) will result in the worst case emissions compared to all the other response rate malfunctions. Manufacturers shall also perform a test for any other oxygen sensor parameter under sections (f)(8.2.1)(A) and (f)(8.2.2)(A) that can cause engine emissions to exceed the emission threshold malfunction criteria (e.g., 1.5 times the applicable standards due to a shift in air/fuel ratio at which oxygen sensor switches, decreased amplitude). When performing additional test(s), all primary and secondary (if applicable) oxygen sensors used for fuel control shall be operating at the malfunction criteria limit for the applicable parameter only. All other primary and secondary oxygen sensor parameters shall be with normal characteristics.

(B) For engines utilizing sensors other than oxygen sensors for primary fuel control (e.g., hydrocarbon sensors), the manufacturer shall submit, for Executive Officer approval, a demonstration test plan for performing testing of all of the sensor parameters that can cause engine emissions to exceed the emission threshold malfunction criteria (e.g., 1.5 times the applicable standards). The Executive Officer shall approve the plan if it is determined that it will provide data that will assure proper performance of the diagnostics of the sensors, consistent with the intent of section (i).

(3.2.8) VVT System: The manufacturer shall perform a test at each target error limit and slow response limit calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) in sections (f)(9.2.1) and (f)(9.2.2). In conducting the VVT system demonstration tests, the manufacturer may use computer modifications to cause the VVT system to operate at the malfunction limit if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction.

(3.2.9) For each of the testing requirements of section (i)(3.2), if the manufacturer has established that only a functional check is required because no failure or deterioration of the specific tested system could result in an engine's emissions exceeding the emission threshold malfunction criteria (e.g., 1.5 times any of the applicable standards), the manufacturer is not required to perform a demonstration test; however the manufacturer is required to provide the data and/or engineering analysis used to determine that only a functional test of the system(s) is required.

(3.3) Required Testing for All Engines:

(3.3.1) Other Emission Control Systems: The manufacturer shall conduct demonstration tests for all other emission control components (e.g., hydrocarbon traps, adsorbers) designed and calibrated to an emission threshold malfunction criteria (e.g., 1.5 times the applicable standards)

under the provisions of section (g)(4).

(3.3.2) For each of the testing requirements of section (i)(3.3), if the manufacturer has established that only a functional check is required because no failure or deterioration of the specific tested system could result in an engine's emissions exceeding the emission threshold malfunction criteria (e.g., 1.5 times any of the applicable standards), the manufacturer is not required to perform a demonstration test; however the manufacturer is required to provide the data and/or engineering analysis used to determine that only a functional test of the system(s) is required.

(3.4) The manufacturer may electronically simulate deteriorated components if the manufacturer can demonstrate to the Executive Officer that the computer modifications produce test results equivalent to an induced hardware malfunction but may not make any engine control unit modifications (unless otherwise provided above or exempted pursuant to this section) when performing demonstration tests. All equipment necessary to duplicate the demonstration test must be made available to ARB upon request. A manufacturer may request Executive Officer approval to electronically simulate a deteriorated component with engine control unit modifications. The Executive Officer shall approve the request upon determining the manufacturer has submitted data and/or engineering analysis demonstrating that is technically infeasible, very difficult, and/or resource intensive to implant the fault with modifications external to the engine control unit.

(3.5) For each of the testing requirements of (i)(3), when performing a test, all components or systems used in parallel for the same purpose (e.g., separate VVT actuators on the intake valves for Bank 1 and Bank 2, separate NOx converting catalysts on parallel exhaust banks) shall be simultaneously deteriorated to the malfunction criteria limit. Components or systems in series or used for different purposes (e.g., upstream and downstream exhaust gas sensors in a single exhaust bank, separate high pressure and low pressure EGR systems) may not be simultaneously deteriorated to the malfunction criteria limit.

(3.6) For each of the testing requirements under section (i)(3), if the manufacturer has established that only a functional check is required because no failure or deterioration of the specific tested system could result in an engine's emissions exceeding the emission threshold malfunction criteria (e.g., 1.5 times the standards), the manufacturer is not required to perform a demonstration test; however the manufacturer is required to provide the data and/or engineering analysis used to determine that only a functional test of the system(s) is required.

(4) Testing Protocol:

(4.1) Preconditioning:.The manufacturer may request Executive Officer approval to use a preconditioning cycle prior to conducting each of the above emission tests. The Executive Officer shall approve the request upon determining that a

manufacturer has provided data and/or engineering evaluation that demonstrate that the preconditioning is necessary to stabilize the emission control system. The manufacturer may also request Executive Officer approval to use an additional identical preconditioning cycle following a 20 minute hot soak after the initial preconditioning cycle. The Executive Officer shall approve the request upon determining that a manufacturer has provided data and/or engineering evaluation that demonstrate that the additional preconditioning is necessary to stabilize the emission control system. The manufacturer may not require the test engine to be cold soaked prior to conducting preconditioning cycles in order for the monitoring system testing to be successful. If a second preconditioning cycle is permitted, the manufacturer may adjust the system or component to be tested before conducting the second preconditioning cycle. The manufacturer may not replace, modify, or adjust the system or component after the last preconditioning cycle has taken place.

(4.2) Test Sequence:

(4.2.1) The manufacturer shall set the system or component on the test engine for which detection is to be tested at the malfunction criteria limit(s) prior to conducting the applicable emission test (or preconditioning, if approved).

(4.2.2) The test engine shall be operated over the first engine start of the FTP emission test (i.e., the cold start) or a SET cycle to allow for the initial detection of the tested system or component malfunction. If required by the designated monitoring strategy, an additional cold soak and first engine start of the FTP cycle (i.e., the cold start) may be performed prior to conducting this test cycle (e.g., for two-trip monitors that only run during cold starts).

(4.2.3) The test engine shall then be operated over the second engine start of the FTP emission test (i.e., the hot start) or an SET emission test. The second SET cycle may be omitted from the testing protocol if it is unnecessary (e.g., one-trip fault detection strategies that run on the SET).

(4.3) Test Data Collection:

(4.3.1) During the test sequence of section (i)(4.2), the manufacturer shall collect data immediately prior to each engine shut-down (e.g., the end of each preconditioning cycle in section (i)(4.2.1), the end of the cold start FTP cycle in section (i)(4.2.3), the end of the warm start FTP cycle in section (i)(4.2.3)). If the data cannot be collected immediately prior to engine shut-down, the data shall be collected immediately after engine shut-down.

(4.3.2) The manufacturer shall collect the following data:

(A) Approximate time on the test cycle (in seconds after engine start) when the MIL illuminates (e.g., MIL illuminated at 402 seconds into the cold start FTP cycle);

(B) All data required by sections (h)(4.1) through (h)(4.9) and (h)(5) including readiness status, current data stream values, fault code(s), freeze frame data, test results, CAL ID, CVN, VIN, ESN, ECU Name, in-use performance ratios, and engine run time tracking data.

(4.4) A manufacturer required to test more than one test engine (section (i)(2.2)) may utilize internal calibration sign-off test procedures (e.g., forced cool downs, less frequently calibrated emission analyzers) instead of official test procedures to obtain the emission test data required in section (i) for all but one of the required test engines. The manufacturer may elect this option if the data from the alternative test procedure are representative of official emission test results. Manufacturers using this option are still responsible for meeting the malfunction criteria specified in sections (e) through (g) when emission tests are performed in accordance with official test procedures.

(4.5) A manufacturer may request Executive Officer approval to utilize an alternate testing protocol for demonstration of MIL illumination if the engine dynamometer emission test cycle does not allow all of a monitor's enable conditions to be satisfied. A manufacturer may request the use of an alternate engine dynamometer test cycle or the use of chassis testing to demonstrate proper MIL illumination. In evaluating the manufacturer's request, the Executive Officer shall consider the technical necessity for using an alternate test cycle and the degree to which the alternate test cycle demonstrates that in-use operation with the malfunctioning component will properly result in MIL illumination.

(5) Evaluation Protocol:

(5.1) Full OBD engine ratings subject to sections (d)(7.1.1), (d)(7.2.2), or (d)(7.3) shall be evaluated according to the following protocol.

(5.1.1) For all tests conducted under section (i), the MIL shall be illuminated upon detection of the tested system or component malfunction before the end of the emission test specified in (i)(4.2.3) in accordance with the requirements of sections (e) through (g).

(5.1.2) If the MIL illuminates prior to emissions exceeding the applicable emission threshold malfunction criteria specified in sections (e) through (g), no further demonstration is required. With respect to the misfire monitor demonstration test, if a manufacturer has elected to use the minimum misfire malfunction criteria of one percent as allowed in sections (e)(2.2.2)(A) and (f)(2.2.2)(A), no further demonstration is required if the MIL illuminates with misfire implanted at the malfunction criteria limit.

(5.1.3) If the MIL does not illuminate when the system or component is set at its limit(s), the criteria limit or the OBD system is not acceptable.

(A) If the MIL first illuminates after emissions exceed the applicable emission threshold malfunction criteria specified in sections (e) through (g), the test engine shall be retested with the tested system or component adjusted so

that the MIL will illuminate without emissions exceeding the applicable emission threshold malfunction criteria specified in sections (e) through (g). If the system or component cannot be adjusted to meet this criterion because a default fuel or emission control strategy is used when a malfunction is detected (e.g., open loop fuel control used after an oxygen sensor malfunction is determined), the test engine shall be retested with the system or component adjusted to the worst acceptable limit (i.e., the applicable monitor indicates the system or component's performance is passing but at the closest possible value relative to the monitor threshold value at which a fault would be detected that would invoke the default strategy and illuminate the MIL). The manufacturer may request the Executive Officer to accept test data when the system or component's performance is at the worst acceptable limit within a margin of error necessary to accommodate testing variability and/or other practical limitations in setting the performance at the absolute worst acceptable limit. The Executive Officer shall accept the test data upon determining that the test data adequately demonstrate that emissions do not exceed the applicable malfunction criteria at the tested worst acceptable limit and that emissions will not exceed the applicable emission threshold malfunction criteria before performance exceeds the monitor threshold for fault detection. These provisions shall only apply to testing of the catalyst (i.e., components monitored under sections (e)(5.2.2), (e)(6.2.1), (e)(7.2.1), and (f)(6.2.1)) or PM filter system (i.e., (e)(8.2.1) and (e)(8.2.4)) if the on-board computer invokes a default fuel or emission control strategy upon detection of the relevant catalyst malfunction. Otherwise, the provisions of section (i)(5.1.3)(B) shall apply to testing of the catalyst or PM filter system.

(B) Except as provided for in section (i)(5.1.3)(A), in testing the catalyst (i.e., components monitored under sections (e)(5.2.2), (e)(6.2.1), (e)(7.2.1), and (f)(6.2.1)) or PM filter system (i.e., (e)(8.2.1) and (e)(8.2.4)), if the MIL first illuminates after emissions exceed the applicable emission threshold malfunction criteria specified in sections (e) and (f), the tested engine shall be retested with a less deteriorated catalyst/PM filter system (i.e., more of the applicable engine out pollutants are converted or trapped). Adjustment and testing of the catalyst or PM filter system's performance may be repeated until successful results are obtained. For the OBD system to be approved, either of the following conditions must be satisfied by the test results:

(i) The MIL is illuminated and emissions do not exceed the emission threshold malfunction criteria specified in sections (e) or (f); or

(ii) The manufacturer demonstrates that the MIL illuminates within the upper and lower limits of the malfunction criteria identified below. The demonstration shall be deemed appropriate when the test results show:

a. The MIL is illuminated and emissions exceed the emission threshold malfunction criteria specified in sections (e) or (f) by 20 percent or

less of the applicable standard (e.g., emissions are less than 2.2 times the applicable standard for an emission threshold malfunction criterion of 2.0 times the standard); and

b. The MIL is not illuminated and emissions are below the emission threshold malfunction criteria specified in sections (e) or (f) by no more than 20 percent of the standard (e.g., emissions are between 1.8 and 2.0 times the applicable standard for an emission threshold malfunction criterion of 2.0 times the standard).

(5.1.4) If an OBD system is determined unacceptable by the above criteria, the manufacturer may recalibrate and retest the system on the same test engine. In such a case, the manufacturer must confirm, by retesting, that all systems and components that were tested prior to recalibration and are affected by the recalibration function properly under the OBD system as recalibrated.

(5.2) OBD child ratings subject to sections (d)(7.1.2) or (d)(7.2.3) (i.e., extrapolated OBD) shall be evaluated according to the following protocol.

(5.2.1) For all tests conducted under section (i), the MIL shall be illuminated upon detection of the tested system or component malfunction before the end of the emission test specified in (i)(4.2.3) in accordance with the malfunction criteria established by the manufacturer under sections (d)(7.1.2) and (d)(7.2.3).

(5.2.2) Except for testing of the catalyst or PM filter system, if the MIL first illuminates after the tested component or system significantly exceeds the applicable malfunction criteria established by the manufacturer, the test engine shall be retested with the tested system or component adjusted so that the MIL will illuminate at the applicable malfunction criteria established by the manufacturer.

(5.2.3) In testing the catalyst or PM filter system, if the MIL first illuminates after the tested component or system significantly exceeds the applicable malfunction criteria established by the manufacturer, the tested engine shall be retested with a less deteriorated catalyst/PM filter system (i.e., more of the applicable engine out pollutants are converted or trapped). For the OBD system to be approved, testing shall be continued until either of the following conditions are satisfied:

(A) The MIL is illuminated and the tested component or system is at the applicable malfunction criteria established by the manufacturer; or

(B) The manufacturer demonstrates that the MIL illuminates within the upper and lower limits of the threshold identified below. The manufacturer shall demonstrate acceptable limits by continuing testing until the test results show:

(i) The MIL is illuminated and monitoring results indicate the tested

component or system exceeds the malfunction criteria established by the manufacturer by 10 percent or less of the monitored parameter; and

(ii) The MIL is not illuminated and monitoring results indicate the tested component or system is below the malfunction criteria established by the manufacturer by 10 percent or less of the monitored parameter.

(6) Confirmatory Testing:

(6.1) ARB may perform confirmatory testing to verify the emission test data submitted by the manufacturer under the requirements of section (i) comply with the requirements of section (i) and the malfunction criteria identified in sections (e) through (g). This confirmatory testing is limited to the engine rating represented by the demonstration engine(s).

(6.2) ARB or its designee may install appropriately deteriorated or malfunctioning components (or simulate a deteriorated or malfunctioning component) in an otherwise properly functioning test engine of an engine rating represented by the demonstration test engine(s) in order to test any of the components or systems required to be tested in section (i). Upon request by the Executive Officer, the manufacturer shall make available an engine and all test equipment (e.g., malfunction simulators, deteriorated components) necessary to duplicate the manufacturer's testing. The Executive Officer shall make the request within six months of reviewing and approving the demonstration test engine data submitted by the manufacturer for the specific engine rating.

(j) *Certification Documentation.*

(1) When submitting an application for certification of an engine, the manufacturer shall submit the following documentation. If any of the items listed below are standardized for all of a manufacturer's engines, the manufacturer may, for each model year, submit one set of documents covering the standardized items for all of its engines.

(1.1) For the required documentation not standardized across all engines, the manufacturer may propose to the Executive Officer that it be allowed to submit documentation for certification from one engine that is representative of other engines. The Executive Officer shall approve the engine as representative if the engine possesses the most stringent exhaust emission standards and OBD monitoring requirements and covers all of the emission control devices for the engines covered by the submitted documentation. Upon approval, this grouping shall be known as an "OBD certification documentation group".

(1.2) With Executive Officer approval, one or more of the documentation requirements of section (j) may be waived or modified if the information required would be redundant or unnecessarily burdensome to generate.

(1.3) To the extent possible, the certification documentation shall use SAE J1930 or J2403 terms, abbreviations, and acronyms.

(2) The following information shall be submitted as part of the certification application. Except as provided below for demonstration data, the Executive Officer will not issue an Executive Order certifying the covered engines without the information having been provided. The information must include:

(2.1) A description of the functional operation of the OBD system including a complete written description for each monitoring strategy that outlines every step in the decision-making process of the monitor. Algorithms, diagrams, samples of data, and/or other graphical representations of the monitoring strategy shall be included where necessary to adequately describe the information.

(2.2) A table, in the standardized format detailed in Attachment C of ARB Mail-Out #MSC 09-22.

(2.2.1) The table must include the following information for each monitored component or system (either computer-sensed or -controlled) of the emission control system:

(A) Corresponding fault code

(B) Monitoring method or procedure for malfunction detection

(C) Primary malfunction detection parameter and its type of output signal

(D) Fault criteria limits used to evaluate output signal of primary parameter

(E) Other monitored secondary parameters and conditions (in engineering units) necessary for malfunction detection

(F) Monitoring time length and frequency of checks

(G) Criteria for storing fault code

(H) Criteria for illuminating malfunction indicator light

(I) Criteria used for determining out-of-range values and input component rationality checks

(2.2.2) Wherever possible, the table shall use the following engineering units:

(A) Degrees Celsius (°C) for all temperature criteria

(B) KiloPascals (KPa) for all pressure criteria related to manifold or atmospheric pressure

(C) Grams (g) for all intake air mass criteria

(D) Pascals (Pa) for all pressure criteria related to evaporative system vapor pressure

(E) Miles per hour (mph) for all vehicle speed criteria

(F) Relative percent (%) for all relative throttle position criteria (as defined in SAE J1979/J1939)

(G) Voltage (V) for all absolute throttle position criteria (as defined in SAE J1979/J1939)

(H) Milligrams per stroke (mg/stroke) for all fuel quantity-based per ignition event criteria for diesel engines, and per crankshaft revolution (/rev) for all other changes per ignition event based criteria (e.g., airflow in g/rev instead of g/stroke or g/firing) for gasoline and diesel engines

(I) Per second (/sec) for all changes per time based criteria (e.g., g/sec)

(J) Percent of nominal tank volume (%) for all fuel tank level criteria

(2.3) A logic flowchart describing the step-by-step evaluation of the enable criteria and malfunction criteria for each monitored emission-related component or system.

(2.4) Emission test data, a description of the testing sequence (e.g., the number and types of preconditioning cycles), the data required to be collected in section (i)(4.3), and a description of the modified or deteriorated components used for fault simulation with respect to the demonstration tests specified in section (i). The Executive Officer may approve conditional certification of an engine prior to the submittal of this data for ARB review and approval. Factors to be considered by the Executive Officer in approving the late submission of information identified in section (j)(2.4) shall include the reason for the delay in the data collection, the length of time until data will be available, and the demonstrated previous success of the manufacturer in submitting the data prior to certification.

(2.5) For gasoline engines, data supporting the misfire monitor, including:

(2.5.1) The established percentage of misfire that can be tolerated without damaging the catalyst over the full range of engine speed and load conditions.

(2.5.2) Data demonstrating the probability of detection of misfire events of the misfire monitoring system over the full engine speed and load operating range as detailed in ARB Mail-Out #MSC 09-22 for the following misfire patterns: random cylinders misfiring at the malfunction criteria established in section (f)(2.2.2), one cylinder continuously misfiring, and paired cylinders continuously misfiring.

(2.5.3) Data identifying all disablement of misfire monitoring that occurs during the FTP. For every disablement that occurs during the cycles, the data shall identify: when the disablement occurred relative to the driver's trace, the number of engine revolutions that each disablement was present for, and which disable condition documented in the certification application caused the disablement. The number of 1000-revolution intervals completed and the number of 1000-revoluation intervals in which the FTP misfire threshold

was exceeded shall also be identified. The data shall be submitted in the standardized format detailed in Attachment A: Misfire Disablement and Detection Chart of ARB Mail-Out #MSC 09-22.

(2.5.4) Manufacturers are not required to use the durability demonstration engine to collect the misfire data for sections (j)(2.5.1) through (2.5.3).

(2.6) For diesel engines subject to the monitoring requirements of section (e)(2.2.2), data supporting the misfire monitor, including:

(2.6.1) Data demonstrating the probability of detection of misfire events of the misfire monitoring system as detailed in ARB Mail-Out #MSC 09-22 over the required engine speed and load operating range for the following misfire patterns: random cylinders misfiring at the malfunction criteria specified in section (e)(2.2.2), one cylinder continuously misfiring, and paired cylinders continuously misfiring.

(2.6.2) Data identifying all disablement of misfire monitoring that occurs during the EPA Urban Dynamometer Driving Schedule for Heavy-Duty Vehicles specified in 40 CFR Part 86, Appendix I (d). For every disablement that occurs during the cycle, the data shall identify: when the disablement occurred relative to the driver's trace, the number of engine revolutions that each disablement was present for, and which disable condition documented in the certification application caused the disablement. The number of 1000-revolution intervals completed and the number of 1000-revoluation intervals in which the misfire threshold was exceeded shall also be identified. The data shall be submitted in the standardized format detailed in Attachment A: Misfire Disablement and Detection Chart of ARB Mail-Out #MSC 09-22.

(2.7) Data supporting the criteria used to detect a malfunction of the fuel system, EGR system, boost pressure control system, catalyst, NOx adsorber, PM filter, cold start emission reduction strategy, secondary air, evaporative system, VVT system, exhaust gas sensors, and other emission controls which causes emissions to exceed the applicable malfunction criteria specified in sections (e), (f), and (g). For diesel engine monitors in sections (e) and (g) that are required to indicate a malfunction before emissions exceed an emission threshold based on any applicable standard (e.g., 1.5 times any of the applicable standards), the test cycle and standard determined by the manufacturer to be the most stringent for each applicable monitor in accordance with section (d)(6.1) and the adjustment factors determined by the manufacturer for each applicable monitor in accordance with section (d)(6.2).

(2.8) A listing of all electronic powertrain input and output signals (including those not monitored by the OBD system) that identifies which signals are monitored by the OBD system. For input and output signals that are monitored as comprehensive components, the listing shall also identify the specific fault code for each malfunction criteria (e.g., out of range low, out of range high, open circuit, rationality low, rationality high).

(2.9) A written description of all parameters and conditions necessary to begin closed-loop/feedback control of emission control systems (e.g., fuel system, boost pressure, EGR flow, SCR reductant delivery, PM filter regeneration, fuel system pressure).

(2.10) A written identification of the communication protocol utilized by each engine for communication with an SAE J1978/J1939 scan tool.

(2.11) A pictorial representation or written description of the diagnostic connector and its location including any covers or labels.

(2.12) A written description of the method used by the manufacturer to meet the requirements of section (g)(2) for CV system monitoring including diagrams or pictures of valve and/or hose connections.

(2.13) A written description of each AECD utilized by the manufacturer including the sensor signals and/or calculated values used to invoke each AECD, the engineering data and/or analysis demonstrating the need for such an AECD, the actions taken when each AECD is activated, the expected in-use frequency of operation of each AECD, the expected emission impact from each AECD activation, the expected emission impact from each AECD activation, and, for diesel engines, the identification of each AECD that has been determined by the manufacturer to be an EI-AECD and the assignment by the manufacturer to the data required to be tracked and reported in the standardized format specified in section (h)(6) (e.g., the AECD of "engine overheat protection as determined by coolant temperature greater than..." is an EI-AECD and is reported as EI-AECD #1 to a generic scan tool).

(2.14) A written description of each NOx and PM NTE deficiency and emission carve-out utilized by the manufacturer including the sensor signals and/or calculated values used to invoke each NTE deficiency or carve-out, the engineering data and/or analysis demonstrating the need for such an NTE deficiency or carve-out, the actions taken when each NTE deficiency or carve-out is activated, the expected in-use frequency of operation of each NTE deficiency or carve-out, and the expected emission impact from each NTE deficiency or carve-out activation.

(2.15) Build specifications provided to engine purchasers or chassis manufacturers detailing all specifications or limitations imposed on the engine purchaser relevant to OBD requirements or emission compliance (e.g., allowable MIL locations, connector location specifications, cooling system heat rejection rates). A description of the method or copies of agreements used to ensure engine purchasers or chassis manufacturers will comply with the OBD and emission relevant build specifications (e.g., signed agreements, required audit/evaluation procedures).

(2.16) A cover letter identifying all concerns and deficiencies applicable to the equivalent previous model year engine, the changes and/or resolution of each concern or deficiency for the current model year engine, and all other known

issues that apply to the current model year engine (e.g., concerns or deficiencies of another engine that also apply to this engine).

(2.17) A checklist of all the malfunction criteria in sections (e), (f), and (g) and the corresponding diagnostic noted by fault code for each malfunction criterion. The formats of the checklists are detailed in Attachments G and H of ARB Mail-Out #MSC 09-22, July 7, 2009, incorporated by reference.

(2.18) A list of all components/systems required to track and report in-use performance under section (d)(3.2.1), the corresponding diagnostic(s) noted by fault code used to increment the numerator for each component/system, and a description of the incrementing specifications for the in-use monitor performance numerator and denominator for each diagnostic.

(2.19) A list of the test results required to be made available under section (h)(4.5) and the corresponding diagnostic(s) noted by fault code for each test result.

(2.20) A timeline showing the start of engine production and the start of vehicle production for the engine family, and the required deadlines for production vehicle evaluation testing of the standardized requirements (according to section (l)(1.2)) and the monitoring requirements (according to section (l)(2.1)).

(2.21) Any other information determined by the Executive Officer to be necessary to demonstrate compliance with the requirements of this regulation.

(k) *Deficiencies.*

(1) The Executive Officer, upon receipt of an application from the manufacturer, may certify OBD systems installed on engines even though the systems do not comply with one or more of the requirements of title 13, CCR section 1971.1.1. In granting the certification, the Executive Officer shall consider the following factors: the extent to which the requirements of section 1971.1.1 are satisfied overall based on a review of the engine applications in question, the relative performance of the resultant OBD system compared to systems fully compliant with the requirements of section 1971.1.1, and a demonstrated good-faith effort on the part of the manufacturer to: (1) meet the requirements in full by evaluating and considering the best available monitoring technology; and (2) come into compliance as expeditiously as possible. The Executive Officer may not grant certification to an engine in which the reported noncompliance for which a deficiency is sought would be subject to ordered recall pursuant to section 1971.5.1(d)(3)(A).

(2) For 2013 and subsequent model year engines, manufacturers of OBD systems for which deficiencies have been granted are subject to fines pursuant to section 43016 of the California Health and Safety Code. The specified fines apply to: (1) the third and subsequently identified deficiency(ies), ordered according to section (k)(3), and (2) a monitoring system deficiency where a required monitoring strategy is completely absent from the OBD system.

(3) The fines for engines specified in section (k)(2) above are in the amount of $50 per deficiency per engine for non-compliance with any of the monitoring requirements specified in sections (e), (f), and (g)(4), and $25 per deficiency per engine for non-compliance with any other requirement of section 1971.1.1. In determining the identified order of deficiencies, deficiencies subject to a $50 fine are identified first. Total fines per engine under section (k) may not exceed $500 per engine and are payable to the State Treasurer for deposit in the Air Pollution Control Fund.

(4) Manufacturers must re-apply for Executive Officer approval of a deficiency each model year. In considering the request to carry-over a deficiency, the Executive Officer shall consider the factors identified in section (k)(1) including the manufacturer's progress towards correcting the deficiency. Except as provided for in sections (k)(4.1) and (k)(4.2) below, the Executive Officer may not allow manufacturers to carry over monitoring system deficiencies for more than two model years unless it can be demonstrated that substantial engine hardware modifications and additional lead time beyond two years would be necessary to correct the deficiency, in which case the Executive Officer shall allow the deficiency to be carried over for three model years.

(4.1) For deficiencies first granted in the 2010 model year, the Executive Officer may allow manufacturers to carry over the deficiency into the 2013 model year unless it can be demonstrated that substantial engine hardware modifications and additional lead time beyond the 2013 model year would be necessary to correct the deficiency, in which case the Executive Officer shall allow the deficiency to be carried over into the 2014 model year.

(4.2) For deficiencies first granted in the 2011 model year, the Executive Officer may allow manufacturers to carry over the deficiency into the 2014 model year.

(5) Except as allowed in section (k)(6), deficiencies may not be retroactively granted after certification.

(6) Request for retroactive deficiencies

(6.1) During either the first 6 months after commencement of the start of engine production or the first 6 months after commencement of the start of vehicle production, whichever is later, manufacturers may request that the Executive Officer grant a deficiency and amend an engine's certification to conform to the granting of the deficiencies for each aspect of the monitoring system: (a) identified by the manufacturer (during testing required by section (l)(2) or any other testing) to be functioning different than the certified system or otherwise not meeting the requirements of any aspect of section 1971.1.1; and (b) reported to the Executive Officer. If the Executive Officer grants the deficiency(ies) and amends the certification, the approval would be retroactive to all affected engines within the engine family.

(6.2) Executive Officer approval of the request for a retroactive deficiency shall be granted provided that the conditions necessary for a pre-certification deficiency

determination are satisfied (see section (k)(1)) and the manufacturer could not have reasonably anticipated the identified problem before commencement of production.

(6.3) In granting the amended certification, the Executive Officer shall include any approved post-production deficiencies together with all previously approved deficiencies in computing fines in accordance with section (k)(2).

(7) For 2013 through 2015 model year engines that utilize PM sensors for PM filter filtering performance monitoring (section (e)(8.2.1)), in cases where the deficiency is for a monitor required to detect malfunctions of the PM filter filtering performance (section (e)(8.2.1)), the PM sensor (section (e)(9.2.2)), or the PM sensor heater (section (e)(9.2.4)), the deficiency shall be exempt from the specified fines of section (k)(3) and the deficiency shall not be included in the count of deficiencies used in (k)(2) to determine the number of deficiencies subject to fines.

(8) For hybrid vehicles:

(8.1) For 2014 model year hybrid vehicles previously certified with deficiencies for the 2013 model year, the 2014 model year shall be considered the first model year for the deficiency with regards to the carry-over provisions in section (k)(4).

(8.2) For deficiencies related to issues with the implementation of the hybrid system or of the hybrid system itself on 2013 through 2015 model year engines, two additional deficiencies shall be exempt from the specified fines of section (k)(3) and the deficiencies shall not be included in the count of deficiencies used in (k)(2) to determine the number of deficiencies subject to fines.

(9) Any OBD system installed on a production engine/vehicle that fails to conform with the certified OBD system for that engine/vehicle or otherwise fails to meet the requirements of section 1971.1.1 and has not been granted a deficiency pursuant to the provisions of section (k)(1) through (k)(6) are considered non-compliant. The engines/vehicles are subject to enforcement pursuant to applicable provisions of the Health and Safety Code and title 13, CCR section 1971.5.1.

(l) *Production Engine/Vehicle Evaluation Testing.*

(1) Verification of Standardized Requirements.

(1.1) Requirement: Manufacturers shall perform testing to verify that 2013 and subsequent model year production engines installed in vehicles meet the requirements of section (h)(3) and (h)(4) relevant to proper communication of required emission-related messages to an SAE J1978/J1939 scan tool.

(1.2) Selection of Test Vehicles:

(1.2.1) Engine manufacturers shall perform this testing every model year on ten unique production vehicles (i.e., engine rating and chassis application combination) per engine family. If there are less than ten unique

production vehicles for a certain engine family, the manufacturer shall test each unique production vehicle in that engine family. Manufacturers shall perform this testing no later than either three months after the start of engine production or one month after the start of vehicle production, whichever is later. Manufacturers may request Executive Officer approval to group multiple production vehicles together and test one representative vehicle per group. The Executive Officer shall approve the request upon finding that the software and hardware designed to comply with the standardization requirements of section (h) (e.g., communication protocol message timing, number of supported data stream parameters, engine and vehicle communication network architecture) in the representative vehicle are identical to all others in the group and that any differences in the production vehicles are not relevant with respect to meeting the criteria in section (l)(1.4).

(1.2.2) For 2016 and subsequent model year engines, the Executive Officer shall reduce the maximum required number of vehicles to be tested from ten per engine family to five per engine family for a manufacturer based on the demonstrated previous success of the manufacturer to meet the requirements of section (l)(1). For purposes of this requirement, a manufacturer shall be determined to be successful in meeting the requirements of section (l)(1) if zero vehicles fail the testing required by section (l)(1) for two consecutive years.

(1.2.3) For 2019 and subsequent model year engines, the Executive Officer shall further reduce the maximum required number of vehicles to be tested to three per engine family for a manufacturer based on the demonstrated previous success of the manufacturer to meet the requirements of section (l)(1). For purposes of this requirement, a manufacturer shall be determined to be successful in meeting the requirements of section (l)(1) if zero vehicles fail the testing required by section (l)(1) for three consecutive years.

(1.2.4) The Executive Officer may waive the requirement for submittal of data from one or more of the production vehicles if data have been previously submitted for all of the production vehicles. Manufacturers may request Executive Officer approval to carry over data collected in previous model years. The Executive Officer shall approve the request upon finding that the software and hardware designed to comply with the standardization requirements of section (h) are identical to the previous model year and no other hardware or software changes that affect compliance with the standardization requirements have been made.

(1.3) Test Equipment: For the testing required in section (l)(1), manufacturers shall utilize an off-board device to conduct the testing. Prior to conducting testing, manufacturers are required to request and receive Executive Officer approval of the off-board device that the manufacturer will use to perform the testing.

(1.3.1) For vehicles using the ISO 15765-4 protocol for the standardized functions required in section (h), the Executive Officer shall approve the request upon determining that the manufacturer has submitted data, specifications, and/or engineering analysis that demonstrate that the off-board device meets the minimum requirements to conduct testing according to SAE J1699-3 using the software developed and maintained for the SAE J1699-3 committee and available through www.sourceforge.net and SAE J2534 compliant hardware configured specifically for SAE J1699-3 testing.

(1.3.2) For vehicles using the SAE J1939 protocol for the standardized functions required in section (h), the Executive Officer shall approve the request upon determining that the manufacturer has submitted data, specifications, and/or engineering analysis that demonstrate that the off-board device is able to verify that vehicles tested are able to perform all of the required functions in section (l)(1.4) with any other off-board device designed and built in accordance with the SAE J1978/J1939 generic scan tool specifications.

(1.4) Required Testing:

(1.4.1) The testing shall verify that communication can be properly established between all emission-related on-board computers and any SAE J1978/J1939 scan tool designed to adhere strictly to the communication protocols allowed in section (h)(3);

(1.4.2) The testing shall verify that all emission-related information is properly communicated between all emission-related on-board computers and any SAE J1978/J1939 scan tool in accordance with the requirements of section (h) and the applicable ISO and SAE specifications including specifications for physical layer, network layer, message structure, and message content.

(1.4.3) The testing shall further verify that the following information can be properly communicated to any SAE J1978/J1939 scan tool:

(A) The current readiness status from all on-board computers required to support readiness status in accordance with SAE J1979/J1939-73 and section (h)(4.1) in the key on, engine off position and while the engine is running;

(B) The MIL command status while the MIL is commanded off and while the MIL is commanded on in accordance with SAE J1979/J1939 and section (h)(4.2) in the key on, engine off position and while the engine is running, and in accordance with SAE J1979/J1939 and sections (d)(2.1.2) during the MIL functional check and, if applicable, (h)(4.1.3) during the MIL readiness status check while the engine is off;

(C) All data stream parameters required in section (h)(4.2) in accordance with SAE J1979/J1939 including, if applicable, the proper identification of each data stream parameter as supported in SAE J1979 (e.g., Mode/Service $01, PID $00);

(D) The CAL ID, CVN, ESN, and VIN in accordance with SAE J1979/J1939 and sections (h)(4.6) through (4.8);

(E) An emission-related fault code (permanent, confirmed, pending, MIL-on, and previously MIL-on) in accordance with SAE J1979/J1939-73 (including correctly indicating the number of stored fault codes and MIL command status (e.g., Mode/Service $01, PID $01, Data A for SAE J1979)) and section (h)(4.4) for each diagnostic and emission critical electronic powertrain control unit;

(1.4.4) The testing shall also verify that the on-board computer(s) can properly respond to any SAE J1978/J1939 scan tool request to clear emission-related fault codes and reset readiness status in accordance with section (h)(4.10).

(1.5) Reporting of Results:

(1.5.1) The manufacturer shall submit to the Executive Officer the following, based on the results of testing:

(A) If a variant meets all the requirements of section (l)(1.4), the test results (i.e., the test log file) and a statement specifying that the variant passed all the tests, or

(B) If any variant does not meet the requirements of section (l)(1.4), a written report to the Executive Officer for approval within one month of testing the specific variant. The written report shall include the problem(s) identified and the manufacturer's proposed corrective action (if any) to remedy the problem(s). Factors to be considered by the Executive Officer in approving the proposed corrective action shall include the severity of the problem(s), the ability of the vehicle to be tested in a California inspection program (e.g., roadside inspection, fleet self-inspection program), the ability of service technicians to access the required diagnostic information, the impact on equipment and tool manufacturers, and the amount of time prior to implementation of the proposed corrective action.

(1.5.2) Upon request of the Executive Officer, a manufacturer shall submit a report of the results of any testing conducted pursuant to section (l)(1) to the Executive Officer for review.

(1.5.3) In accordance with section (k)(6), manufacturers may request Executive Officer approval for a retroactive deficiency to be granted for items identified during this testing.

(1.6) Alternative Testing Protocols. Manufacturers may request Executive Officer approval to use other testing protocols. The Executive Officer shall approve the protocol if the manufacturer can demonstrate that the alternate testing methods and equipment provide an equivalent level of verification of compliance with the standardized requirements to the requirements of section (l)(1).

(2) Verification of Monitoring Requirements.

(2.1) No later than either six months after the start of engine production or three months after the start of vehicle production, whichever is later, manufacturers shall conduct a complete evaluation of the OBD system of one or more production vehicles (test vehicles) and submit the results of the evaluation to the Executive Officer.

(2.2) Selection of test vehicles:

(2.2.1) For each engine selected for monitoring system demonstration in section (j), the manufacturer shall evaluate one production vehicle equipped with an engine from the same engine family and rating as the demonstration engine. The Executive Officer shall select the specific production vehicle(s) to be tested.

(2.2.2) A manufacturer required to test more than one test vehicle may test an engine in lieu of a vehicle for all but one of the required test vehicles.

(2.2.3) The Executive Officer may waive the requirements for submittal of evaluation results from one or more of the test vehicles if data have been previously submitted for all of the engine ratings and variants.

(2.3) Evaluation requirements:

(2.3.1) The evaluation shall demonstrate the ability of the OBD system on the selected production vehicle to detect a malfunction, illuminate the MIL, and, where applicable, store an appropriate fault code readable by a scan tool conforming to SAE J1978/J1939 when a malfunction is present and the monitoring conditions have been satisfied for each individual diagnostic required by title 13, CCR section 1971.1.1.

(2.3.2) The evaluation shall verify that malfunctions detected by non-MIL illuminating diagnostics of components used to enable any other OBD system diagnostic (e.g., fuel level sensor) will not inhibit the ability of other OBD system diagnostics to properly detect malfunctions.

(2.3.3) The evaluation shall verify that the software used to track the numerator and denominator for purposes of determining in-use monitoring frequency correctly increments as required in section (d)(4).

(2.3.4) Malfunctions may be mechanically implanted or electronically simulated but internal on-board computer hardware or software changes may not be used to simulate malfunctions. For monitors that are required to indicate a malfunction before emissions exceed an emission threshold based on any applicable standard (e.g., 2.0 times any of the applicable standards), manufacturers are not required to use malfunctioning components/systems set exactly at their malfunction criteria limits. Emission testing to confirm that the malfunction is detected before the appropriate emission threshold malfunction criteria (e.g., 2.0 times the standard) are exceeded is not required.

(2.3.5) Manufacturers shall submit a proposed test plan for Executive Officer approval prior to evaluation testing being performed. The test plan shall identify the method used to induce a malfunction for each diagnostic. If the Executive Officer determines that the requirements of section (l)(2) are satisfied, the proposed test plan shall be approved.

(2.3.6) Subject to Executive Officer approval, manufacturers may omit demonstration of specific diagnostics. The Executive Officer shall approve a manufacturer's request if the demonstration cannot be reasonably performed without causing physical damage to the vehicle (e.g., on-board computer internal circuit faults) or jeopardizing the safety of personnel performing the demonstration.

(2.3.7) For evaluation of test vehicles selected in accordance with section (l)(2.2), manufacturers are not required to demonstrate diagnostics that were previously demonstrated prior to certification as required in section (i).

(2.4) Manufacturers shall submit a report of the results of all testing conducted pursuant to section (l)(2) to the Executive Officer for review. This report shall identify the method used to induce a malfunction in each diagnostic, the MIL illumination status, and the fault code(s) stored.

(2.5) In accordance with section (k)(6), manufacturers may request Executive Officer approval for a retroactive deficiency to be granted for items identified during this testing.

(3) Verification and Reporting of In-use Monitoring Performance.

(3.1) Manufacturers are required to collect and report in-use monitoring performance data representative of production vehicles (i.e., engine rating and chassis application combination). Manufacturers shall collect and report the data to ARB within twelve months after the production vehicles were first introduced into commerce.

(3.2) Manufacturers shall separate production vehicles into monitoring performance groups, as defined by sections (l)(3.2.1) and (3.2.2) below, and submit data representative of each group:

(3.2.1) Emission architecture. Engines shall be separated by emission architecture. All engines that use the same or similar emission control architecture and monitoring system shall be in the same emission architecture category.

(3.2.2) Monitoring performance group. Within an emission architecture category, engines shall be separated by vehicle application. The separate monitoring performance groups shall be based on three classifications: engines intended primarily for line-haul chassis applications, engines intended primarily for urban delivery chassis applications, and all other engines.

(3.3) Manufacturers may request Executive Officer approval to use an alternate grouping method to collect representative data. Executive Officer approval shall be granted upon determining that the proposed groupings include production vehicles using similar emission controls, OBD strategies, monitoring condition calibrations, and vehicle application driving/usage patterns such that they are expected to have similar in-use monitoring performance. If approved by the Executive Officer, the manufacturer may submit one set of data for each of the approved groupings.

(3.4) For each group, the data must include all of the in-use performance tracking data reported through SAE J1979/J1939 (i.e., all numerators, denominators, the general denominator, and the ignition cycle counter), the engine model year, the engine manufacturer, the engine family, the engine serial number, the engine HP rating (for diesels), the engine torque rating (for diesels), the date the data were collected, the odometer reading, the vehicle/chassis VIN, the monitoring performance group, and the ECM software calibration identification number and be in the standardized format detailed in Attachments D and E of ARB Mail-Out #MSC 09-22.

(3.5) Manufacturers shall submit a plan to the Executive Officer for review and approval that details the types of production vehicles in each group, the number of vehicles per group to be sampled, the sampling method, the time line to collect the data, and the reporting format. The Executive Officer shall approve the plan upon determining that it provides for effective collection of data from a sample of vehicles that, at a minimum, is fifteen vehicles per group, will likely result in the collection and submittal of data within the required time frame, will generate data that are representative of California drivers and temperatures, and does not, by design, exclude or include specific vehicles in an attempt to collect data only from vehicles with the highest in-use performance ratios.

(3.6) Upon request of the manufacturer, the Executive Officer may for good cause extend the twelve month time requirement set forth in section (l)(3.1) up to a maximum of eighteen months. In granting additional time, the Executive Officer shall consider, among other things, information submitted by the manufacturer to justify the delay, sales volume of the group(s), and the sampling mechanism utilized by the manufacturer to procure vehicles for data collection. If an extension beyond twelve months is granted, the manufacturer shall additionally be required to submit an interim report within twelve months for data collected up to the time of the interim report.

(4) Verification of In-Use Compliance

(4.1) As a condition for certification, manufacturers are required to perform compliance testing on in-use engines as specified in California Code of Regulations, title 13, section 1971.5.1(c).

NOTE: Authority cited: Sections 39010, 39600, 39601, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, 43106, 43154, 43211, and 43212, Health and

Safety Code. Reference: Sections 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600, 39601, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150, 43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211, and 43212, Health and Safety Code.

§ 1971.5.1. Enforcement of Malfunction and Diagnostic System Requirements for 2010 and Subsequent Model-Year Heavy-Duty Engines. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *General.*

(1) *Applicability.*

(A) These procedures shall be used to assure compliance with the requirements of California Code of Regulations (Cal. Code Regs.), title 13, section 1971.1.1 for all 2010 and subsequent model year heavy-duty engines equipped with OBD systems that have been certified for sale in California.

(B) Engines manufactured prior to the 2010 model year are covered by the general enforcement and penalty provisions of the Health and Safety Code, and the specific provisions of Cal. Code Regs., title 13, section 1971 and section 2111 through section 2149.

(2) *Purpose.*

The purpose of this section is to establish the enforcement protocol that shall be used by the Air Resources Board (ARB) to assure that engines certified for sale in California are equipped with OBD systems that properly function and meet the purposes and requirements of Cal. Code Regs., title 13, section 1971.1.1.

(3) *Definitions.*

The definitions applicable to these rules include those set forth in Health and Safety Code section 39010 et seq. and in Cal. Code Regs., title 13, section 1900(b) and section 1971.1.1(c), which are incorporated by reference herein. The following definitions are specifically applicable to section 1971.5.1 and take precedence over any contrary definitions.

"*Days*", when computing any period of time, unless otherwise noted, means normal working days that a manufacturer is open for business.

"*Engine Class*" means a group or set of engines subject to enforcement testing that have been determined by the Executive Officer to share common or similar hardware, software, OBD monitoring strategy, or emission control strategy.

"*Engine Manufacturer*" means the manufacturer granted certification to sell engines in the State of California.

"*Executive Officer*" means the Executive Officer of ARB or his or her authorized representative.

"*Influenced OBD-Related Recall*" means an inspection, repair, adjustment, or modification program initiated and conducted by a manufacturer as a result of

enforcement testing conducted by the ARB or any other information for the purpose of correcting any nonconforming OBD system for which direct notification of vehicle or engine owners is necessary.

"*Major Monitor*" means those monitors covered by the requirements set forth in Cal. Code Regs., title 13, section 1971.1.1(e), (f), and (g)(4).

"*Nonconforming OBD System*" means an OBD system on a production engine that has been determined not to comply with the emission standards as defined in Cal. Code Regs., title 13, section 1971.1.1(c), irrespective of whether engines in the engine class, on average, meet other applicable emission standards (e.g., exhaust emission standards defined in Cal. Code Regs., title 13, section 1956.8, evaporative emission standards defined in Cal. Code Regs., title 13, section 1976).

"*OBD Emission Testing*" refers to testing conducted to determine compliance with the malfunction criteria in Cal. Code Regs., title 13, section 1971.1.1(e) through (g) that are based on a multiple of, or an additive to, a tailpipe emission standard or an absolute measurement from an applicable emission test cycle (e.g., 1.5 times the applicable federal test procedure (FTP) emission standards, PM standard plus 0.02 g/bhp-hr, PM level of 0.03 g/bhp-hr as measured from an applicable emission test cycle).

"*OBD Ratio Testing*" refers to testing conducted to determine compliance with the required in-use monitor performance ratio in Cal. Code Regs., title 13, section 1971.1.1(d)(3.2.2).

"*Ordered OBD-Related Recall*" means an inspection, repair, adjustment, or modification program required by ARB to be conducted by the manufacturer to correct any nonconforming OBD system for which direct notification of vehicle or engine owners is necessary.

"*Quarterly Reports*" refer to the following calendar periods: January 1 – March 31; April 1 – June 30; July 1 – September 30; October 1 – December 31.

"*Test Sample Group*" means a group of production engines in a designated engine class that are equipped with OBD systems and are selected and tested as part of the enforcement testing program set forth in sections (b) and (c).

"*Voluntary OBD-Related Recall*" means an inspection, repair, adjustment, or modification program voluntarily initiated and conducted by a manufacturer to correct any nonconforming OBD system for which direct notification of vehicle or engine owners is necessary.

(b) *Testing Procedures for ARB-Conducted Testing.*

(1) *Purpose.*

To assure that OBD systems on production engines comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1, ARB may periodically evaluate engines from an engine class.

(2) *Preliminary Testing and Evaluation.*

(A) As part of his or her evaluation of engines to determine compliance with the requirements of Cal. Code Regs., title 13, section 1971.1.1, the Executive Officer may routinely conduct testing on any production engines that have been certified for sale in California.

(B) Based upon such testing or any other information, including data from California or other state heavy duty inspection programs, warranty information reports, and field information reports, the Executive Officer may conduct enforcement testing pursuant to sections (b)(3) through (5) below.

(3) *Engine Selection for ARB-Conducted Enforcement Testing.*

(A) Determining the Engine Class.

(i) Upon deciding to conduct enforcement testing, the Executive Officer shall determine the engine class to be tested. In determining the scope of the engine class to be tested, the Executive Officer shall consider the similarities and differences in the OBD systems of potentially affected engines. Among other things, the Executive Officer shall consider whether engines share similar computer hardware and software, calibrations, or OBD monitoring and emission control strategies.

(ii) The default engine class is the engine family or OBD group used by the manufacturer to certify the engines to be tested. However, upon concluding that a subgroup of engines differs from other engines in the identified engine family or OBD group and that a reasonable basis exists to believe that the differences may directly impact the type of testing that will be performed, the Executive Officer may determine that a subgroup of the engine family or OBD group is the appropriate engine class for testing.

(iii) Similarly, upon concluding that engines from several engine families or OBD groups (which may include engine families or OBD groups from different model years) share such common characteristics that a reasonable basis exists to believe that results of enforcement testing may be applicable to an engine class larger than a specific engine family or OBD group, the Executive Officer may determine that the appropriate engine class includes more than one engine family or OBD group.

(iv) Except for testing to determine if an OBD system has been designed to deactivate based on age and/or mileage (Cal. Code Regs., title 13, section 1971.1.1(d)(1.3)), the Executive Officer may not conduct testing of an engine class whose engines, on average, exceed the defined full useful life of the engine class. For purposes of the determination of this average, the Executive Officer shall use the accrual rates appropriate for engines in the engine class considering the vehicle weight class, usage type, and other subcategories as defined and used by EMFAC2007, which is incorporated by reference herein.

(B) Size of Test Sample Group.

After determining the engine class to be tested, the Executive Officer shall determine the appropriate number of engines to include in the test sample group for enforcement testing in accordance with the following guidelines:

(i) For OBD emission testing, the Executive Officer shall follow the provisions of Cal. Code Regs., title 13, section 2137 regarding test sample size. In accordance with section 2137, the Executive Officer shall test 10 engines that have been procured following the protocol of section (b)(3)(C) below and meet the selection criteria of section (b)(3)(D)(i) below to determine the emissions characteristics of the engine class being tested.

(ii) For OBD ratio testing, the Executive Officer shall collect data from a test sample group of 30 engines that have been procured following the protocol of section (b)(3)(C) below and meet the selection criteria of section (b)(3)(D)(ii) below to determine the in-use OBD monitoring performance of the engine class being tested.

(iii) In determining compliance with any other requirements of Cal. Code Regs., title 13, section 1971.1.1 (e.g., diagnostic connector location, communication protocol standards, MIL illumination protocol, evaporative system diagnostics, etc.), the Executive Officer shall determine, on a case by case basis, the number of engines meeting the selection criteria of section (b)(3)(D)(iii) needed to assure that the results of such testing may be reasonably inferred to the engine class. The Executive Officer's determination shall be based upon the nature of the nonconformance and the scope of the engine class. The test sample group could be as few as two test engines.

(C) Protocol for Procuring Engines for Test Sample Group.

(i) For OBD emission and ratio testing, the Executive Officer shall determine the appropriate manner for procuring engines. In making his or her determination, the Executive Officer shall consider the nature of the nonconformance and the scope of the engine class. The method used shall ensure that engines are recruited from more than one source. Methods used may include obtaining lists of engine owners from specific sources (e.g., engine manufacturers, motor vehicle registration records) and soliciting participation from owners, discussing with fleet or rental operations to locate engines in the engine class, or using methods used by the manufacturer to procure engines for the manufacturer-run heavy duty diesel in-use testing program established pursuant to 70 Federal Register 34594. In selecting engines for OBD emission testing, the Executive Officer shall include only engines meeting the criteria set forth in section (b)(3)(D)(i) below. For OBD ratio testing, the Executive Officer shall include only engines meeting the criteria set forth in section (b)(3)(D)(ii) below.

(ii) For all other testing, the Executive Officer shall, on a case by case basis, determine the appropriate manner for procuring engines. In making his or her determination, the Executive Officer shall consider the nature of the nonconformance and the scope of the engine class. The Executive Officer may procure engine(s) by any means that assures effective collection and testing of engines (e.g., rental car agencies, fleet vehicles, etc.), but shall not include any vehicle for which a reasonable basis exists that a vehicle operator's driving or maintenance habits would substantially impact test results to determine nonconformance. In all cases, however, the selection process must ensure proper selection of engines in accord with section (b)(3)(D)(iii) below.

(D) Engines to be included in a Test Sample Group.

(i) In selecting engines to be included in a test sample group for enforcement OBD emission testing, the Executive Officer shall include only engines that:

a. Are certified to the requirements of Cal. Code Regs., title 13, section 1971.1.1 and California exhaust emission standards.

b. Are registered for operation in the United States.

c. Have mileage that is less than 75 percent of the certified full useful life mileage and have an age of less than the certified full useful life age for the subject vehicles.

d. Have not been tampered with or equipped with add-on or modified parts that would cause the OBD system not to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1 or would have a permanent effect on exhaust emission performance

e. Have not been subjected to abuse (e.g., racing, overloading, misfueling), neglect, improper maintenance, or other factors that would cause the OBD system not to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1 or would have a permanent effect on exhaust emission performance.

f. Have no detected or known malfunction(s) unrelated to the monitor or system being evaluated that would affect the performance of the OBD system. At its discretion, ARB may elect to repair an engine with a detected or known malfunction and then include the engine in the test sample group.

g. Have had no major repair to the engine resulting from a collision.

h. Have no problem that might jeopardize the safety of laboratory personnel.

(ii) In selecting engines to be included in a test sample group for enforcement OBD ratio testing, the Executive Officer shall include only engines that:

a. Are certified to the requirements of Cal. Code Regs., title 13, section 1971.1.1.

b. Have collected sufficient engine operation data for the monitor to be tested. For monitors required to meet the in-use monitor performance ratio and to track and report ratio data pursuant to Cal. Code Regs., title 13, section 1971.1.1(d)(3.2), sufficient engine operation data shall mean the denominator meets the criteria set forth in sections (b)(3)(D)(ii)1. through 5. below. For monitors required to meet the in-use monitor performance ratio but not required to track and report ratio data pursuant to Cal. Code Regs., title 13, section 1971.1.1(d)(3.2), sufficient engine operation data shall mean that engines that have a denominator that meets the criteria set forth in sections (b)(3)(D)(ii)1. through 5. below after undergoing testing as set forth in section (b)(4)(C)(ii) below. Specifically, the denominator, as defined in Cal. Code Regs., title 13, section 1971.1.1(d)(4.3), for the monitor to be tested must have a value equal to or greater than:

1. 150 for gasoline evaporative system and secondary air system monitors, and gasoline monitors utilizing a denominator incremented in accordance with Cal. Code Regs., title 13, section 1971.1.1(d)(4.3.2)(D), (E), and (F) (e.g., cold start monitors, variable valve timing and/or control system monitors, etc.), or

2. 300 for gasoline catalyst, oxygen sensor, EGR, and all other component monitors.

3. 50 for diesel PM filter monitors, NMHC converting catalyst monitors, PM sensor monitors, and PM sensor heater monitors using a denominator incremented in accordance with Cal. Code Regs., title 13, section 1971.1.1(d)(4.3.2)(E), (F), (G) or (H), or

4. 150 for diesel monitors utilizing a denominator incremented in accordance with Cal. Code Regs., title 13, section 1971.1.1(d)(4.3.2)(D), (E), or (F) (e.g., cold start monitors, comprehensive component output component monitors, etc.) and not covered in section (b)(3)(D)(ii)3. above, or

5. 300 for all other diesel monitors not covered under sections (b)(3)(D)(ii)3. and 4. above.

c. Have not been tampered with or equipped with add-on or modified parts that would cause the OBD system not to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1.

d. Have mileage and age that are less than or equal to the certified full useful life mileage and age for the subject engines.

(iii) In selecting engines to be included in a test sample group for enforcement testing of any other requirement of Cal. Code Regs., title 13, section

1971.1.1 (not covered by sections (b)(3)(D)(i) or (ii) above), the Executive Officer shall include only engines that:

a. Are certified to the requirements of Cal. Code Regs., title 13, section 1971.1.1.

b. Have not been tampered with or equipped with add-on or modified parts that would cause the OBD system not to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1.

c. Have no detected or known malfunction(s) unrelated to the monitor or system being evaluated that would affect the performance of the OBD system. At its discretion, ARB may elect to repair an engine with a detected or known malfunction and then include the engine in the test sample group.

d. Have mileage and age that are less than or equal to the certified full useful life mileage and age for the subject engines.

(iv) If the Executive Officer discovers, by either evidence presented by the manufacturer as provided in section (b)(7) or on his or her own, that an engine fails to meet one or more of the applicable criteria of section (b)(3)(D)(i) through (iii), the Executive Officer shall remove the engine from the test sample group. The Executive Officer may replace any engine removed with an additional engine selected in accordance with sections (b)(3)(C) and (D) above. Test results relying on data from the removed engine shall be recalculated without using the data from the removed engine.

(4) *Enforcement Testing Procedures.*

(A) Prior to conducting any testing under section (b)(4), the Executive Officer may replace components monitored by the OBD system with components that are sufficiently deteriorated or simulated to cause malfunctions that exceed the malfunction criteria established pursuant to Cal. Code Regs., title 13, section 1971.1.1(e) through (g) in a properly operating system. The Executive Officer may not use components deteriorated or simulated to represent failure modes that could not have been foreseen to occur by the manufacturer (e.g., the use of leaded gasoline in an unleaded gasoline engine, etc.). Upon request by the Executive Officer, the manufacturer shall make available all test equipment used by the manufacturer in development, calibration, or demonstration testing (e.g., malfunction simulators, deteriorated "threshold" components, etc.) necessary to duplicate testing done by the manufacturer to determine the malfunction criteria used for major monitors subject to OBD emission testing.

(B) OBD Emission Testing. After the test sample group has been selected and procured, the Executive Officer may perform one or more of the following tests:

(i) Emission testing with the test procedures used by the Executive Officer for in-use testing of compliance with exhaust emission standards in accordance with Cal. Code Regs., title 13, section 1956.8(b) and (d).

(ii) On-road or engine or chassis dynamometer testing with the engine being operated in a manner that reasonably ensures that all of the monitoring conditions disclosed in the manufacturer's certification application for the tested monitor are encountered.

(C) OBD Ratio Testing.

(i) For OBD ratio testing of monitors required to meet the in-use monitor performance ratio and track and report ratio data pursuant to Cal. Code Regs., title 13, section 1971.1.1(d)(3.2), after the test sample group has been selected and procured, the Executive Officer shall download the data from monitors required to track and report such data.

(ii) For OBD ratio testing of monitors required to meet the in-use monitor performance ratio but not required to track and report ratio data pursuant to Cal. Code Regs., title 13, section 1971.1.1(d)(3.2), after the test sample group has been selected and procured, the Executive Officer shall collect data by installing instrumentation or data-logging equipment on the engines/vehicles. After installation of the equipment, the engines/vehicles shall be returned to the engine/vehicle owner/operator to continue to operate the engine/vehicle until the minimum denominator criteria (see section (b)(3)(D)(ii)b.) are satisfied. The Executive Officer shall then calculate the ratio from the data collected in accordance with the requirements of Cal. Code Regs., title 13, section 1971.1.1(d)(3.2) to allow the Executive Officer to effectively determine the in-use monitor performance ratio.

(D) Testing for compliance with any other requirement of Cal. Code Regs., title 13, section 1971.1.1. After the test sample group has been selected and procured, the Executive Officer may perform one or more of the following tests:

(i) Emission testing on the applicable FTP or supplemental emission test (SET) cycle or other applicable emission test cycle used for measuring exhaust or evaporative emissions;

(ii) On-road or engine or chassis dynamometer testing with the engine being operated in a manner that reasonably ensures that all of the monitoring conditions disclosed in the manufacturer's certification application for the tested monitor are encountered; or

(iii) Any other testing determined to be necessary by the Executive Officer. This may include, but is not limited to, the use of special test equipment to verify compliance with standardization requirements.

(5) *Additional Testing.*

(A) Based upon testing of the engine class in section (b)(4) above and after review of all evidence available at the conclusion of such testing, the Executive Officer may elect to conduct further testing of a subgroup of engines from the engine class if the Executive Officer has determined that:

(i) A subgroup of tested engines differs sufficiently enough from other engines in the tested engine class, and

(ii) A reasonable basis exists to believe that the identified differences may indicate that the subgroup may be nonconforming whereas the tested engine class as a whole is not.

(B) Hereinafter all references to engine class shall be applicable to the subgroup meeting the conditions of section (b)(5)(A) above.

(C) In any testing of a subgroup of engines under section (b)(5), the Executive Officer shall follow the engine selection and testing procedures set forth in sections (b)(3) and (4) above.

(6) *Finding of Nonconformance after Enforcement Testing.*

After conducting enforcement testing pursuant to section (b)(4) above, the Executive Officer shall make a finding of nonconformance of the OBD system in the identified engine class under the respective tests for the applicable model year(s) as follows:

(A) OBD Emission Testing.

(i) For 2010 through 2012 model year engines:

a. Engines certified as an OBD parent rating (i.e., the engine rating subject to the "full OBD" requirement under Cal. Code Regs., title 13, section 1971.1.1(d)(7.1.1)), shall be considered nonconforming if the emission test results indicate that 50 percent or more of the engines in the test sample group do not properly illuminate the MIL when emissions exceed 2.0 times the malfunction criteria (e.g., 5.0 times the standard if the malfunction criterion is 2.5 times the standard).

b. In determining an engine to be nonconforming, the Executive Officer shall use:

1. The test cycle and standard determined and identified by the manufacturer at the time of certification in accordance with Cal. Code Regs., title 13, section 1971.1.1(d)(6.1) as the most stringent for purposes of determining OBD system nonconformance with the applicable standard in section (b)(6)(A)(i)a. and

2.The adjustment factors determined by the manufacturer at the time of certification in accordance with Cal. Code Regs., title 13, section

1971.1.1(d)(6.2) for purposes of determining OBD system nonconformance in section (b)(6)(A)(i)a.

c. Engines certified as an OBD child rating (i.e., the engine ratings subject to the "extrapolated OBD" requirement under Cal. Code Regs., title 13, section 1971.1.1(d)(7.1.2)), may not be considered nonconforming based on testing emission levels.

(ii) For 2013 through 2015 model year engines:

a. All engines classified as OBD parent and child ratings subject to Cal. Code Regs., title 13, section 1971.1.1(d)(7.2.2) shall be considered to be nonconforming if the emission test results indicate that 50 percent or more of the engines in the test sample group do not properly illuminate the MIL when emissions exceed 2.0 times the malfunction criteria (e.g., 4.0 times the standard if the malfunction criterion is 2.0 times the standard).

b. In determining compliance, the Executive Officer shall use only the test cycle and standard determined and identified by the manufacturer at the time of certification in accordance with Cal. Code Regs., title 13, section 1971.1.1(d)(6.1) as the most stringent for purposes of determining OBD system nonconformance with the applicable standard in section (b)(6)(A)(ii)a.

c. All other engines and engine ratings may not be considered nonconforming based on the emission levels of the tests.

(iii) For 2016 through 2018 model year engines:

a. PM filter monitors on engines subject to the malfunction criteria of Cal. Code Regs., title 13, sections 1971.1.1(e)(8.2.1)(D) and (E) shall be considered to be nonconforming if the emission test results indicate that 50 percent or more of the engines in the test sample group do not properly illuminate the MIL when emissions exceed 2.0 times the malfunction criteria (e.g., PM emission level of 0.06 g/bhp-hr if the malfunction criterion is 0.03 g/bhp-hr) on any of the applicable standards (i.e., FTP or SET).

b. Monitors on engines and engine ratings previously certified to Cal. Code Regs., title 13, section 1971.1.1(d)(7.2.3) for extrapolated OBD in the 2013 through 2015 model years shall be considered nonconforming if the emission test results indicate that 50 percent or more of the engines in the test sample group do not properly illuminate the MIL when emissions exceed 2.0 times the malfunction criteria (e.g., 4.0 times the standard if the malfunction criterion is 2.0 times the standard) on any of the applicable standards (i.e., FTP or SET).

c. Monitors on engines not covered under sections (b)(6)(A)(iii)a. and b. above shall be considered nonconforming if the emission test results

indicate that 50 percent or more of the engines in the test sample group do not properly illuminate the MIL when emissions exceed the malfunction criteria on any of the applicable standards (i.e., FTP or SET).

(iv) For 2019 and subsequent model year engines, any engine shall be considered nonconforming if the results of the tests indicate that 50 percent or more of the engines in the test sample do not properly illuminate the MIL when emissions exceed the malfunction criteria on any of the applicable standards (i.e., FTP or SET).

(v) The Executive Officer may not consider an OBD system nonconforming solely due to a failure or deterioration mode of a monitored component or system that could not have been reasonably foreseen to occur by the manufacturer.

(B) OBD Ratio Testing.

(i) 2013 through 2015 model year engines certified to a ratio of 0.100 in accordance with Cal. Code Regs., title 13, section 1971.1.1(d)(3.2.2) and PM filter filtering performance monitors (section 1971.1.1(e)(8.2.1)) and missing substrate monitors (section 1971.1.1(e)(8.2.5)) on 2016 through 2018 model year engines shall be considered nonconforming if the data collected from the engines in the test sample group indicate either that the average in-use monitor performance ratio for one or more of the monitors in the test sample group is less than 0.050 or that 66.0 percent or more of the engines in the test sample group have an in-use monitor performance ratio of less than 0.050 for the same monitor.

(ii) Except as provided above in section (b)(6)(B)(i) above, 2016 and subsequent model year engines certified to a ratio of 0.100 in accordance with Cal. Code Regs., title 13, section 1971.1.1(d)(3.2.2) shall be considered nonconforming if the data collected from the engines in the test sample group indicate either that the average in-use monitor performance ratio for one or more of the monitors in the test sample group is less than 0.088 or that 66.0 percent or more of the engines in the test sample group have an in-use monitor performance ratio of less than 0.100 for the same monitor.

(C) All Other OBD Testing.

(i) Engines shall be considered nonconforming if the results of the testing indicate that at least 30 percent of the engines in the test sample group do not comply with the same requirement of Cal. Code Regs., title 13, section 1971.1.1.

(ii) Engines shall be considered nonconforming if the results of the testing indicate that at least 30 percent of the engines in the test sample group do not comply with one or more of the requirements of Cal. Code Regs., title 13, section 1971.1.1 while the engine is running and while in the key on,

engine off position such that off-board equipment designed to access the following parameters via the standards referenced in Cal. Code Regs., title 13, section 1971.1.1 for 2013 and subsequent model year engines cannot obtain valid and correct data for the following parameters:

a. The current readiness status from all on-board computers required to support readiness status in accordance with Society of Automotive Engineers J1979 (SAE J1979) or J1939 (SAE J1939) as incorporated by reference in Cal. Code Regs., title 13, section 1971.1.1(h)(1) and section 1971.1.1(h)(4.1);

b. The current MIL command status while the MIL is commanded off and while the MIL is commanded on in accordance with SAE J1979/J1939 and Cal. Code Regs., title 13, section 1971.1.1(h)(4.2), and in accordance with SAE J1979/J1939 and Cal. Code Regs., title 13, section 1971.1.1(d)(2.1.2) during the MIL functional check and, if applicable Cal. Code Regs., title 13, section 1971.1.1(h)(4.1.6) during the MIL readiness status check;

c. The current permanent fault code(s) in accordance with SAE J1979/J1939 and Cal. Code Regs., title 13, section 1971.1.1(h)(4.4);

d. The data stream parameters for: engine speed and OBD requirements to which the engine is certified as required in Cal. Code Regs., title 13, section 1971.1.1(h)(4.2) and in accordance with SAE J1979/J1939;

e. The CAL ID, CVN, ESN, and VIN as required in Cal. Code Regs., title 13, sections 1971.1.1(h)(4.6), (h)(4.7), and (h)(4.8) and in accordance with SAE J1979/J1939; or

f. The proper identification of all data identified in (b)(6)(C)(ii)a. through (b)(6)(C)(ii)e. as supported or unsupported as required in Cal. Code Regs., title 13, section 1971.1.1(h)(4) and in accordance with SAE J1979/J1939.

(iii) If the finding of nonconformance under section (b)(6)(C)(i) above concerns engines that do not comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1(d)(4) or (5) (e.g., numerators or denominators are not properly being incremented), it shall be presumed that the nonconformance would result in an OBD ratio enforcement test result that would be subject to an ordered OBD-related recall in accord with the criterion in section (d)(3)(A)(i). The manufacturer may rebut such a presumption by presenting evidence in accord with section (b)(7)(C)(iii) below that demonstrates to the satisfaction of the Executive Officer that the identified nonconformance would not result in an ordered OBD- related recall under section (d)(3)(A)(i).

(7) *Executive Officer Notification to the Manufacturer Regarding Determination of*

Nonconformance.

(A) Upon making the determination of nonconformance in section (b)(6) above, the Executive Officer shall notify the manufacturer in writing.

(B) The Executive Officer shall include in the notice:

(i) a description of each group or set of engines in the engine class covered by the determination;

(ii) the factual basis for the determination, including a summary of the test results relied upon for the determination;

(iii) a statement that the Executive Officer shall provide to the manufacturer, upon request and consistent with the California Public Records Act, Government Code section 6250 et seq., all records material to the Executive Officer's determination;

(iv) a provision allowing the manufacturer no less than 90 days from the date of issuance of the notice to provide the Executive Officer with any information contesting the findings set forth in the notice; and

(v) a statement that if a final determination is made that the engine class is equipped with a nonconforming OBD system, the manufacturer may be subject to appropriate remedial action, including recall and monetary penalties.

(C) Within the time period set by the Executive Officer in section (b)(7)(B)(iv) and any extensions of time granted under section (b)(7)(H), the manufacturer shall provide the Executive Officer, consistent with paragraphs (i) through (iii) below, with any test results, data, or other information derived from engine testing that may rebut or mitigate the results of ARB testing, including any evidence that an engine class, if determined to be nonconforming, should be exempted from mandatory recall. (See section (d)(3)(B) below.).

(i) For OBD emission testing and OBD ratio testing:

a. The manufacturer may submit evidence to demonstrate that engines in the test sample group used by the Executive Officer were inappropriately selected, procured, or tested in support of a request to have engines excluded from the test sample group in accordance with section (b)(3)(D)(iv).

b. If the manufacturer elects to conduct additional testing of engines in the engine class and submit the results of such testing to the Executive Officer, the manufacturer shall:

1. Present evidence that it has followed the procurement and test procedures set forth in sections (b)(3) and (4) above, or

2. If the manufacturer elects to use different procurement and testing procedures, submit a detailed description of the procedures used and

evidence that such procedures provide an equivalent level of assurance that the results are representative of the engine class.

(ii) If the manufacturer objects to the size of the test sample group or the method used to procure engines in the test sample group used by the Executive Officer pursuant to section (b)(3)(B)(iii) or (b)(3)(C)(ii), the manufacturer shall set forth what it considers to be the appropriate size and procurement method, the reasons therefore, and test data from engines that confirm the manufacturer's position.

(iii) If the manufacturer elects to present evidence to overcome the presumption of nonconformance in section (b)(6)(C)(iii) above, the manufacturer shall demonstrate that the engines in the engine class comply with in-use monitor performance ratio requirements of Cal. Code Regs., title 13, section 1971.1.1(d)(3.2) by presenting:

a. Evidence in accord with the procurement and testing requirements of sections (b)(3) and (4).

b. Any other evidence that provides an equivalent level of proof that engines operated in California comply with the in-use monitor performance ratio requirements.

(D) The Executive Officer may accept any information submitted by a manufacturer pursuant to section (b)(7)(C) above after the time established for submission of such information has passed if the manufacturer could not have reasonably foreseen the need for providing the information within the time period provided. Otherwise, the Executive Officer is not required to accept late information. In determining whether to accept late information, the Executive Officer will consider the lateness of the submission, the manufacturer's reasons for why such information was not timely presented, the materiality of the information to the Executive Officer's final determination, and what effect any delay may have on effective enforcement and the health and welfare of the State.

(E) The requirements of section (b)(7) shall not be construed to abridge the manufacturer's right to assert any privilege or right provided under California law.

(F) After receipt of any information submitted by the manufacturer pursuant to section (b)(7)(C) above, the Executive Officer shall consider all information submitted by the manufacturer and may conduct any additional testing that he or she believes is necessary.

(G) Final Determination.

(i) Within 60 days after completing any additional testing that the Executive Officer deemed necessary under section (b)(7)(F) above, the Executive Officer shall notify the manufacturer of his or her final determination regarding the finding of nonconformity of the OBD system in the engine

class. The determination shall be made after considering all of the information collected and received, including all information that has been received from the manufacturer.

(ii) The notice must include a description of each engine family(ies), OBD group(s), or subgroups thereof, that has been determined to have a nonconforming OBD system and set forth the factual bases for the determination.

(H) Extensions. The Executive Officer may for good cause extend the time requirements set forth in section (b)(7). In granting additional time to a manufacturer, the Executive Officer shall consider, among other things, any documentation submitted by the manufacturer regarding the time that it reasonably believes is necessary to conduct its own testing, why such information could not have been more expeditiously presented, and what effect any delay caused by granting the extension may have on effective enforcement and the health and welfare of the State. The Executive Officer shall grant a manufacturer a reasonable extension of time upon the manufacturer demonstrating that despite the exercise of reasonable diligence, the manufacturer has been unable to produce relevant evidence in the time initially provided.

(c) *Manufacturer Self-Testing.*

(1) *Purpose.*

To assure that OBD systems on production engines certified on an engine dynamometer are able to detect a fault before emissions exceed the malfunction criteria established in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g), engine manufacturers shall evaluate engines for each model year, starting with the 2010 model year.

(2) *Engine Selection for Manufacturer Self-Testing.*

(A) After OBD certification of all engines in the model year, a manufacturer shall submit a listing to the Executive Officer of all of the engine families and engine ratings within each family certified for that model year. The Executive Officer will then select the engine family(ies) and the specific engine rating within the engine family(ies) that the manufacturer shall use as a test engine for the test sample group to provide emission test data.

(i) For 2013 through 2015 model year engines, the Executive Officer may not select engines from OBD child ratings subject to "extrapolated OBD" under Cal. Code Regs., title 13, section 1971.1.1(d)(7.2.3).

(B) Number of test engines.

(i) For the 2010 model year, a manufacturer shall provide emission test data of a test engine from the OBD parent rating.

(ii) For the 2013 and subsequent model years, a manufacturer certifying one to five engine families in a model year shall provide emission test data of a test engine from one engine rating. A manufacturer certifying six to ten engine families in a model year shall provide emission test data from test engines from two engine ratings. A manufacturer certifying eleven or more engine families in a model year shall provide emission test data of test engines from three engine ratings. The Executive Officer may waive the requirement for submittal of data of one or more of the test engines if data have been previously submitted for all of the engine ratings.

(C) Engines to be included in test sample group.

(i) In selecting engines to be included in a test sample group for manufacturer self-testing, the manufacturer shall include only engines that:

a. Are certified to the requirements of Cal. Code Regs., title 13, section 1971.1.1 and California exhaust emission standards.

b. Are used in vehicles registered for operation in the United States.

c. Have mileage that is between 70 to 80 percent of the certified full useful life mileage and an age of less than the certified full useful life age for the subject engines.

d. Have not been tampered with or equipped with add-on or modified parts that would cause the OBD system not to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1 or would have a permanent effect on exhaust emission performance.

e. Have not been subjected to abuse (e.g., overloading, misfueling) neglect, improper maintenance, or other factors that would cause the OBD system not to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1 or would have a permanent effect on exhaust emission performance.

f. Have no detected or known malfunction(s) unrelated to the monitor or system being evaluated that would affect the performance of the OBD system. With request to and approval from the Executive Officer, the manufacturer may elect to repair an engine with a detected or known malfunction and then include the engine in the test sample group.

g. Have had no major repair to the engine resulting from a collision.

h. Have no problem that might jeopardize the safety of laboratory personnel.

(ii) If the manufacturer discovers, by either evidence presented by the Executive Officer or on its own, that an engine fails to meet one or more of the applicable criteria of section (c)(2)(C)(i), the manufacturer shall notify the Executive Officer of its findings and request approval to remove the engine from the test sample group. If approved by the Executive Officer,

the manufacturer shall replace any engine removed with an additional engine selected in accordance with section (c)(2)(C)(i). Test results relying on data from the removed engine shall be recalculated without using the data from the removed engine.

(3) *Compliance/Enforcement Testing Procedures.*

(A) Within three calendar years after the model year of the engine (e.g., by the end of calendar year 2013 for a 2010 model year engine), the engine manufacturer shall complete the testing required under section (c)(3).

(B) Prior to conducting any testing under section (c)(3), the engine manufacturer shall replace components monitored by the OBD system with components that are sufficiently deteriorated or simulated to cause malfunctions that exceed the malfunction criteria established pursuant to Cal. Code Regs., title 13, sections 1971.1.1(e) through (g) in a properly operating system. The engine manufacturer may not use components deteriorated or simulated to represent failure modes that could not have been foreseen to occur by the manufacturer (e.g., the use of leaded gasoline in an unleaded engine, etc.).

(C) After the test engine(s) has been selected and procured under section (c)(2) above, the engine manufacturer shall perform emission testing for all applicable components/systems according to the certification demonstration testing requirements of Cal. Code Regs., title 13, sections 1971.1.1(i)(3) and (i)(4).

(D) No modifications or replacement of components to make the engine compatible with engine dynamometer testing (e.g., replacement of an air-to-air charge cooler with a water-to-air charge cooler) shall be done without approval by the Executive Officer. The Executive Officer shall approve such requests upon the manufacturer documenting the technical need for such a modification or replacement and providing engineering data or analysis demonstrating that any such modified part will be configured to simulate the current performance of the actual part removed from the engine (e.g., the water-to-air cooler must be configured to perform similarly to the air-to-air cooler in its current state of aging/deterioration, not to the performance specifications of the air-to-air cooler when new or to the manufacturer's specifications or performance characteristics used on the water-to-air cooler when the engine was originally certified).

(E) Upon request of the manufacturer, the Executive Officer may extend the deadline set forth in section (c)(3)(A) or reduce the minimum mileage required in section (c)(2)(C)(i)c. upon finding that the manufacturer has demonstrated good cause for the requested extension or mileage reduction.

(F) Upon request of the manufacturer, the Executive Officer may approve other compliance/enforcement testing protocols for (c)(3). The Executive Officer shall approve the request upon the manufacturer demonstrating that other testing protocol will provide comparable assurance that the in-use engines

comply with the malfunction criteria established pursuant to Cal. Code Regs., title 13, sections 1971.1.1(e) through (g).

(4) *Additional Testing.*

(A) If the results of the OBD emission tests conducted under section (c)(3) indicate that the OBD system properly illuminates the MIL for all component/system monitors before emissions exceed the malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g), no further testing is required.

(B) If the results of the OBD emission tests conducted under section (c)(3) indicate that OBD system does not properly illuminate the MIL for one or more of the component/system monitor(s) before emissions exceed the malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g), the engine manufacturer shall conduct further testing on additional engines.

(i) Within six months after the completion of testing required in section (c)(3), the engine manufacturer shall emission test an additional four engines from the same engine rating and engine family as the test engine.

(ii) The engine manufacturer shall only be required to test the component/system monitor(s) for which the OBD emission test results in (b)(3) exceeded the malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g).

(C) For manufacturers subject to section (c)(4)(B) above, no further testing is required if the results of the OBD emission tests conducted under section (c)(4)(B) indicate that OBD system properly illuminates the MIL for the tested component/system monitor(s) before emissions exceed the malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g) on three or more of the additional test engines.

(D) For manufacturers subject to section (c)(4)(B) above, if the results of the OBD emission tests conducted under section (c)(4)(B) indicate that the OBD system does not properly illuminate the MIL for one or more of the tested component/system monitor(s) before emissions exceed the malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g) on two or more of the additional test engines, the engine manufacturer shall conduct further testing.

(i) Within six months after the completion of testing required in section (c)(4)(B), the engine manufacturer shall test an additional five engines from the same engine rating and engine family as the previously tested engines.

(ii) The engine manufacturer shall test only the component/system monitor(s) for which the OBD emission test results exceeded the malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g).

(E) In any testing of the additional engines under section (c)(4), the engine manufacturer shall follow the engine selection and testing procedures set forth in sections (c)(2) and (c)(3) above.

(5) *ARB Authority to Observe Testing.* The Executive Officer may elect to have ARB personnel observe the testing under sections (c)(3) and (c)(4) above.

(A) During conducting of the test procedures described in sections (c)(3) and (c)(4) above, an engine manufacturer, upon receipt of prior notice, must admit or cause to be admitted during operating hours any ARB personnel that has presented proper credentials to any of the following:

(i) Any facility where tests or procedures or activities connected with such tests or procedures are performed;

(ii) Any facility where a manufacturer procures, inspects, screens, removes from vehicles, works on, configures, or modifies engines for testing; and

(iii) Any facility where any record or other document relating to any of the above is located.

(B) Upon admission to any facility referred to in section (c)(5)(A) above, any ARB personnel must be allowed to:

(i) Inspect and monitor any part or aspect of such procedures, activities, and testing facilities, including monitoring engine preconditioning, emissions tests, and break-in, maintenance, and engine storage procedures;

(ii) Verify correlation or calibration of test equipment;

(iii) Inspect and make copies of any such records, designs, or other documents; and

(iv) Inspect and/or photograph any part or aspect of any such tested engine and any components or equipment used in the testing thereof.

(C) Any ARB personnel must be furnished by those in charge of a facility being inspected with such reasonable assistance as may be necessary to discharge any function listed in section (c)(5)(B) above. The engine manufacturer is required to cause those in charge of a facility operated for its benefit to furnish such reasonable assistance without charge to ARB irrespective of whether or not the engine manufacturer controls the facility.

(D) The duty to admit or cause to be admitted any ARB personnel applies whether or not the engine manufacturer owns or controls the facility in question and applies both to the domestic and foreign engine manufacturers and facilities. If ARB personnel are prohibited from admission, the Executive Officer may reject any data produced by the manufacturer and may presume that the tested engines do not conform to certification standards. In such circumstances, the Executive Officer may suspend or revoke the engine's certification or take other necessary corrective action.

(E) For purposes of section (c)(5):

(i) "Presentation of credentials" means a display of a document designating a person as an ARB employee.

(ii) Where engine, component, or engine storage areas or facilities are concerned, "operating hours" means all times during which employees are at work in the vicinity of the area or facility and have access to it.

(iii) Where facilities or areas other than those covered by paragraph (c)(5)(E)(ii) above are concerned, "operating hours" means all times during which an assembly line is in operation or during which testing, maintenance, break-in procedure, production or compilation of records, or any other procedure or activity is being conducted related to certification testing, translation of designs from the test stage to the production stage, or engine manufacture or assembly.

(iv) "Reasonable assistance" includes providing clerical, copying, interpretation and translation services, making personnel available upon request to inform ARB personnel of how the facility operates and to answer questions, and performing requested emissions test on any engine that is being, has been, or will be used for certification testing. Such tests must be nondestructive, but may require appropriate break-in. Upon service of a written request from the Executive Officer for the appearance of any employee at a facility qualified for reasonable assistance, the engine manufacturer shall cause the personal appearance of such qualified employee to appear before and assist ARB personnel.

(6) *Manufacturer Reporting of Self-Testing Results to the Executive Officer.*

(A) Within 30 days after completing the testing under section (c)(3), the manufacturer shall submit a report of the results of all the testing to the Executive Officer for review. If further testing is required under section (c)(4), an additional report shall be submitted within 30 days of completing the additional testing. The report(s) must include the following:

(i) A description of each test engine and the engine family and engine rating to which the test engine belongs to;

(ii) A description of the test sequence (e.g., the number and types of preconditioning cycles) used for each testing;

(iii) A description of the modified or deteriorated components used for fault simulation with respect to each testing; and

(iv) The test results of all testing done under sections (c)(3) and (c)(4) for each test engine, consisting of:

a. the weighted emission test results for all measured pollutants for each test; and

b. the OBD data specified by Cal. Code Regs., title 13, section 1971.1.1(i)(4.3.2) collected prior to (or immediately after) each engine shut-down during the testing of sections (c)(3) and (c)(4) including the preconditioning cycles.

(7) *Finding of Nonconformance after Manufacturer Self-Testing.*

After the engine manufacturer has conducted testing pursuant to sections (c)(3) and (c)(4) and the Executive Officer has received the test results pursuant to section (c)(6) above, the Executive Officer shall make a finding of nonconformance of the OBD system in the engine class according to the criteria of section (b)(6)(A).

(8) *Executive Officer Notification to the Manufacturer Regarding Determination of Nonconformance.*

Upon making the determination of nonconformance in section (c)(7) above, the Executive Officer shall follow the procedures and requirements of section (b)(7).

(d) *Remedial Action.*

(1) *Voluntary OBD-Related Recalls.*

If a manufacturer initiates a voluntary OBD-related recall campaign, the manufacturer shall notify the Executive Officer of the recall at least 45 days before owner notification is to begin. The manufacturer shall also submit a voluntary OBD-related recall plan for approval, as prescribed under section (e)(1) below. A voluntary recall plan shall be deemed approved unless disapproved by the Executive Officer within 30 days after receipt of the recall plan.

(2) *Influenced OBD-Related Recalls.*

(A) Upon being notified by the Executive Officer, pursuant to section (b)(7)(G), that an engine class is equipped with a nonconforming OBD system, the manufacturer may, within 45 days from the date of service of such notification, elect to conduct an influenced OBD-related recall of all engines within the engine class for the purpose of correcting the nonconforming OBD systems. Upon such an election, the manufacturer shall, within 45 days from the date of such election, submit an influenced OBD-related recall plan for approval, as prescribed under section (e)(1) below.

(B) If a manufacturer does not elect to conduct an influenced OBD-related recall under section (d)(2)(A) above, the Executive Officer may order the manufacturer to undertake appropriate remedial action, up to and including the recall and repair of the nonconforming OBD systems.

(3) *Ordered Remedial Action-Mandatory Recall.*

(A) Except as provided in sections (d)(3)(B) below, the Executive Officer shall order the recall and repair of all engines in an engine class that have been determined to be equipped with a nonconforming OBD system if enforcement

testing conducted pursuant to sections (b) or (c) above or information received from the manufacturer indicates that:

(i) For major monitors required to meet the in-use performance ratio pursuant to Cal. Code Regs., title 13, section 1971.1.1(d)(3.2) and subject to the nonconformance criteria of section (b)(6)(B)(ii) on 2016 and subsequent model year engines, the average in-use monitor performance ratio for one or more of the major monitors in the test sample group is less than or equal to 33.0 percent of the applicable required minimum ratio established in Cal. Code Regs., title 13, section 1971.1.1(d)(3.2.2) (e.g., if the required ratio is 0.100, less than or equal to a ratio of 0.033) or 66.0 percent or more of the vehicles in the test sample group have an in-use monitor performance ratio of less than or equal to 33.0 percent of the applicable required minimum ratio established in Cal. Code Regs., title 13, section 1971.1.1(d)(3.2.2) for the same major monitor.

(ii) For major monitors required to indicate a malfunction before emissions exceed a certain emission threshold, when the engine is tested in a vehicle and operated so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the OBD system is unable to detect and illuminate the MIL for a malfunction of a component/system monitored by the major monitor prior to emissions exceeding:

a. For 2013 through 2015 model year OBD parent and child ratings subject to the "full OBD" requirement under Cal. Code Regs., title 13, section 1971.1.1(d)(7.2.2), three times the applicable major monitor malfunction criteria (e.g., if the malfunction criteria is 2.5 times the applicable standard, recall would be required when emissions exceed 7.5 times the applicable standard, or if the malfunction criteria is the PM standard plus 0.02 g/bhp-hr and the PM standard is 0.01 g/bhp-hr, recall would be required when emissions exceeded 0.09 g-bhp-hr).

b. For 2016 through 2018 model year engines:

1. For engine ratings previously certified to Cal. Code Regs., title 13, section 1971.1.1(d)(7.2.3) for "extrapolated OBD" in the 2013 through 2015 model years, three times the applicable major monitor malfunction criteria (e.g., if the malfunction criteria is 2.5 times the applicable standard, recall would be required when emissions exceed 7.5 times the applicable standard, or if the malfunction criteria is the PM standard plus 0.02 g/bhp-hr and the PM standard is 0.01 g/bhp-hr, recall would be required when emissions exceeded 0.09 g-bhp-hr), and

2. For all other engine ratings, three times the malfunction criteria for PM filter monitors subject to Cal. Code Regs., title 13, sections 1971.1.1(e)(8.2.1)(D) and (E) (e.g., if the malfunction criteria is the PM standard plus 0.02 g/bhp-hr and the PM standard is 0.01 g/bhp-

hr, recall would be required when emissions exceeded 0.09 g-bhp-hr) and two times the malfunction criteria for all other applicable major monitors.

c. For 2019 and subsequent model year engines, two times the applicable major monitor malfunction criteria (e.g., if the malfunction criteria is 2.5 times the applicable standards, recall would be required when emissions exceed 5.0 times the applicable standards).

(iii) For misfire monitor:

a. Gasoline misfire monitor: For 2016 and subsequent model year gasoline engines, the monitor for misfire causing catalyst damage is unable to properly detect and illuminate the MIL for misfire rates that are more than 20 percentage points greater than the misfire rates disclosed by the manufacturer in its certification application as causing catalyst damage (e.g., if the disclosed misfire rate is 12 percent, recall would be required if the misfire rate is greater than 32 percent without proper detection).

b. Diesel misfire monitor: For 2019 and subsequent model year diesel engines, the misfire monitor is unable to properly detect and illuminate the MIL for misfire rates that are more than 10 percentage points greater than the misfire malfunction criteria specified in section Cal. Code Regs., title 13, section 1971.1.1(e)(2.2.2) (e.g., misfire rate more than 15 percent if the misfire malfunction criteria is 5 percent).

(iv) For 2016 and subsequent model year gasoline engines, when the engine is tested in a vehicle and operated so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the evaporative system monitor is unable to detect and illuminate the MIL for a cumulative leak or leaks in the evaporative system equivalent to that caused by an orifice with a diameter of at least 1.5 times the diameter of the required orifice in Cal. Code Regs., title 13, section 1971.1.1(f)(7.2.2)(B).

(v) When the engine is tested in a vehicle and operated so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the OBD system cannot detect and illuminate the MIL for a malfunction of a component that effectively disables a major monitor and the major monitor, by being disabled, meets the criteria for recall identified in sections (d)(3)(A)(ii) or (iv) above (e.g. is unable to detect and illuminate the MIL for malfunctions that cause FTP emissions to exceed two times the malfunction criteria).

(vi) For 2013 and subsequent model year diesel engines, when the engine is tested in a vehicle and operated so as to reasonably encounter all monitoring conditions disclosed in the manufacturer's certification application, the PM filter monitor is unable to detect and illuminate the MIL for any of the following:

a. a missing substrate fault in accordance with title 13, CCR section 1971.1.1(e)(8.2.5); or

b. a malfunction of the PM filter that causes PM emissions to be equal to or greater than the emission level of the engine, as measured from an applicable emission test cycle (i.e., FTP or SET), with the PM filter substrate completely removed.

(vii) The engine class cannot be tested so as to obtain valid test results in accordance with the criteria identified in section (b)(6)(C)(ii) due to the nonconforming OBD system.

(B) An engine class shall not be subject to mandatory recall if the Executive Officer determines that, even though a monitor meets a criterion set forth in section (d)(3)(A)(i)-(vi) for mandatory recall:

(i) The OBD system can still detect and illuminate the MIL for all malfunctions monitored by the nonconforming monitor (e.g., monitor "A" is non-functional but monitor "B" is able to detect all malfunctions of the component(s) monitored by monitor "A").

(ii) The monitor meets the criterion solely due to a failure or deterioration mode of a monitored component or system that could not have been reasonably foreseen to occur by the manufacturer.

(iii) The failure or deterioration of the monitored component or system that cannot be properly detected causes the engine to be unoperable (e.g., engine stalls continuously or the transmission will not shift out of first gear, etc.) or causes an overt indication such that the operator is certain to respond and have the problem corrected (e.g., illumination of an over-temperature warning light or charging system light that uncorrected will result in an undriveable vehicle, etc.).

(C) A motor vehicle class that is not subject to mandatory recall pursuant to paragraph (d)(3)(B) may still be subject to remedial action pursuant to section (d)(4) below.

(4) *Other Ordered Remedial Action.*

(A) If the Executive Officer has determined based upon enforcement testing conducted pursuant to sections (b) or (c) above or information received from the manufacturer that an engine class is equipped with a nonconforming OBD system and the nonconformance does not fall within the provisions of section (d)(3), he or she may require the manufacturer to undertake remedial action up to and including recall of the affected engine class.

(B) In making his or her findings regarding remedial action, the Executive Officer shall consider the capability of the OBD system to properly function. This determination shall be based upon consideration of all relevant circumstances including, but not limited to, those set forth below.

(i) Whether the manufacturer identified and informed ARB about the nonconformance(s) or whether ARB identified the nonconformance(s) prior to being informed by the manufacturer.

(ii) The number of nonconformances.

(iii) If the identified nonconformance(s) is with a major monitor(s), the nature and extent of the nonconformance(s), including:

a. the degree to which the in-use monitor performance ratio(s) is below the required ratio(s) specified in Cal. Code Regs., title 13, section 1971.1.1(d)(3.2.2), and

b. the amount of the emission exceedance(s) over the established malfunction criteria set forth in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g) before a malfunction is detected and the MIL is illuminated.

(iv) If the identified nonconformance(s) is with a non-major monitor, the nature and extent of the nonconformance(s), including:

a. the degree to which the in-use monitor performance ratio(s) (where applicable) is below the required ratio(s) specified in Cal. Code Regs., title 13, section 1971.1.1(d)(3.2.2),

b. the degree to which the monitored component must be malfunctioning or exceed the established malfunction criteria set forth in Cal. Code Regs., title 13, sections 1971.1.1(e) through (g) before a malfunction is detected and the MIL is illuminated, and

c. the effect that the nonconformance(s) has on the operation of a major monitor(s).

(v) The impact of the nonconformance on vehicle or engine owners (e.g., cost of future repairs, driveability, etc.) and the ability of the service and repair industry to make effective repairs (e.g., difficulty in accessing fault information, diagnosing the root cause of a failure, etc.).

(vi) The degree to which the identified nonconformance(s) complicates, interferes with, disrupts, or hampers a service technician's or inspector's ability to perform a California heavy-duty vehicle or engine inspection.

(vii) The failure of the data link connector of the engine class to meet the requirements of Cal. Code Regs., title 13, section 1971.1.1(h)(2).

(viii) The failure of the crankcase ventilation system in the engine class to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1(g)(2).

(ix) The failure of the cooling system monitor in the engine class to properly verify that the cooling system reaches the highest enable temperature used for any other monitor when the engine is operated in a vehicle in the

monitoring conditions disclosed in the manufacturer's certification application, or failure to comply with any requirement in Cal. Code Regs., title 13, section 1971.1.1(g)(1).

(x) The estimated frequency that a monitor detects a malfunction and illuminates the MIL when no component malfunction is present (i.e., false MILs).

(xi) The estimated frequency that a monitor fails to detect a malfunction and illuminate the MIL when the monitoring conditions, as set forth in the manufacturer's approved certification application, have been satisfied and a faulty or deteriorated monitored component is present (i.e., false passes).

(xii) Whether the manufacturer submitted false, inaccurate, or incomplete documentation regarding the identified nonconformance at the time of certification pursuant to Cal. Code Regs., title 13, section 1971.1.1(j) and the extent to which the false, inaccurate, or incomplete documentation was material to the granting of certification.

(C) In making the determination, the average tailpipe and evaporative emissions of engines within the affected engine class shall not be considered.

(5) *Assessment of Monetary Penalties.*

The Executive Officer may seek penalties pursuant to the applicable provisions of the Health and Safety Code for violations of the requirements of Cal. Code Regs., title 13, section 1971.1.1 or for production engines otherwise failing to be equipped with OBD systems that have been certified by ARB. In determining the penalty amounts that ARB may seek, the Executive Officer shall consider all relevant circumstances including the factors set forth below:

(A) Whether the manufacturer self-reported the nonconformity or ARB discovered the nonconformity independent of the manufacturer.

(B) The nature and degree of the nonconformity and whether the manufacturer should reasonably have discovered the nonconformity and taken corrective action by voluntary OBD-related recall or running changes during the production year.

(C) The economic benefits, if any, gained by the manufacturer from not complying with the provisions of Cal. Code Regs., title 13, section 1971.1.1.

(D) The manufacturer's history of compliance with the OBD requirements.

(E) The preventative efforts taken by the manufacturer to avoid nonconformance, including any programs followed by the manufacturer to ensure compliance.

(F) The manufacturer's efforts to correct the nonconformity once it was identified.

(G) The innovative nature and magnitude of effort, including the cost of any other proposed remedial action, necessary to correct the nonconformity.

(H) The deterrent effect of the penalty.

(I) Whether the manufacturer has failed to provide complete and accurate information required to be submitted at the time of certification pursuant to Cal. Code Regs., title 13, section 1971.1.1(j).

(J) The nature and degree that OBD systems on production engines differ from the systems that have been certified by ARB.

(6) *Notice to Manufacturer for an Ordered Remedial Action.*

(A) The Executive Officer shall immediately notify the manufacturer upon the Executive Officer determining the type of remedial action to be taken.

(B) For remedial actions other than the assessment of monetary penalties, the notice must:

(i) specifically set forth the remedial action that is being ordered,

(ii) include a description of the engine family(ies), OBD group(s), or subgroup(s) thereof, that has been determined to have a nonconforming OBD system,

(iii) set forth the factual bases for the determination, and

(iv) designate a date at least 45 days from the date of receipt of such notice by which the manufacturer shall submit a plan, pursuant to section (e)(1) below, outlining the remedial action to be undertaken consistent with the Executive Officer's order. Except as provided in section (d)(7)(C) below, all plans shall be submitted to the Chief, Emissions Certification and Compliance Division, 4001 Iowa Avenue, Riverside, California 92507, within the time limit specified in the notice. The Executive Officer may grant the manufacturer an extension of time for good cause.

(C) For cases in which ARB elects to seek monetary penalties pursuant to authority granted under the Health and Safety Code, the Executive Officer shall issue a notice to the manufacturer that he or she will be filing a complaint in the appropriate administrative or civil court forum seeking penalties against the manufacturer for violations of Cal. Code Regs., title 13, section 1971.1.1. The notice must include a description of the engine family(ies), OBD group(s), or subgroup(s) thereof, that have been determined to have a nonconforming OBD system and set forth the factual bases for the determination.

(7) *Availability of Public Hearing to Contest Remedial Actions Other than Determination to Seek Monetary Penalties.*

(A) Within 45 days from the date of receipt of the notice that is required under section (d)(6) above, the manufacturer may request a public hearing pursuant to the procedures set forth in Cal. Code Regs., title 17, section 60055.1, et seq., to contest the findings of nonconformity, the necessity for, or the scope of any ordered remedial action. Pursuant to those procedures, the Executive Officer has the initial burden of presenting evidence that those parts of the

Executive Officer's determination specifically challenged are supported by the facts and applicable law. (Cal. Code Regs., title 17, §60055.32(d)(1).) Each issue of controversy shall be decided based upon the preponderance of the evidence presented at the hearing. (Cal. Code Regs., title 17, §60055.32(h).)

(B) Notwithstanding the provisions of Cal. Code Regs., title 17, section 60055.17(a)(1), administrative hearings conducted pursuant to a request filed under section (c)(7)(A) above shall be referred to the Office of Administrative Hearings, which shall otherwise follow the procedures established in Cal. Code Regs., title 17, section 60055.1 et seq.

(C) If a manufacturer requests a public hearing pursuant to section (d)(7)(A) above and if the Executive Officer's determination of nonconformity is confirmed at the hearing, the manufacturer shall submit the required remedial action plan in accordance with section (e)(1) below within 30 days after receipt of the Board's decision.

(e) *Requirements for Implementing Remedial Actions.*

(1) *Remedial Action Plans.*

(A) A manufacturer initiating a remedial action (voluntary, influenced, or ordered), other than payment of monetary penalties, shall develop a remedial action plan that contains the following information, unless otherwise specified:

(i) A description of each engine family, OBD group, or subgroup thereof covered by the remedial action, including the number of engines, the engine families, or subgroups within the identified class(es), the make(s), model(s), and model years of the covered engines, and such other information as may be required to identify the covered engines.

(ii) A description of the nonconforming OBD system and, in the case of a recall (whether voluntary, influenced, or ordered), the specific modifications, alterations, repairs, adjustments, or other changes to correct the nonconforming OBD system, including data and/or engineering evaluation supporting the specific corrections.

(iii) A description of the method that the manufacturer will use to determine the names and addresses of vehicle or engine owners and the manufacturer's method and schedule for notifying the service facilities and vehicle or engine owners of the remedial action.

(iv) A copy of all instructions that the manufacturer will use to notify service facilities about the required remedial action and the specific corrections, if any, that will be required to be made to the nonconforming OBD systems.

(v) A description of the procedure to be followed by vehicle/engine owners to obtain remedial action for the nonconforming OBD system. This must include the date on or after which the owner can have required remedial action performed, the time reasonably necessary to perform the labor to

remedy the nonconformity, and the designation of facilities at which the nonconformity can be remedied.

(vi) If some or all of the nonconforming OBD systems are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of such class of service agents and what steps, including a copy of all instructions mailed to such service agents, the manufacturer will take to assure that such agents are prepared and equipped to perform the proposed remedial action.

(vii) A copy of the letter of notification to be sent to vehicle or engine owners.

(viii) A proposed schedule for implementing the remedial action, including identified increments of progress towards full implementation.

(ix) A description of the method that the manufacturer will use to assure that an adequate supply of parts will be available to initiate the remedial action campaign on the date set by the manufacturer and that an adequate supply of parts will continue to be available throughout the campaign.

(x) A description and test data of the emission impact, if any, that the proposed remedial action may cause to a representative engine from the engine class to be remedied.

(xi) A description of the impact, if any, and supporting data and/or engineering evaluation that the proposed remedial action will have on fuel economy, driveability, performance, and safety of the engine class covered by the remedial action.

(xii) Any other information, reports, or data which the Executive Officer may reasonably determine to be necessary to evaluate the remedial action plan.

(B) Approval and Implementation of Remedial Action Plans.

(i) If the Executive Officer finds that the remedial action plan is designed effectively to address the required remedial action and complies with the provisions in section (e)(1)(A) above, he or she shall notify the manufacturer in writing within 30 days of receipt of the plan that the plan has been approved.

(ii) The Executive Officer shall approve a voluntary, influenced, or ordered remedial action plan if the plan contains the information specified in section (e)(1)(A) above and is designed to notify the vehicle or engine owner and implement the remedial action in an expeditious manner.

(iii) In disapproving an ordered remedial action plan, the Executive Officer shall notify the manufacturer in writing of the disapproval and the reasons for the determination. The manufacturer shall resubmit a revised remedial action plan that fully addresses the reasons for the Executive Officer's disapproval within 10 days of receipt of the disapproval notice.

(iv) Upon receipt of the approval notice of the ordered remedial action plan from the Executive Officer, the manufacturer shall, within 45 days of receipt of the notice, begin to notify vehicle or engine owners and implement the remedial action campaign.

(v) If the Executive Officer disapproves a voluntary or influenced remedial action plan, the manufacturer shall either accept the proposed modifications to the plan as suggested by the Executive Officer, resubmit a revised remedial action plan that fully addresses the reasons for the Executive Officer's disapproval within 30 days or be subject to an Executive Officer order that the manufacturer undertake appropriate remedial action pursuant to section (d)(2)(B) above.

(vi) Upon receipt of the voluntary or influenced remedial action approval notice from the Executive Officer, the manufacturer shall begin to notify vehicle or engine owners and implement the remedial action campaign according to the schedule indicated in the remedial action plan.

(2) *Eligibility for Remedial Action.*

(A) The manufacturer may not condition a vehicle or engine owner's eligibility for remedial action required under section 1971.5.1 on the proper maintenance or use of the engine.

(B) The manufacturer shall not be obligated to repair a component which has been modified or altered such that the remedial action cannot be performed without additional cost.

(3) *Notice to Owners.*

(A) The manufacturer shall notify owners of vehicles or engines in the engine class covered by the remedial order. The notice must be made by first-class mail or by such other means as approved by the Executive Officer. When necessary, the Executive Officer may require the use of certified mail for ordered remedial actions to assure effective notification.

(B) The manufacturer shall use all reasonable means necessary to locate vehicle or engine owners, including motor vehicle registration lists available from the California Department of Motor Vehicles and commercial sources such as R.L. Polk & Co.

(C) The notice must contain the following:

(i) For ordered remedial actions, a statement: "The California Air Resources Board has determined that your (vehicle or engine) (is or may be) equipped with an improperly functioning on-board emission-related diagnostic system that violates established standards and regulations that were adopted to protect your health and welfare from the dangers of air pollution."

(ii) For voluntary and influenced remedial actions, a statement: "Your (vehicle or engine) (is or may be) equipped with an improperly functioning on-board

emission-related diagnostic system that violates (California or California and Federal) standards and regulations" if applicable as determined by the Executive Officer.

(iii) A statement that the nonconformity of any such engines will be remedied at the expense of the manufacturer.

(iv) A statement that eligibility for remedial action may not be denied solely on the basis that the vehicle or engine owner used parts not manufactured by the original equipment engine manufacturer, or had repairs performed by outlets other than the engine manufacturer's franchised dealers.

(v) Instructions to the vehicle or engine owners on how to obtain remedial action, including instructions on whom to contact (i.e., a description of the facilities where the vehicles or engines should be taken for the remedial action), the first date that a vehicle or engine may be brought in for remedial action, and the time that it will reasonably take to correct the nonconformity.

(vi) The statement: "In order to assure your full protection under the emission warranty provisions, it is recommended that you have your (vehicle or engine) serviced as soon as possible. Failure to do so could be determined as lack of proper maintenance of your (vehicle or engine)."

(vii) A telephone number for vehicle or engine owners to call to report difficulty in obtaining remedial action.

(viii) A card to be used by a vehicle or engine owner in the event the vehicle or engine to be recalled has been sold. Such card should be addressed to the manufacturer, have postage paid, and shall provide a space in which the owner may indicate the name and address of the person to whom the vehicle or engine was sold or transferred.

(ix) If the remedial action involves recall, the notice must also provide:

a. A clear description of the components that will be affected by the remedial action and a general statement of the measures to be taken to correct the nonconformity.

b. A statement that such nonconformity, if not corrected, may cause the vehicle or engine to fail an emission inspection.

c. A statement describing the adverse effects, if any, of an uncorrected nonconforming OBD system on the performance, fuel economy, or durability of the engine.

d. A statement that after remedial action has been taken, the manufacturer will have the service facility issue a certificate showing that the engine has been corrected under the recall program, and that such a certificate will be required to be provided to the Department of Motor Vehicles as a condition for vehicle registration.

(D) A notice sent pursuant to this section or any other communication sent to vehicle or engine owners or dealers may not contain any statement, expressed or implied, that the OBD system is compliant or that the OBD system will not degrade air quality.

(E) The Executive Officer shall inform the manufacturer of any other requirements pertaining to the notification under section (e)(3) which the Executive Officer has determined as reasonable and necessary to assure the effectiveness of the recall campaign.

(4) *Label Indicating that Recall Repairs Have Been Performed.*

(A) If the required remedial action involves recall of engine family(ies), OBD group(s), or subgroup(s) thereof, the manufacturer shall require those who perform inspections and/or recall repairs to affix a label to each vehicle that has been inspected and/or repaired.

(B) The label must be placed in a location approved by the Executive Officer and must be fabricated of a material suitable for such location in which it is installed and which is not readily removable.

(C) The label must contain the remedial action campaign number and a code designating the facility at which the remedial action or inspection to determine the need for remedial action was performed.

(5) *Proof of Performance of Remedial Action Certificate.*

If the required remedial action involves a recall, the manufacturer shall provide, through its service agents, to owners of vehicles or engines that have had the remedial action performed a certificate that confirms that the engine has been recalled and that required inspection and/or repairs have been performed. The Executive Officer shall prescribe a format for the certificate, which shall be consistent with the format required in Cal. Code Regs., title 13, section 2117 and section 2129.

(6) *Record Keeping and Reporting Requirements.*

(A) The manufacturer shall maintain sufficient records to enable the Executive Officer to conduct an analysis of the adequacy of the remedial action.

(B) Unless otherwise specified by the Executive Officer, the manufacturer shall report on the progress of the remedial action campaign by submitting reports for eight consecutive quarters commencing with the quarter immediately after the recall campaign begins. The reports shall be submitted no later than 25 days after the close of each calendar quarter to: Chief, Emissions Certification and Compliance Division, 4001 Iowa Avenue, Riverside, California 92507. For each recall campaign, the quarterly report must contain the following:

(i) The engine family and the remedial action campaign number designated by the manufacturer and a brief description of the nature of the campaign.

(ii) The date owner notifications began and date completed.

(iii) The number of engines involved in the remedial action campaign.

(iv) The number of engines known or estimated to be equipped with the nonconforming OBD system and an explanation of the means by which this number was determined.

(v) The number of engines inspected during the campaign since its inception.

(vi) The number of engines found to be affected by the nonconformity during the campaign since its inception.

(vii) The number of engines receiving remedial action during the campaign since its inception.

(viii) The number of engines determined to be unavailable for inspection or remedial action, during the campaign since its inception, due to exportation, theft, scrapping, or other reasons (specify).

(ix) The number of engines, during the campaign since its inception, determined to be ineligible for remedial action under section (e)(2)(B).

(x) An initial list, using the following data elements and designated positions, indicating all vehicles or engines subject to recall that the manufacturer has not been invoiced for, or a subsequent list indicating all engines subject to the recall that the manufacturer has been invoiced for since the previous report. The list must be supplied in a standardized computer format to be specified by the Executive Officer. The data elements must be written in "ASCII" code without a comma separating each element. For example: XTY32A71234E-9456123408-25-91A. The add flag (see below) should reflect the vehicles or engines for which the manufacturer has not been invoiced and the delete flag should reflect changes since the previous report. The Executive Officer may change the frequency or format of this submittal depending on the needs of enforcement. The Executive Officer may not, however, require a frequency or format for this submittal that is different in any way from the frequency or format determined by the Executive Officer as required for reporting of data in Cal. Code Regs., title 13, section 2119(a)(10) and section 2133(a)(10).

Data Elements	Positions
• File Code (designated by DMV)	1
• License Plate Number	2-8
• Last three VIN positions	9-11
• Recall ID Number	12-17
• Mfg. ID Number (Mfg. Occupational License Number)	18-22
• Recall Start Date (mmddyyyy)	23-30
• Add or Delete Flag (A/D)	31
• Complete VIN if personalized license plate (File Code "L" or "S")	32-48

(xi) A copy of any service bulletins issued during the reporting period by the manufacturer to franchised dealerships or other service agents that relate to the nonconforming OBD system and the remedial action and have not previously been reported to the Executive Officer.

(xii) A copy of all communications transmitted to vehicle or engine owners that relate to the nonconforming OBD systems and the required remedial action and have not been previously reported to the Executive Officer.

(C) If the manufacturer determines that any of the information submitted to the Executive Officer pursuant to section (e) has changed or is incorrect, the manufacturer shall submit the revised information, with an explanation.

(D) The manufacturer shall maintain in a form suitable for inspection, such as computer information, storage devices, or card files, and shall make available to the Executive Officer or his or her authorized representative upon request, the names and addresses of vehicle or engine owners:

(i) To whom notification was sent;

(ii) Whose engines were repaired or inspected under the recall campaign;

(iii) Whose engines were determined not to be eligible for remedial action because the engines were modified, altered, or unavailable due to exportation, theft, scrapping, or other reason specified in the answer to sections (e)(6)(B)(viii) and (ix).

(E) The information gathered by the manufacturer to compile the reports required by these procedures must be retained for no less than one year beyond when engines within the engine class, on average, exceed the defined full useful life of the engines and must be made available to authorized personnel of ARB upon request.

(F) The filing of any report under the provisions of these procedures must not affect the manufacturer's responsibility to file reports or applications, obtain approval, or give notice under any other provisions of law.

(7) *Extension of Time.*

Upon request of the manufacturer, the Executive Officer may extend any deadline set forth in section 1971.5.1(e) upon finding that the manufacturer has demonstrated good cause for the requested extension.

(f) *Penalties for Failing to Comply with the Requirements of Section (e).*

(1) In addition to the penalties that may be assessed by the Executive Officer pursuant to section (d) because of a manufacturer's failure to comply with the requirements of Cal. Code Regs., title 13, section 1971.1.1, a manufacturer may be subject to penalties pursuant to section 43016, Health and Safety Code for failing to comply with the requirements of section (e).

(2) If a manufacturer fails to comply with a voluntary or influenced remedial action plan, the Executive Officer may order remedial action pursuant to section (d) above.

NOTE: Authority cited: Sections 39010, 39600, 39601, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, 43106, 43154, 43211, and 43212, Health and Safety Code. Reference: Sections 39002, 39003, 39010, 39018, 39021.5, 39024, 39024.5, 39027, 39027.3, 39028, 39029, 39031, 39032, 39032.5, 39033, 39035, 39037.05, 39037.5, 39038, 39039, 39040, 39042, 39042.5, 39046, 39047, 39053, 39054, 39058, 39059, 39060, 39515, 39600, 39601, 43000, 43000.5, 43004, 43006, 43013, 43016, 43018, 43100, 43101, 43102, 43104, 43105, 43105.5, 43106, 43150, 43151, 43152, 43153, 43154, 43155, 43156, 43204, 43211, and 43212, Health and Safety Code.

§ 2035.0.1. Purpose, Applicability, and Definitions (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Purpose.

The purpose of this article is to interpret and make specific the statutory emissions warranty set forth in Health and Safety Code sections 43205, and 43205.5 by clarifying the rights and responsibilities of individual motor vehicle and motor vehicle engine owners, motor vehicle and motor vehicle engine manufacturers, and the service industry.

(b) Applicability.

This article shall apply to:

(1) California-certified 1979 and subsequent model motorcycles, passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty vehicles, registered in California, regardless of their original point of registration; and

(2) California certified motor vehicle engines used in such vehicles.

(c) Definitions. For the purposes of this article, the following definitions shall apply:

(1) "Warrantable condition" means any condition of a vehicle or engine which triggers the responsibility of the manufacturer to take corrective action pursuant to sections 2036, 2037, or 2038.

(2) "Warranted Part" means:

(A) in the case of 1979 through 1989 model year passenger cars, light duty trucks, and medium-duty vehicles, 1979 and later model year motorcycles and heavy-duty vehicles, and 1990 and subsequent model year passenger cars, light-duty trucks, and medium duty vehicles produced before January 24, 1991, any emission-related part installed on a motor vehicle or motor vehicle engine by the vehicle or engine manufacturer, or installed in a warranty repair, which is included on the "Emissions Warranty Parts List" required by section 2036(f) and approved for the vehicle or engine by the Executive Officer; and

(B) in the case of 1990 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles other than those identified in subparagraph (A) of this definition, any part installed on a motor vehicle or motor vehicle engine by the vehicle or engine manufacturer, or installed in

a warranty repair, which affects any regulated emission from a motor vehicle or engine which is subject to California emission standards.

(3) "Warranty period" means the period of time and mileage that the vehicle, engine, or part are covered by the warranty provisions.

(4) "Warranty station" means a service facility authorized by the vehicle or engine manufacturer to perform warranty repairs. This shall include all of the manufacturer's dealerships which are franchised to service the subject vehicles or engines.

(5) "Vehicle or engine manufacturer" means the manufacturer granted certification for a motor vehicle or motor vehicle engine. In the case of motor vehicles for which certification of the exhaust and evaporative emissions control systems is granted to different manufacturers, the warranty responsibility shall be assigned accordingly.

NOTE: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 43106, 43204, 43205, and 43205.5, Health and Safety Code.

§ 2036.0.1 Defects Warranty Requirements for 1979 Through 1989 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles; 1979 and Subsequent Model Motorcycles and Heavy-Duty Vehicles; and Motor Vehicle Engines Used in Such Vehicles. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Applicability.

This section shall apply to 1979 through 1989 model passenger cars, light-duty trucks, and medium-duty vehicles; 1979 and subsequent model motorcycles and heavy-duty vehicles; and motor vehicle engines used in such vehicles. The warranty period shall begin on the date the vehicle is delivered to an ultimate purchaser, or if the vehicle is first placed in service as a "demonstrator" or "company" car prior to delivery, on the date it is first placed in service.

(b) General Emissions Warranty Coverage.

The manufacturer of each motor vehicle or motor vehicle engine shall warrant to the ultimate purchaser and each subsequent purchaser that the vehicle or engine is:

(1) Designed, built, and equipped so as to conform, at the time of sale, with all applicable regulations adopted by the Air Resources Board pursuant to its authority in chapters 1 and 2, part 5, division 26 of the Health and Safety Code; and

(2) Free from defects in materials and workmanship which cause the failure of a warranted part to be identical in all material respects to that part as described in the vehicle or engine manufacturer's application for certification.

(c) Warranty Period.

The warranty period applicable to this section shall be:

(1) In the case of Class I motorcycles and motorcycle engines (50 to 169 cc or 3.1 to 10.4 cu. in.), a period of use of five years or 12,000 kilometers (7,456 miles), whichever first occurs.

(2) In the case of Class II motorcycles and motorcycle engines (170 to 279 cc or 10.4 to 17.1 cu. in.), a period of use of five years or 18,000 kilometers (11,185 miles), whichever first occurs.

(3) In the case of Class III motorcycles and motorcycle engines (280 cc and larger or 17.1 cu. in. and larger), a period of use of five years or 30,000 kilometers (18,641 miles), whichever first occurs.

(4) In the case of diesel-powered heavy-duty vehicles (except medium-duty vehicles), and motor vehicle engines used in such vehicles, a period of use of five years, 100,000 miles, or 3000 hours of operations, whichever first occurs. However, in no case may this period be less than the basic mechanical warranty that the manufacturer provides (with or without additional charge) to the purchaser of the engine. Extended warranties on select parts do not extend the emissions warranty requirements for the entire engine but only for those parts. In cases where responsibility for an extended warranty is shared between the owner and the manufacturer, the emissions warranty shall also be shared in the same manner as specified in the warranty agreement.

(5) In the case of passenger cars, light-duty trucks, and medium-duty vehicles certified under the optional 100,000-mile certification procedure, and motor vehicle engines used in such vehicles, a period of use of ten years or 100,000 miles, whichever first occurs, except as otherwise provided in this paragraph. In the case of diesel particulate control system components on the 1985 and subsequent model passenger cars, light duty trucks, and medium-duty vehicles certified under the optional 100,000-mile certification procedure, the warranty period means five years or 50,000 miles, whichever first occurs, for failures of such components which do not result in the failure of any other warranted part to perform as designed during the warranty period of the vehicle, and ten years or 100,000 miles, whichever first occurs, for all other failures.

(6) In the case of vehicles certified to the optional emission standards pursuant to Health and Safety Code section 43101.5(a), which are sold on or after January 1, 1983, for fuel metering and ignition components contained in the state board's "Emissions Warranty Parts List", dated December 14, 1978, as amended February 22, 1985, a period of use of two years or 24,000 miles, whichever first occurs, and for all other warranted parts, a period of use of five years or 50,000 miles, whichever first occurs.

(7) In the case of all other passenger cars, light-duty trucks, and medium-duty vehicles, a period of use of five years or 50,000 miles, which ever first occurs.

(8) In the case of heavy-duty vehicles and motor vehicle engines used in such vehicles, (except for diesel-powered heavy-duty vehicles or all medium-duty vehicles, and motor vehicle engines used in such vehicles,) a period of use of five years or 50,000 miles, whichever first occurs. However, in no case may this period be less than the basic mechanical warranty period that the manufacturer provides (with or without additional charge) to the purchaser of the engine. Extended warranties on select parts do not extend the emissions warranty requirements for the entire engine but only for those parts. In cases where responsibility for an

extended warranty is shared between the owner and the manufacturer, the emissions warranty shall also be shared in the same manner as specified in the warranty agreement.

(d) Subject to the conditions and exclusions of subsection (j), the warranty on emissions-related parts shall function as follows:

(1) Any warranted part which is not scheduled for replacement as required maintenance in the written instructions required by subsection (e) shall be warranted for the warranty period defined in subsection (c). If any such part fails during the warranty period, it shall be repaired or replaced by the vehicle or engine manufacturer according to subsection (4) below. Any such part repaired or replaced under warranty shall be warranted for the remaining warranty period.

(2) Any warranted part which is scheduled only for regular inspection in the written instructions required by subsection (e) shall be warranted for the warranty period defined in subsection (c). A statement in such written instructions to the effect of "repair or replace as necessary" shall not reduce the period of warranty coverage. Any such part repaired or replaced under warranty shall be warranted for the remaining warranty period.

(3) Any warranted part which is scheduled for replacement as required maintenance in the written instructions required by subsection (e) shall be warranted for the period of time or mileage, whichever first occurs, prior to the first scheduled replacement point for that part. If the part fails before the first scheduled replacement point, the part shall be repaired or replaced by the vehicle or engine manufacturer according to subsection (4) below. Any such part repaired or replaced under warranty shall be warranted for the remainder of the period prior to the first scheduled replacement point for the part.

(4) Repair or replacement of any warranted part under the warranty provisions of this article shall be performed at no charge to the vehicle or engine owner, at a warranty station, except in the case of an emergency when a warranted part or a warranty station is not reasonably available to the vehicle or engine owner. In an emergency, repairs may be performed at any available service establishment, or by the owner, using any replacement part. The manufacturer shall reimburse the owner for his or her expenses including diagnostic charges for such emergency repair or replacement, not to exceed the manufacturer's suggested retail price for all warranted parts replaced and labor charges based on the manufacturer's recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate. Heavy-duty vehicle and engine manufacturers shall establish reasonable emergency repair procedures which may differ from those specified in this subsection. A vehicle or engine owner may reasonably be required to keep receipts and failed parts in order to receive compensation for warranted repairs reimbursable due to an emergency, provided the manufacturer's written instructions advise the owner of his obligation.

(5) Notwithstanding the provisions of subsection (4), warranty services or repairs shall be provided at all of a manufacturer's dealership which are franchised to service the subject vehicles or engines.

(6) The vehicle or engine owner shall not be charged for diagnostic labor which leads to the determination that a warranted part is in fact defective, provided that such diagnostic work is performed at a warranty station.

(7) The vehicle or engine manufacturer shall be liable for damages to other vehicle components proximately caused by a failure under warranty any warranted part.

(8) Throughout the vehicle or engine's warranty period defined in subsection (b), the vehicle or engine manufacturer shall maintain a supply of warranted parts sufficient to meet the expected demand for such parts. The lack of availability of such parts or the incompleteness of repairs within a reasonable time period, not to exceed 30 days from the time the vehicle or engine is initially presented to the warranty station for repair, shall constitute an emergency for purposes of subsection (4).

(9) Any replacement part may be used in the performance of any maintenance or repairs. Any replacement part designated by a manufacturer may be used in warranty repairs provided without charge to the vehicle owner. Such use shall not reduce the warranty obligations of the vehicle or engine manufacturer, except that the vehicle or engine manufacturer shall not be liable under this article for repair or replacement of any replacement part which is not a warranted part (except as provided under subsection (7)).

(10) Any add-on or modified part exempted by the Air Resources Board from the prohibitions of Vehicle Code section 27156 may be used on a vehicle or engine. Such use, in and of itself, shall not be grounds for disallowing a warranty claim made in accordance with this article. The vehicle or engine manufacturer shall not be liable under this article to warrant failures of warranted parts caused by the use of an add-on or modified part.

(11) The Executive Officer may request and, in such case, the vehicle or engine manufacturer shall provide, any documents which describe that manufacturer's warranty procedures or policies.

(e) Commencing with 1980 models sold on or after September 1, 1979, each manufacturer shall furnish with each new vehicle or engine written instructions for the maintenance and use of the vehicle or engine by the owner, which instructions shall be consistent with this article and applicable regulations in article 2 of this subchapter.

(f) Commencing with 1980 models sold on or after September 1, 1979, each manufacturer shall furnish with each new vehicle or engine a list of the warranted parts installed on that vehicle or engine. The list shall include those parts included on the Air Resources Board "Emissions Warranty Parts List," dated December 14, 1978, as amended on February 22, 1985, and incorporated herein by reference.

(g) Except for 1980 and 1981 model motorcycles, each manufacturer shall submit the documents required by sections (e) and (f), with the manufacturer's preliminary application for new vehicle or engine certification for approval by the Executive Officer. The Executive Officer may reject or require modification of the manufacturer's list of warranted parts to ensure that each such list is of proper scope and also may reject or require modification of any of the documents required by subsection (e). Approval by the Executive Officer of the documents required by subsections (e) and (f), shall be a condition of certification. The Executive Officer shall approve or disapprove the documents required by subsections (e) and (f), within 90 days of the date such documents are received from the manufacturer. Any disapproval shall be accompanied by a statement of the reasons therefore. In the event of disapproval, the manufacturer may petition the Board to review the decision of the Executive Officer.

(h) Notwithstanding subsection (f), the Executive Officer may delete any part from a manufacturer's list of warranted parts provided in the manufacturer demonstrates to the Executive Officer's satisfaction that:

(1) Failure of such part will not increase the emissions of any vehicle or engine on which it is installed, and

(2) Any deterioration of driveability or performance which results from failure of the part could not be corrected by adjustments or modifications to other vehicle components.

(i) Vehicle Inspection Program.

This subsection shall apply to passenger cars, light-duty trucks, medium-duty and heavy-duty vehicles and motorcycles required to be inspected pursuant to any California statutorily authorized motor vehicle emissions inspection and maintenance program. The provisions of this section shall be contained in the warranty statement required pursuant to section 2039.

(1) The owner of a vehicle which fails the inspection during its warranty period may choose to have the vehicle repaired at a warranty station.

(A) If the warranty station identifies that the inspection failure was caused by the failure or malfunction of a warranted part, than the vehicle manufacturer shall be liable for expenses involved in detecting and correcting the part failure or malfunction, unless the warranty station demonstrates that the part failure or malfunction was caused by abuse,

neglect, or improper maintenance as specified in subsection (j)(1), or was caused by an adjustment not covered by warranty as specified in subsection (j)(2).

(B) If the warranty station demonstrates that the inspection failure was caused by one or more conditions executed from warranty coverage pursuant to subsection (j), the vehicle owner shall be liable for all diagnostic and repair expenses. Such expenses shall not exceed the maximum repair costs permissible under the inspection program.

(C) If the warranty station identifies that the inspection failure was caused by one or more defects covered under warranty pursuant to these regulations and in combination with one or more conditions excluded from warranty coverage pursuant to subsection (j), than the vehicle owner shall not be charged for the diagnostic and repair costs related to detecting and repairing the warrantable defects.

(2) In the alternative, the owner of a vehicle which fails an inspection may choose to have the vehicle repaired at other than a warranty station. If a warrantable defect is found, the vehicle owner may deliver the vehicle to a warranty station and have the defect corrected free of charge. The vehicle manufacturer shall not be liable for any expenses incurred at a service establishment not authorized to perform warranty repairs, except in the case of an emergency as specified in subsection (d)(4). If the vehicle owner chooses to have the warrantable defect repaired at other than a warranty station, the upper cost limit pursuant to Health and Safety Code section 44017 shall not apply to the repair.

(j) Exclusions.

(1) The repair or replacement of any warranted part otherwise eligible for warranty coverage under subsection (d) or (i), shall be excluded for such warranty coverage if the vehicle or engine manufacturer demonstrates that the vehicle or engine has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for the repair or replacement of the part.

(2) The following adjustments to warranted parts are excluded from warranty coverage under subsection (d) or (i); the idle air/fuel mixture ratio (for 1979 model passenger cars, and 1979 and 1980 model light-duty trucks and medium-duty vehicles), curb or high idle speed, ignition timing, valve lash, injection timing for diesel-powered vehicles, or any combination thereof.

(3) Except as provided in subsection (1) above, any adjustment of a component which as a factory installed, and properly operating, adjustment limiting device (such as an idle limiter cap) is eligible for warranty coverage under subsection (d) or (i).

NOTE: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 43106, 43204, 43205.5, 44004, 44010, 44011, 44012, 44015, and 44017, Health and Safety Code.

§ 2040.0.1. Vehicle Owner Obligations. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The owner of any vehicle or engine warranted pursuant to this article shall be responsible for the performance of all required scheduled maintenance specified in the written instructions furnished to the owner pursuant to subsections 2036 (e), 2037(e), and 2038(c)(1). Such maintenance may be performed by the owner, at a service establishment of the owner's choosing, or by a person or persons of the owner's choosing.

(b) Except as specified in subsections 2036(j)(l), 2037(i), and 2038(c), failure of the vehicle or engine owner to ensure the performance of such scheduled maintenance or to keep maintenance records shall not, per se, be grounds for disallowing a warranty claim.

NOTE: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 43106. 43204, 43205, and 43205.5, Health and Safety Code.

§ 2111.0.1. Applicability. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) These procedures shall apply to:

(1) California-certified 1982 through the 2009 model-year passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles, motorcycles, and California-certified 1997 and subsequent model-year off-road motorcycles and all-terrain vehicles, and 2007 and subsequent model-year off-road sport vehicles, off-road utility vehicles, and sand cars, including those federally certified vehicles which are sold in California pursuant to Health and Safety Code section 43102,

(2) California-certified motor vehicle engines used in such vehicles,

(3) California-certified 2000 and subsequent model-year off-road compression-ignition engines, and

(4) California-certified 2009 and subsequent model-year spark-ignition inboard and sterndrive marine engines complying with the Option 1 requirements in Section 2442(b)(l) and California-certified 2008 and subsequent model-year spark-ignition inboard and sterndrive marine engines complying with the Option 2 requirements in Section 2442(b)(1).

(b) These procedures shall not apply to zero emission vehicles and those vehicles certified under Health and Safety Code section 44201.

(c) The Executive Officer may waive any or all of the requirements of these procedures if he or she determines that the requirement constitutes an unwarranted burden on the manufacturer without a corresponding emission reduction.

NOTE: Authority cited: Sections 39600, 39601,43013,43018,43105 and 43106, Health and Safety Code. Reference: Sections 43000, 43009.5, 43013, 43018, 43101,43104,43105,43106,43107 and 43204-43205.5, Health and Safety Code.

§ 2113.0.1. Initiation and Approval of Voluntary and Influenced Emission-Related Recalls. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) When any manufacturer initiates a voluntary emission recall campaign, the manufacturer shall notify the Executive Officer of the recall at least 30 days before owner notification is to begin. The manufacturer shall also submit a voluntary recall plan for approval, as prescribed under Section 2114 of these procedures. A voluntary recall plan shall be deemed approved unless disapproved by the Executive Officer within 20 days after receipt of the recall plan.

(b) When any manufacturer, based on enforcement test results or any other information provided or required by the ARB, proposes to initiate an influenced emission recall campaign, the manufacturer shall submit for approval by the Executive Officer an influenced emission recall plan as prescribed by Section 2114 of these procedures. The plan shall be submitted within 45 days following the receipt of a notification from the ARB that enforcement test results or other information demonstrate a vehicle or an engine noncompliance.

(c) The Executive Officer shall approve the recall plan if the plan contains the information specified in Section 2114 and is designed to notify the vehicle owner and correct the nonconformity in an expeditious manner. Notification of vehicle or engine owners and the implementation of recall repairs shall commence no later than the schedule specified under Section 2114(a)(3) and (4), unless the manufacturer can show good cause for the Executive Officer to extend the deadline.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2114.0.1. Voluntary and Influenced Recall Plans. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The recall plan for both voluntary and influenced recalls shall contain the following information unless otherwise specified:

(1) A description of each class or category of vehicle or engine subject to recall including the number of vehicles or engines to be recalled, the engine family, test group or a subgroup thereof, the model year, the make, the model, and such other information as may be required to identify the vehicles or engines to be recalled.

(2) A description of the nonconformity and the specific modifications, alterations, repairs, adjustments, or other changes to be made to correct the vehicles or engines.

(3) A description of the method by which the manufacturer will determine the names and addresses of vehicle or engine owners and the manufacturer's method and schedule for notifying the service facilities and vehicle or engine owners of the recall.

(4) A description of the procedure to be followed by vehicle or engine owners to obtain correction of the nonconformity. This shall include the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor to remedy the nonconformity, and the designation of facilities at which the nonconformity can be remedied.

(5) If some or all of the nonconforming vehicles or engines are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of such class of persons.

(6) A copy of the letter of notification to be sent to vehicle or engine owners.

(7) A description of the system by which the manufacturer will assure that an adequate supply of parts will be available to perform the repair under the recall plan, including the date by which an adequate supply of parts will be available to initiate the repair campaign, and the method to be used to assure the supply remains both adequate and responsive to owner demand.

(8) A copy of all necessary instructions to be sent to those persons who are to perform the repair.

(9) A description of the impact of the proposed repairs or adjustments on fuel economy, driveability, performance and safety of each class or category of vehicles or engines to be recalled and a brief summary of the data, technical studies, or engineering evaluations which support these descriptions.

(10) Under an influenced recall, an estimate of the capture rate from the proposed recall derived from actual data and/or manufacturer experience. A 60 percent capture rate shall be assigned for recalls based exclusively on noncompliance as defined in Section 2112(h)(1), above.

(11) Under an influenced recall based on noncompliance as defined in Section 2112(h)(2), above, a description of the impact of the proposed changes on the average emissions from the vehicles or engines to be recalled. The description shall contain the following:

(A) Average noncompliance emission levels.

(B) Average emission reduction per pollutant resulting from the recall repair. These averages shall be verified by the manufacturer by applying the proposed recall repairs to two or more in-use vehicles or engines representing the average noncompliance emission levels. Only those vehicles or engines with baseline-emission levels within 25 percent of the average emission levels of noncomplying pollutant(s) established under the in-use enforcement test program may be used by manufacturers to verify proposed recall repairs. The Executive Officer may allow the use of vehicles or engines exceeding these limits if none which meet the limits can be reasonably procured. In the case of heavy-duty engines, the average emission levels may be verified using laboratory engines, subject to approval by the Executive Officer.

(C) An estimate of the average emission level per pollutant for the class or category of vehicles or engines after repair as corrected by the estimated capture rate. The estimated average emission level shall comply with the applicable emission standard. The Executive Officer may waive the requirement for average emission compliance with the standards provided the emission level per vehicle repaired is reduced to its new-vehicle certification emission level at a minimum capture rate of 60 percent.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2115.0.1. Eligibility for Repair. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The manufacturer shall not condition eligibility for repair on the proper maintenance or use of the vehicle except for strong and compelling reasons and with the approval of the Executive Officer; however, the manufacturer shall not be obligated to repair a component which has been removed or altered so that the remedial action cannot be performed without additional cost.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2116.0.1. Repair Label. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The manufacturer shall require those who perform the repair to affix a label to each vehicle or engine repaired, or, when required, inspected, under the voluntary or influenced recall plan.

(b) The label shall be placed in a location approved by the Executive Officer and shall be fabricated of a material suitable for such location in which it is installed and which is not readily removable.

(c) The label shall contain the recall campaign number and a code designating the campaign facility at which the repair, or inspection for repair, was performed.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2117.0.1. Proof of Correction Certificate. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The manufacturer shall require those who perform the repair to provide the owner for each vehicle or engine repaired with a certificate, in a format prescribed by the Executive Officer, which indicates that the noncomplying vehicle or engine has been corrected under the recall program. This requirement shall become effective and applicable upon the effective date of a recall enforcement program adopted by the Department of Motor Vehicles or another state agency which requires presentation of proof of correction of a recalled vehicle prior to issuance of a smog certificate, registration renewal, or other entitlement to use.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2118.0.1. Notification. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The notification of vehicle or engine owners shall contain the following:

(a) The statement: "Your (vehicle or engine) (is or may be) releasing air pollutants which exceed (California or California and federal) standards," if applicable as determined by the Executive Officer.

(b) A statement that the nonconformity of any such vehicles or engines will be remedied at the expense of the manufacturer.

(c) A statement that such nonconformity if not repaired may cause the vehicle or engine to fail a vehicle inspection or Smog Check test when such tests are required under state law.

(d) A statement describing the adverse effect, if any, of the uncorrected nonconformity on the performance, fuel economy, or durability of the vehicle or engine.

(e) After the effective date of the recall enforcement program referred to in Section 2117, a statement that a certificate showing that the vehicle has been repaired under the recall program shall be issued by the service facilities, and that such a certificate will be required as a condition of vehicle registration or operation, as appropriate.

(f) A card to be used by a vehicle or engine owner in the event the vehicle or engine to be recalled has been sold. Such card should be addressed to the manufacturer, have postage paid, and shall provide a space in which the owner may indicate the name and address of the person to whom the vehicle or engine was sold or transferred.

(g) The statement: "In order to ensure your full protection under the emission warranty provisions, it is recommended that you have your (vehicle or engine) serviced as soon as possible. Failure to do so could be determined as lack of proper maintenance of your (vehicle or engine)." This statement is not required for off-road motorcycles or all-terrain vehicles.

(h) A telephone number provided by the manufacturer, which may be used to report difficulty in obtaining recall repairs.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2119.0.1. Recordkeeping and Reporting Requirements. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Unless otherwise specified by the Executive Officer, the manufacturer shall report on the progress of the recall campaign by submitting subsequent reports for six consecutive quarters commencing with the quarter after the recall campaign begins. Such reports shall be submitted no later than 25 days after the close of each calendar quarter to: Chief, Emissions Certification and Compliance Division, 4001 Iowa Ave, Riverside, CA 92507. For each class or category of vehicle or engine subject to the emission recall campaign, the quarterly report shall contain the following:

(1) Engine family or test group and emission recall campaign number designated by the manufacturer.

(2) Date owner notification was begun, and date completed.

(3) Number of vehicles or engines involved in the voluntary or influenced emission recall campaign.

(4) Number of vehicles or engines known or estimated to be affected by the nonconformity and an explanation of the means by which this number was determined.

(5) Number of vehicles or engines inspected pursuant to the voluntary or influenced emission recall plan.

(6) Number of inspected vehicles or engines found to be affected by the nonconformity.

(7) Number of vehicles or engines receiving repair under the recall plan.

(8) Number of vehicles or engines determined to be unavailable for inspection or repair under the recall plan due to exportation, theft, scrapping, or for other reasons (specify).

(9) Number of vehicles or engines determined to be ineligible for recall action due to removed or altered components.

(10) A listing of the identification numbers of vehicles or engines subject to recall but for whose repair the manufacturer has not been invoiced. This listing shall be supplied in a standardized computer data storage device to be specified by the

Executive Officer. The frequency of this submittal may be changed by the Executive Officer depending on the needs of recall enforcement.

(11) A copy of any service bulletins transmitted to dealers or other authorized repair facilities which relate to the nonconformity to be corrected and which have not previously been reported.

(12) A copy of all communications transmitted to vehicle or engine owners which relate to the nonconformity and which have not previously been submitted.

(b) If the manufacturer determines that any of the information submitted to the Executive Officer pursuant to (a) above has changed or was incorrect, revised information and an explanatory note shall be submitted. Responses to subsections (a)(5), (6), (7), (8), and (9) above shall be cumulative totals.

(c) The manufacturer shall maintain in a form suitable for inspection, such as computer information storage devices or card files, and shall make available to the Executive Officer or his or her authorized representative upon request, the names and addresses of vehicle or engine owners:

(1) To whom notification was given;

(2) Whose vehicles were repaired or inspected under the recall plan; and

(3) Who were determined not to qualify for such recall action due to removed or altered components.

(d) The information gathered by the manufacturer to compile the reports required by these procedures shall be retained for not less than one year beyond the useful life of the vehicles or engines and shall be made available to authorized personnel of the Air Resources Board upon request.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2121.0.1. Penalties. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

Under the influenced recall, failure by a manufacturer to notify the vehicle or engine owners and repair the vehicles or engines in the manner specified in the plan shall constitute a violation of the Executive Officer's order approving the plan and a violation of Health and Safety Code Section 43105. Notwithstanding the above, no penalty shall be imposed for a manufacturer's failure to meet the estimated capture rate except for an influenced recall when the 60-percent capture rate is required pursuant to Section 2114(a)(10) above, in which case a recall pursuant to Section 2123 below may be ordered if the Executive Officer determines that the manufacturer did not show a good faith effort to achieve the capture rate set forth in the recall plan.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2123.0.1. Initiation and Notification of Ordered Emission-Related Recalls. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) A manufacturer shall be notified whenever the Executive Officer has determined, based on warranty information reports, field information reports, enforcement testing results, or any other information, that a substantial number of a class or category of vehicles or engines produced by that manufacturer, although properly maintained and used, contain a failure in an emission-related component which, if uncorrected, may result in the vehicles' or engines' failure to meet applicable standards over their useful lives; or whenever a class or category of vehicles or engines within their useful lives, on average, do not conform to the standards prescribed pursuant to Section 43101 of the Health and Safety Code as applicable to the model year of such vehicles.

(b) It shall be presumed for purposes of this section that an emission-related failure will result in the exceedance of emission standards unless the manufacturer presents evidence in accordance with the procedures set forth in Title 13, California Code of Regulations, Section 2147 which demonstrates to the satisfaction of the Executive Officer that the failure will not result in exceedance of emission standards over the useful life of the vehicle or engine,

(c) The notification shall include a description of each class or category of vehicles or engines encompassed by the determination of nonconformity, shall set forth the factual basis for the determination and shall designate a date at least 45 days from the date of receipt of such notification by which the manufacturer shall submit a plan to remedy the nonconformity.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2125.0.1. Ordered Recall Plan. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Unless a public hearing is requested by the manufacturer, a recall plan shall be submitted to the Chief, Emissions Certification and Compliance Division, 4001 Iowa Ave, Riverside, CA 92507, within the time limit specified in the notification. The Executive Officer may grant the manufacturer an extension upon good cause shown.

(b) The recall plan shall contain the following:

(1) A description of each class or category of vehicle or engine to be recalled, including the engine family or sub-group thereof, the model-year, the make, the model, and such other information as may be required to identify the vehicles or engines to be recalled.

(2) A description of the nonconformity and the specific modifications, alterations, repairs, corrections, adjustments or other changes to be made to bring the vehicles or engines into conformity including a brief summary of the data and technical studies which support the manufacturer's decision regarding the specific corrections to be made.

(3) A description of the method by which the manufacturer will determine the names and addresses of vehicle or engine owners and the method by which they will be notified.

(4) A description of the procedure to be followed by vehicle or engine owners to obtain correction of the nonconformity including the date on or after which the owner can have the nonconformity remedied, the time reasonably necessary to perform the labor required to correct the nonconformity, and the designation of facilities at which the nonconformity can be remedied. The repair shall be completed within a reasonable time designated by the Executive Officer from the date the owner delivers the vehicle or engine for repair. This requirement becomes applicable on the date designated by the manufacturer as the date on or after which the owner can have the nonconformity remedied.

(5) If some or all of the nonconforming vehicles or engines are to be remedied by persons other than dealers or authorized warranty agents of the manufacturer, a description of such class of persons and a statement indicating that the participating members of the class will be properly equipped to perform such remedial action.

(6) The capture rate required for each class or category of vehicle or engine to be recalled. Under recalls based on exceedance of emission standards, the capture rate shall be calculated using the following formula:

$$R = \frac{(Ef - Es) \times 100\%}{\Delta}$$

where: R = capture rate (see section 2112(a), above, for definition).

Δ = average reduction per vehicle resulting from the recall repair (see subsection (b)(12)(B), below, for determination).

Ef = average noncompliance emission level determined from in-use enforcement testing and other sources.

Es = emission standard for a particular pollutant.

An 80 percent capture rate shall be required for recalls based exclusively on noncompliance as defined in section 2112(h)(1), above.

(7) The plan may specify the maximum incentives (such as a tune-up or specified quantity of gasoline), if any, the manufacturer will offer to induce vehicle or engine owners to present their vehicles for repair, as evidence that the manufacturer has made a good faith effort to repair the percentage of vehicles or engines specified in the plan. The plan shall include a schedule for implementing actions to be taken including identified increments of progress towards implementation and deadlines for completing each such increment.

(8) A copy of the letter of notification to be sent to vehicle or engine owners.

(9) A description of the system by which the manufacturer will assure that an adequate supply of parts will be available to perform the repair under the recall plan including the date by which an adequate supply of parts will be available to initiate the repair campaign, and the method to be used to assure the supply remains both adequate and responsive to owner demand.

(10) A copy of all necessary instructions to be sent to those persons who are to perform the repair under the recall plan.

(11) A description of the impact of the proposed changes on fuel economy, driveability, performance and safety of each class or category of vehicles or engines to be recalled and a brief summary of the data, technical studies, or engineering evaluations which support these descriptions.

(12) A description of the impact of the proposed changes on the average emissions of the vehicles or engines to be recalled based on noncompliance as defined in section 2112(h)(2), above. The description shall contain the following:

(A) Average noncompliance emission levels.

(B) Average emission reduction or increase per pollutant resulting from the recall repair. These averages shall be verified by the manufacturer by applying the proposed recall repairs to two or more in-use vehicles or engines representing the average noncompliance emission levels. Only those vehicles or engines with baseline emission levels within 25 percent of the average emission levels of noncomplying pollutant(s) established under

the in-use enforcement test program may be used by manufacturers to verify proposed recall repairs. The Executive Officer may allow the use of vehicles or engines exceeding these limits if none which meet the limits can be reasonably procured. In the case of heavy-duty engines, the average emission levels may be verified by using laboratory engines, subject to approval by the Executive Officer.

(C) An estimate of the average emission level per pollutant for a class or category of vehicles or engines after repair as corrected by the required capture rate. The estimated average emission level shall comply with the applicable emission standards. If the average emissions levels achieved by applying the average emission reduction per vehicle or engine after repair and the estimated capture rate, do not achieve compliance with the emissions standards, a manufacturer shall propose other measures to achieve average emissions compliance.

(13) Any other information, reports, or data which the Executive Officer may reasonably determine to be necessary to evaluate the recall plan.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2126.0.1. Approval and Implementation of Recall Plan. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) If the Executive Officer finds that the recall plan is designed effectively to correct the nonconformity and complies with the provisions of Section 2125, he or she will so notify the manufacturer in writing. Upon receipt of the approval notice from the Executive Officer, the manufacturer shall commence implementation of the approved plan. Notification of vehicle or engine owners and the implementation of recall repairs shall commence within 45 days of the receipt of notice unless the manufacturer can show good cause for the Executive Officer to extend the deadline.

(b) If the Executive Officer does not approve the recall plan or the mitigation measures provided in Section 2130 as submitted, the Executive Officer shall order modification of the plan or mitigation measures with such changes and additions as he or she determines to be necessary. The Executive Officer shall notify the manufacturer in writing of the disapproval and the reasons for the disapproval.

(c) The manufacturer may contest the Executive Officer's disapproval by requesting a public hearing pursuant to the procedures set forth in Section 60055.1, Title 17, California Code of Regulations. As a result of the hearing, the Board may affirm, overturn or modify the Executive Officer's action. In its decision, affirming or modifying, the Board shall specify the date by which the manufacturer shall commence notifying vehicle or engine owners and implementing the required recall repairs.

(d) If no public hearing is requested in accordance with (c) above, the manufacturer shall incorporate the changes and additions required by the Executive Officer and shall commence notifying vehicle or engine owners and implementing the required recall repairs within 60 days of the manufacturer's receipt of the Executive Officer's disapproval.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

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§ 2127.0.1. Notification of Owners. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Notification to vehicle or engine owners shall be made by first class mail or by such other means as approved by the Executive Officer provided, that for good cause, the Executive Officer may require the use of certified mail to ensure an effective notification.
(b) The manufacturer shall use all reasonable means necessary to locate vehicle or engine owners provided, that for good cause, the Executive Officer may require the manufacturer to use motor vehicle registration lists available from State or commercial sources to obtain the names and addresses of vehicle or engine owners to ensure effective notification.

(c) The Executive Officer may require subsequent notification by the manufacturer to vehicle or engine owners by first class mail or other reasonable means provided, that for good cause, the Executive Officer may require the use of certified mail to ensure effective notification.

(d) The notification of vehicle or engine owners shall contain the following:

(1) The statement: "the California Air Resources Board has determined that your (vehicle or engine) (is or may be) releasing air pollutants which exceed (California or California and Federal) standards. These standards were established to protect your health and welfare from the dangers of air pollution."

(2) A statement that the nonconformity of any such vehicles or engines will be remedied at the expense of the manufacturer.

(3) A statement that eligibility may not be denied solely on the basis that the vehicle or engine owner used parts not manufactured by the original equipment vehicle manufacturer, or had repairs performed by outlets other than the vehicle or engine manufacturer's franchised dealers.

(4) A clear description of the components which will be affected by the recall action and a general statement of the measures to be taken to correct the nonconformity.

(5) A statement that such nonconformity, if not repaired, may cause the vehicle or engine to fail an emission inspection or Smog Check test when such tests are required under State law.

(6) A description of the adverse effects, if any, that an uncorrected nonconformity would have on the performance, fuel economy, or driveability of the vehicle or engine or to the function of other engine components.

(7) A description of the procedure which the vehicle or engine owner should follow to obtain correction of the nonconformity including the date on or after which the

owner can have the nonconformity remedied, the time reasonably necessary to correct the nonconformity, and a designation of the facilities at which the nonconformity can be remedied.

(8) After the effective date of the recall enforcement program referred to in Section 2117, above, a statement that a certificate showing that the vehicle has been repaired under the recall program shall be issued by the service facilities and that such a certificate may be required as a condition of vehicle registration or operation, as applicable.

(9) A card to be used by a vehicle or engine owner in the event the vehicle or engine to be recalled has been sold. Such card should be addressed to the manufacturer, have postage paid, and shall provide a space in which the owner may indicate the name and address of the person to whom the vehicle or engine was sold.

(10) The statement: "In order to ensure your full protection under the emission warranty made applicable to your (vehicle or engine) by State or Federal law, and your right to participate in future recalls, it is recommended that you have your (vehicle or engine) serviced as soon as possible. Failure to do so could be determined to be a lack of proper maintenance of your (vehicle or engine)." This statement is not required for off-road motorcycles or all-terrain vehicles.

(11) A telephone number provided by the manufacturer, which may be used to report difficulty in obtaining recall repairs.

(e) The manufacturer shall not condition eligibility for repair on the proper maintenance or use of the vehicle except for strong or compelling reasons and with approval of the Executive Officer; however, the manufacturer shall not be obligated to repair a component which has been removed or altered so that the recall action cannot be performed without additional cost.

(f) No notice sent pursuant to Section 2125(b)(8), above, nor any other communication sent to vehicle or engine owners or dealers shall contain any statement, express or implied, that the nonconformity does not exist or will not degrade air quality.

(g) The manufacturer shall be informed of any other requirements pertaining to the notification under this section which the Executive Officer has determined are reasonable and necessary to ensure the effectiveness of the recall campaign.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2128.0.1. Repair Label. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The manufacturer shall require those who perform the repair under the recall plan to affix a label to each vehicle or engine repaired or, when required, inspected under the recall plan.

(b) The label shall be placed in a location as approved by the Executive Officer and shall be fabricated of a material suitable for such location and which is not readily removable.

(c) The label shall contain the recall campaign number and a code designating the facility at which the repair, inspection for repair, was performed.

NOTE: Authority cited: Sections 39600, 39601, 43013. 43018 and 43105. Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104. 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2129.0.1. Proof of Correction Certificate. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The manufacturer shall require those who perform the recall repair to provide the owner of each vehicle or engine repaired with a certificate, through a protocol and in a format prescribed by the Executive Officer, which indicates that the noncomplying vehicle or engine has been corrected under the recall program. This requirement shall become effective and applicable upon the effective date of the recall enforcement program referred to in Section 2117, above.

NOTE Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2130.0.1. Capture Rates and Alternative Measures. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The manufacturer shall comply with the capture rate specified in the recall plan as determined pursuant to Section 2125(b)(6), above, within six consecutive quarters beginning with the quarter in which the notification of vehicle or engine owners was initiated. If, after good faith efforts, the manufacturer cannot correct the percentage of vehicles specified in the plan by the applicable deadlines and cannot take other measures to bring the engine family or test group into compliance with the standards, the manufacturer shall propose mitigation measures to offset the emissions of the unrepaired vehicles within 45 days from the last report filed pursuant to Section 2133(c), below. The Executive Officer shall approve such measures provided that:

(a) the emission reductions from the recalled and repaired vehicles or engines and the mitigation measures are equivalent to achieving the capture rate; and

(b) the emission reductions from the mitigation measures are real and verifiable; and

(c) the mitigation measures are implemented in a timely manner.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2131.0.1. Preliminary Tests. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The Executive Officer may require the manufacturer to conduct tests on components and vehicles or engines incorporating a proposed correction, repair, or modification reasonably designed and necessary to demonstrate the effectiveness of the correction, repair, or modification.

NOTE: Authority cited: Sections 39600. 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2133.0.1. Recordkeeping and Reporting Requirements. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The manufacturer shall maintain sufficient records to enable the Executive Officer to conduct an analysis of the adequacy of the recall campaign. The records shall include, for each class or category of vehicle or engine, but need not be limited to, the following:

(1) Engine family involved and recall campaign number as designated by the manufacturer.

(2) Date owner notification was begun, and date completed.

(3) Number of vehicles or engines involved in the recall campaign.

(4) Number of vehicles or engines known or estimated to be affected by the nonconformity.

(5) Number of vehicles or engines inspected pursuant to the recall plan and found to be affected by the nonconformity.

(6) Number of inspected vehicles or engines.

(7) Number of vehicles or engines receiving repair under the recall plan.

(8) Number of vehicles or engines determined to be unavailable for inspection or repair under the recall plan due to exportation, theft, scrap- ping, or for other reasons (specify).

(9) Number of vehicles or engines determined to be ineligible for recall action due to removed or altered components.

(10) A listing of the identification numbers of vehicles or engines subject to recall but for whose repair the manufacturer has not been invoiced. This listing shall be supplied in a standardized computer data storage device to be specified by the Executive Officer. The frequency of this submittal as specified in subsection (c) below, may be changed by the Executive Officer depending on the needs of recall enforcement.

(11) Any service bulletins transmitted to dealers which relate to the nonconformity and which have not previously been submitted.

(12) All communications transmitted to vehicle or engine owners which relate to the nonconformity and which have not previously been submitted.

(b) If the manufacturer determines that the original responses to subsections (a)(3) and (4) of these procedures are incorrect, revised figures and an explanatory note shall be submitted. Responses to subsections (a)(5), (6), (7), (8), and (9) shall be cumulative totals.

(c) Unless otherwise directed by the Executive Officer, the information specified in subsection (a) of these procedures shall be included in six quarterly reports, beginning with the quarter in which the notification of owners was initiated, or until all nonconforming vehicles or engines involved in the campaign have been remedied, whichever occurs sooner. Such reports shall be submitted no later than 25 days after the close of each calendar quarter.

(d) The manufacturer shall maintain in a form suitable for inspection, such as computer information storage devices or card files, and shall make available to the Executive Officer or his or her authorized representative upon request, lists of the names and addresses of vehicle or engine owners:

(1) To whom notification was given;

(2) Who received remedial repair or inspection under the recall plan; and

(3) Who were denied eligibility for repair due to removed or altered components.

(e) The records and reports required by these procedures shall be retained for not less than one year beyond the useful life of the vehicles or engines involved, or one year beyond the reporting time frame specified in subsection (c) above, whichever is later.

NOTE: Authority cited: Sections 39600, 39601. 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2137.0.1. Vehicle and Engine Selection. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Any vehicle of an engine family, test group, any vehicle of a subgroup of an engine family or test group, or any engine used in a piece of equipment, manufactured for sale in California, shall be subject to these test procedures during its useful life. A minimum of ten (10) in-use vehicles or engines determined by the CARB to be properly maintained and used will be procured and tested by the CARB or its designated laboratory to represent the emission characteristics of the engine family, test group or subgroup. The CARB may test less than ten (10) in-use vehicles or engines if the manufacturer notifies the CARB in writing that the manufacturer will accept the results from less than ten (10) vehicles or engines as being representative of the engine family, test group or subgroup

(b) No vehicle or engine shall be accepted by the CARB as a representative vehicle or engine for enforcement testing unless the following criteria are met:

(1) California certified and registered.

(2) Odometer indication of less than certified useful-life mileage and vehicle age within useful-life time period.

(3) No indication of abuse (e.g., racing, overloading, misfueling, or other misuse), neglect, improper maintenance or other factors that would have a permanent effect on emission performance.

(4) No major repair to engine or major repair of vehicle resulting from collision.

(5) No indication of any problem that might jeopardize the safety of laboratory personnel.

(6) For off-road compression-ignition engines subject to recall testing, engines shall have an hour meter indication and engine age not exceeding the following periods:

(A) For all engines rated under 19 kilowatts, and for constant-speed engines rated under 37 kilowatts with rated speeds greater than or equal to 3,000 revolutions per minute, four years or 2.250 hours of operation, whichever first occurs.

(B) For all other engines rated above 19 kilowatts and under 37 kilowatts, five years or 3,750 hours of operation, whichever first occurs.

(C) For all engines rated at or above 37 kilowatts, seven years or 6,000 hours of operation, whichever first occurs.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Health and Safety Code Sections 43000, 43009.5, 43013. 43018. 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 2141.0.1. General Provisions. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The provisions regarding applicability of the failure reporting procedures and the definitions shall be the same as those set forth in Title 13, California Code of Regulations, Sections 2111 and 2112, except that this Section 2141 does not apply to off-road compression-ignition engines, as defined in Section 2421. The provisions of this Article shall apply to the vehicles and engines specified in section 2111 manufactured up to and including the 2009 model year, plus their useful lives. This Article shall not apply to vehicles and engines manufactured for the 2010 model year and thereafter.

(b) The requirement to file emission warranty information reports and field information reports for a given class or category of vehicles or engines shall be applicable for the warranty period but not to exceed the useful life period of the vehicles or engines beginning with the 1990 model-year vehicles or engines.

(c) The requirement to file an emissions information report for a given class or category of vehicles or engines shall be applicable for the useful life period of the vehicles or engines.

(d) In the case of motor vehicles or engines for which certification of the exhaust and evaporative emission control systems is granted to different manufacturers, the information reporting responsibility in subsections (b) and (c) above shall be assigned to the certifying manufacturer.

NOTE: Authority cited: Sections 39600, 39601, 43105 and 43106, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204–43205.5, Health and Safety Code.

§ 2142.0.1. Alternative Procedures. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) A vehicle manufacturer may use an alternative procedure to those specified in Sections 2144(a) and 2145(a), provided the Executive Officer has determined that the alternative procedure will produce substan-tially equivalent results. In making such a determination, the Executive Officer shall consider the capacity of the alternative procedure to:

(1) ensure early detection of failing components within the useful life of the vehicles or engines;
(2) track failing components by engine family;

(3) assure prompt notification of the Executive Office when a systematically failing component is indicated;

(4) provide objective, complete and easily monitored data; and

(5) be audited by the Executive Officer.

(b) If, in order to comply with the requirements of Section 2142(a), 2144(a) or 2145(a), a manufacturer elects to develop a system based upon a sampling of representative California dealerships, such plan must be reviewed and approved by the Executive Officer prior to its implementation.

NOTE: Authority cited: Sections 39600, 39601 and 43105, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204–43205.5, Health and Safety Code.

§ 2143.0.1. Failure Levels Triggering Recall. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

An engine family, test group or a subgroup shall be subject to a recall when the number of failures of a specific emission-related component exceeds the failure level set forth below, unless the Executive Officer determines from the emission information report that a recall is unnecessary pursuant to the criteria set forth in Section 2148(a) and (b). Vehicles or engines in an engine family or test group are subject to recall at the following failure levels: 4 percent or 50 (whichever is greater) for 1990 through 1991 model year vehicles or engines; 3 percent or 50 (whichever is greater) for 1992 through 1993 model-year vehicles or engines; and 2 percent or 50 (whichever is greater) for 1994 and subsequent model-year vehicles or engines. The Executive Officer may extend the applicability of the 4 or 3 percent failure levels if he/she determines that proceeding to the next lower level will create an excessive administrative burden on the CARB or the vehicle manufacturers without a corresponding benefit in the reduction of emissions.

NOTE: Authority cited: Sections 39600, 39601 and 43105, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

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§ 2144.0.1. Emission Warranty Information Report. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) A manufacturer shall:

(1) Review warranty claim records for each engine family or test group on a quarterly basis to determine and compile by cumulative total the number of claims made for emission-related components. The data compiled shall be based on all warranty claims, without any prescreening of data as to the validity of the claims. In the case of heavy-duty vehicles or engines, a manufacturer may use nationwide data for monitoring war-ranty claims of a California-certified engine family or test group which is also certified by the United States Environmental Protection Agency.

(2) Categorize warranty claims for each engine family or test group by the specific emission control component replaced or repaired.

(3) On the basis of data obtained subsequent to the effective date of these regulations, file an emission warranty information report for each quarter when the cumulative number of unscreened warranty claims for a specific emission-related component or repair represent at least one percent or twenty five (whichever is greater) of the vehicles or engines of a California-certified engine family or test group.

(b) The emission warranty information report shall contain the following information in substantially the format outlined below:

(1) The manufacturer's corporate name.

(2) A description of each class or category of California-certified vehicles or engines affected by a warranty replacement or warranty repair of a specific emission-related component, including model year and engine family or test group.

(3) The number and percentage of vehicles or engines in each engine family or test group for which a warranty replacement or warranty repair of a specific emission-related component was identified.

(4) A short description of the specific emission-related component that was replaced or repaired under warranty.

(c) Emission warranty information reports shall be submitted not more than 25 days after the close of a calendar quarter. Subsequent to the filing or an emission warranty information report, a manufacturer shall submit quarterly reports updating the number and percentage of emission-related warranty claims with the most recent information, unless a recall has been implemented. Emission warranty information reports and updates shall be submitted to the Chief, Emissions Certification and Compliance Division, 4001 Iowa Ave, Riverside, CA 92507.

(d) The records described in Section 2144(a)(1) of these procedures and the records used under the alternative procedure described in Section 2142(a) of these procedures shall be made available to the Executive Officer upon request.

NOTE: Authority cited: Sections 39600, 39601 and 43105, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204–41205.5, Health and Safety Code.

§ 2145.0.1. Field Information Report. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) On the basis of data obtained and reported pursuant to Section 2144 of these procedures, a manufacturer shall file a field information report not more than 45 days after an emission warranty information report indicates that a cumulative total of unscreened warranty claims for a specific emission-related component is found to exist in excess of the percentage of vehicles specified in Section 2143, unless the manufacturer has committed to perform a recall by notifying the CARB of its intent in writing within the 45-day period. A recall plan must be submitted within 45 days of that notice.

(b) All field information reports shall be submitted to the Chief, Emissions Certification and Compliance Division, 4001 Iowa Ave, Riverside, CA 92507, and shall contain the following information in substantially the format outlined below:

(1) The manufacturer's corporate name.

(2) A field information report number assigned by the manufacturer which shall be used in all related correspondence.

(3) A description of each class or category of California-certified vehicles or engines affected including make, model, model year, engine family or test group and such other information as may be required to identify the vehicles or engines affected. The description shall include those engine families or test groups related to the affected engine family or test group through common certification test data allowed under Title 40, Code of Federal Regulations, Section 86.085-24(f), as amended December 10, 1984 or Title 40 Code of Federal Regulations, Section 86.1839-01, as adopted May 4, 1999 ("carry-over" and "carry-across" engine families).

(4) A description of the emission-related component that failed or was replaced or repaired under warranty, the failure and the probable cause of the failure.

(5) The number and percentage of vehicles or engines in each engine family or test group for which a failure of a specific emission-related component was identified.

(6) The total number and percentage of unscreened warranty claims and failures of a specific emission-related component projected to occur during the engine family's or test group's useful life and a description of the method used to project this number.

(7) An estimated date when the failure of a specific emission-related component will reach the levels specified in Section 2143 of these procedures.

NOTE: Authority cited: Sections 39600, 39601 and 43105, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204–43205.5, Health and Safety Code.

§ 2146.0.1. Emissions Information Report. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) A manufacturer shall file an emissions information report:

(1) For 1990 and subsequent model-year vehicles or engines, when the failure of a specific emission-related component exceeds the percentages specified in Section 2143 of these procedures. An emissions infor-mation report shall not be required sooner than 45 days after the field information report has been submitted to the Executive Officer.

(2) Not more than 45 days after the Executive Officer, with cause, requires such a report. For purposes of this section, "cause" shall be based upon any information in CARB possession which indicates that a failure of significant scope is occurring which might necessitate a recall, includ-ing but not limited to the in-use enforcement test results specified in Section 2140(a) above, and information gathered from CARB in-use surveillance activities, Smog Check inspections, and consumer complaints.

(3) For 1982 through 1989 model-year vehicles or engines, not more than 15 days after a specific emission-related defect is determined to exist in twenty-five or more vehicles or engines of the same model year. A defect shall be determined in accordance with procedures established by a manufacturer to identify safety-related defects.

(b) No emissions information report shall be required if a manufacturer has committed to perform a recall by notifying the CARB of its intent in writing after the failure of a specific emission-related component exceeds the percentages specified in Section 2143 of these procedures. A recall plan shall be submitted within 45 days of the manufacturer's notification of intent to perform a recall.

(c) All emissions information reports shall be submitted to the Chief, Emissions Certification and Compliance Division, 4001 Iowa Ave, Riverside, CA 92507, and shall contain the following information in substantially the format outlined below. For purposes of this section, the term "failure" shall be considered synonymous with the term "defect" for those emissions information reports filed pursuant to subsection (a)(3), above.

(1) The manufacturer's corporate name.

(2) The field information report number from which the failure was first reported, if applicable.

(3) A description of each class or category of California-certified vehicles or engines affected by the failure including make, model, model year, engine family or test group, and such other information as may be required to identify the vehicles or engines affected.

(4) A description of the emission-related component that failed, the failure and the probable cause of failure.

(5) A description of any driveability problems or impact on other vehicle or engine performance factors such as fuel economy and cold starting likely to result from the failure.

(6) For emissions information reports filed pursuant to Section 2146(a)(1) and (2), a description of how emissions will be affected over the useful life of the vehicles or engines due to the failure.

(7) For emissions information reports filed pursuant to Section 2146(a)(3), an evaluation of the emission impact of the failure and any available emission data which relate to the failure.

NOTE: Authority cited: Sections 39600, 39601 and 43105, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204–43205.5, Health and Safety Code.

§ 2148.0.1. Evaluation of Need for Recall. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Once the emission information report is filed, the Executive Officer shall evaluate the failure to determine whether a recall is necessary. Factors to be considered shall include but are not limited to the following:

(1) the validity of the data;

(2) the emission impact of the failure on individual vehicles or engines;

(3) the possibility of induced tampering due to driveability problems resulting from the failure;

(4) the effects of the failure on performance, fuel economy, and safety;

(5) the failure rates and the timing and extent of a remedy if no recall is required; and

(6) other factors specific to the failure.

(b) Notwithstanding subsection (a) above, a recall shall not be required if the manufacturer submits information with the emissions information report which demonstrates to the satisfaction of the Executive Officer that the failure

(1) is limited to an emission-related component on a less-than-substantial percentage of vehicles and does not represent a pervasive defect in design, application, or execution which is likely to affect a substantial number of such emission-related components during the useful life of the vehicle or engines, and

(2) is likely to be corrected under the warranty program or other in-use maintenance procedure shortly after the inception of the problem.

(c) If a manufacturer can identify a subgroup of an engine family or test group which is subject to a failure, a recall may be limited to that subgroup with Executive Officer approval.

NOTE: Authority cited: Sections 39600, 39601 and 43105. Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204–43205.5. Health and Safety Code.

§ 2149.0.1. Notification and Subsequent Action. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The Executive Officer shall notify the manufacturer of the evaluation results. If the Executive Officer deems a noncompliance exists, a manufacturer shall have 15 days upon receipt of CARB notification to notify the CARB in writing of its intent to perform a recall. A manufacturer may initiate one of the following recalls:

(1) A voluntary recall if the emissions information report submitted was required pursuant to Section 2146(a)(1) or (a)(3) of these procedures;

(2) An influenced recall if the emissions information report submitted was required pursuant to Section 2146(a)(2) of these procedures.

(b) If no notification to perform a voluntary or influenced recall is submitted by the manufacturer within the 15-day period specified in subsection (a) above, the CARB may initiate further investigation which could lead, respectively, to an influenced or ordered recall of the subject vehicles or engines.

(c) Following notification of noncompliance by the CARB, a manufacturer shall submit within 45 days a recall plan in accordance with Section 2113(a) or (b), Title 13, California Code of Regulations.

NOTE: Authority cited: Sections 39600, 39601 and 43105, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107, 43204–43205.5, 43211–43213 and 43107, Health and Safety Code.

§ 2423.0.1. Exhaust Emission Standards and Test Procedures — Off-Road Compression-Ignition Engines. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) This section shall be applicable to new heavy-duty off-road compression-ignition engines, produced on or after January 1, 1996, and all other new 2000 and later model year off-road compression-ignition engines. For the purposes of this section, these engines shall be called "compression-ignition engines."

(b)(1)(A) Exhaust emissions from new off-road compression-ignition engines, as sold in this state and as appropriate based on model year and maximum rated power, shall not exceed the levels contained in Table 1a with respect to steady-state testing. Table 1a follows:

Table 1a. -- Tier 1, Tier 2, and Tier 3 Exhaust Emission Standards (grams per kilowatt-hour)

Maximum Rated Power (kW)[1]	Tier	Model Year	NOx[2]	HC[3]	NMHC + NOx[4]	CO[5]	PM[6]
kW<8	Tier 1	2000-2004	--	--	10.5	8.0	1.0
	Tier 2	2005-2007[7]	--	--	7.5	8.0	0.80
8≤kW<19	Tier 1	2000-2004	--	--	9.5	6.6	0.80
	Tier 2	2005-2007[7]	--	--	7.5	6.6	0.80
19≤kW<37	Tier 1	2000-2003	--	--	9.5	5.5	0.80
	Tier 2	2004-2007[7]	--	--	7.5	5.5	0.60
37≤kW<56	Tier 1	2000-2003	9.2	--	--	--	--
	Tier 2	2004-2007	--	--	7.5	5.0	0.40
	Tier 3[8]	2008-2011	--	--	4.7	5.0	0.40
56≤kW<75	Tier 1	2000-2003	9.2	--	--	--	--
	Tier 2	2004-2007	--	--	7.5	5.0	0.40
	Tier 3	2008-2011	--	--	4.7	5.0	0.40
75≤kW<130	Tier 1	2000-2002	9.2	--	--	--	--
	Tier 2	2003-2006	--	--	6.6	5.0	0.30
	Tier 3	2007-2011	--	--	4.0	5.0	0.30
130≤kW<225	Tier 1	1996-2002	9.2	1.3	--	11.4	0.54
	Tier 2	2003-2005	--	--	6.6	3.5	0.20
	Tier 3	2006-2010	--	--	4.0	3.5	0.20

225≤kW<450	Tier 1	1996-2000	9.2	1.3	--	11.4	0.54
	Tier 2	2001-2005	--	--	6.4	3.5	0.20
	Tier 3	2006-2010	--	--	4.0	3.5	0.20
450≤kW≤560	Tier 1	1996-2001	9.2	1.3	--	11.4	0.54
	Tier 2	2002-2005	--	--	6.4	3.5	0.20
	Tier 3	2006-2010	--	--	4.0	3.5	0.20
kW>560	Tier 1	2000-2005	9.2	1.3	--	11.4	0.54
	Tier 2	2006-2010	--	--	6.4	3.5	0.20

[1] kW means kilowatts.
[2] NOx means Oxides of Nitrogen.
[3] HC means Hydrocarbons.
[4] NMHC + NOx means Non-Methane Hydrocarbons plus Oxides of Nitrogen.
[5] CO means Carbon Monoxide.
[6] PM means Particulate Matter.
[7] Tier 2 standards for propulsion marine compression-ignition engines below 37 kW remain in effect beyond the 2007 end date.
[8] Manufacturers may optionally certify engine families to the interim Tier 4 standards in Table 1b for this power category through 2012.

(B) Exhaust emissions from new off-road compression-ignition engines, as sold in this state and as appropriate based on model year and maximum engine power, shall not exceed the levels contained in Table 1b, with respect to steady-state testing, transient testing, and, after application of the criteria in Table 1c, not-to-exceed testing, as applicable. Other compliance options are permissible as provided in the 2008 and Later Test Procedures.

Table 1b. -- Tier 4 Exhaust Emission Standards (grams per kilowatt-hour)

Maximum Engine Power	*Model Year*	*Type*	*PM*	*NMHC +NOx*	*NMHC*	*NOx*	*CO*
			grams per kilowatt-hour				
kW<8[1]	2008 and later	Final	0.40[2]	7.5	-	-	8.0
8≤kW<19[1]							6.6
19≤kW<37[1]	2008-2012	Interim	0.30	7.5	-	-	5.5
	2013 and later	Final	0.03	4.7			
37≤kW<56[3]	2008-2012	Interim	0.30	4.7	-	-	5.0
	2013 and later	Final	0.03				
56≤kW<75	2012-2014[4]	Phase-In	0.02	-	0.19	0.40	5.0
		Phase-Out		4.7	-	-	
		or/ Alt NOx		-	0.19	3.4[5]	
		or/ Alt NO_x+NMHC[8]		3.5[5]	-	-	
	2015 and later	Final		-	0.19	0.40	
75≤kW<130	2012-2014[4]	Phase-In	0.02	-	0.19	0.40	5.0
		Phase-Out		4.0	-	-	
		or/ Alt NOx		-	0.19	3.4[5]	
		or/ Alt NO_x+NMHC[8]		3.5[5]	-	-	
	2015 and later	Final		-	0.19	0.40	
130≤kW≤560	2011-2013	Phase-In	0.02	-	0.19	0.40	3.5
		Phase-Out		4.0	-	-	
		or/ Alt NOx		-	0.19	2.0	
		or/ Alt NO_x+NMHC[8]		2.1	-	-	
	2014 and later	Final		-	0.19	0.40	
560 kW<GEN[6]≤900 kW	2011-2014	Interim	0.10	-	0.40	3.5	3.5
	2015 and later	Final	0.03		0.19	0.67	
GEN>900 kW	2011-2014	Interim	0.10	-	0.40	0.67	3.5
	2015 and later	Final	0.03		0.19		
ELSE[7]>560 kW	2011-2014	Interim	0.10	-	0.40	3.5	3.5
	2015 and later	Final	0.04		0.19		

Notes:

[1] Propulsion marine compression-ignition engines below 37 kW are not subject to Tier 4 standards or requirements. All previously adopted requirements remain applicable for these engines.

[2] The Tier 4 PM standard for hand-start, air cooled, direct injection engines below 8 kW is 0.60 g/kW-hr, but is not required until 2010.

[3] Engine families in this power category may alternately meet Tier 3 PM standards from 2008-2011 in exchange for introducing final PM standards in 2012.

[4] Manufacturers have the option of complying with the Tier 4 standards over a two year period at 50% per year using banked Tier 2 credits or over a three year period at 25% per year without the use of Tier 2 credits. The three year phase-in period is shown. The 2014 model year cannot extend beyond December 30, 2014, when the 3 year phase-in option is used.

[5] Manufacturers may comply with the standards during the transitional implementation years using either a phase-in/phase-out approach or by using the Alternate NOx approach. The three year 25% alternate NOx standard is shown in the table. The two year 50% phase-in NOx standard would be 2.3 g/kW-hr.

[6] "GEN" refers to generator engines only.
[7] "ELSE" refers to all mobile machinery excluding generator engines.
[8] An ALT NOx+NMHC standard equal to 0.5 g/kW-hr is available for one additional model year following the last model year of the ALT NOx+NMHC phase-in shown in the table.

Table 1c. -- Criteria for Determining NTE Limits[1]

Pollutant	Apply NTE Multiplier of 1.25 when ...	Apply NTE Multiplier of 1.50 when ...
NOx	NOx Standard or FEL≥2.5 g/kW-hr	NOx Standard[2] or FEL<2.5 g/kW-hr
NMHC	NOx Standard or FEL≥2.5 g/kW-hr	NOx Standard[2] or FEL<2.5 g/kW-hr
NMHC + NOx	NMHC+NOx Standard or FEL≥2.7 g/kW-hr	NMHC + NOx Standard[2] or FEL<2.7 g/kW-hr
PM	PM Standard or FEL≥0.07 g/kW-hr	PM[2] Standard or FEL[3]<0.07g/kW-hr
CO	Always	Never

Notes:

[1] Other provisions described in the 2008 and Later Test Procedures may affect the calculation of NTE limits.

[2] Engines must be certified to these standards without the use of ABT credits.

[3] For engines certified to a PM FEL less than or equal to 0.01 g/kW-hr, the PM NTE limit shall be 0.02 g/kW-hr.

(2) Manufacturers may elect to include engine families in one of two averaging, banking, and trading (ABT) programs, corresponding to the engine family's model year and emissions categorization. The provisions of these separate ABT programs are specified in Part 89, Subpart C of the 2000 Plus Limited Test Procedures and Part 1039, Subpart H of the 2008 and Later Test Procedures.

(A) For engine families subject to the 2000 Plus Limited Test Procedures, the manufacturer must set a family emission limit (FEL) not to exceed the levels contained in Table 2a. The FEL established by the manufacturer serves as the emission standard for that engine family. Table 2a follows:

Table 2a -- Upper Limit for Tier 1, Tier 2, and Tier 3 Family Emission Limits (FEL) (grams per kilowatt-hour)

Maximum Rated Power (kW)	Tier	Model Year	NOx	NMHC + NOx	PM FEL
kW<8	Tier 1	2000-2004		16.0	1.2
	Tier 2	2005-2007		10.5	1.0
8≤kW<19	Tier 1	2000-2004		16.0	1.2
	Tier 2	2005-2007		9.5	0.80
19≤kW<37	Tier 1	2000-2003		16.0	1.2
	Tier 2	2004-2007		9.5	0.80
37≤kW<56	Tier 1	2000-2003	14.6		
	Tier 2	2004-2007		11.5	1.2

	Tier 3[1]	2008-2011		7.5	1.2
56≤kW<75	Tier 1	2000-2003	14.6		
	Tier 2	2004-2007		11.5	1.2
	Tier 3	2008-2011		7.5	1.2
75≤kW<130	Tier 1	2000-2002	14.6		
	Tier 2	2003-2006		11.5	1.2
	Tier 3	2007-2011		6.6	1.2
130≤kW<225	Tier 1	2000-2002	14.6		
	Tier 2	2003-2005		10.5	0.54
	Tier 3	2006-2010		6.6	0.54
225≤kW<450	Tier 1	2000	14.6		
	Tier 2	2001-2005		10.5	0.54
	Tier 3	2006-2010		6.4	0.54
450≤kW≤560	Tier 1	2000-2001	14.6		
	Tier 2	2002-2005		10.5	0.54
	Tier 3	2006-2010		6.4	0.54
kW>560	Tier 1	2000-2005	14.6		
	Tier 2	2006-2010		10.5	0.54

[1] Manufacturers may optionally certify engine families to the interim Tier 4 FEL caps in Table 2b for this power category through 2012.

(B) For engine families subject to the 2008 and Later Test Procedures, the manufacturer must set a family emission limit (FEL) not to exceed, as applicable, the levels contained in Table 2b. Three distinct FEL types (primary, interim, and alternate) are available conditionally. Primary FEL types are applicable to all power categories indefinitely, whereas interim and alternate FEL types are of variable duration and may be selectively applied to total or partial engine family production volumes as described in the 2008 and Later Test Procedures. The FEL established by the manufacturer serves as the emission standard for that engine family, and is used for determining NTE limits in conjunction with the criteria in Table 1c. Temporary compliance adjustment factors, as explained in the 2008 and Later Test Procedures, shall be applied by the manufacturer to compensate for the use of transitional alternate FELs (Type ALT 20% in Table 2b) when calculating emission credits. Table 2b follows:

Table 2b -- Upper Limit for Tier 4 Family Emission Limits (FELs) and Alternate Allowances Part 1

Maximum Engine Power	*FEL Type*	*Model Year*	*PM*	*NOx*	*NMHC +NOx*
			grams per kilowatt-hour		
kW<8	Primary	2008 and later	0.80	-	10.5
8≤kW<19	Primary	2008 and later	0.80	-	9.5
19≤kW<37	Interim	2008-2012	0.60	-	9.5
	Primary	2013 and later	0.05	-	7.5
	ALT 20%[1]	2013-2016[3]	0.30	-	7.5
	ALT 5%[2]	2017 and later[3]			
37≤kW<56	Interim	2008-2012[3]	0.40	-	7.5
	Primary	2013 and later[3]	0.05	-	7.5
	ALT 20%	2013-2016[3]	0.30	-	7.5
	ALT 5%	2017 and later[3]			
56≤kW<75	Phase-in	2012-2013/2014[5]	0.04	0.80	-
	Phase-out			-	7.5
	ALT NOx Std[4]	2012-2013	0.04	3.0[7]	-
		2012-2014		4.4	
	ALT NO_x+NMHC Std[4]	2012-2013/2014[5]	0.04	-	4.7[7]
	Primary	2014/2015[5] and later	0.04	0.80	-
	ALT 20% PM	2012-2015	0.40		-
	ALT 20% NOx	2012-2015[6]		4.4	-
	ALT 20% NO_x+NMHC Std	2012-2015[6]	-	-	4.7
	ALT 5%	2016 and later	0.40	4.4	-

Notes:

[1] This alternate FEL option is transitional for the four years specified and applies to at most 20% of a manufacturer's U.S. directed population of engine families per year.

[2] This alternate FEL option is available indefinitely, but only applies to 5% of a manufacturer's U.S. directed population of engine families per year.

[3] These dates correspond to the compliance option of meeting interim standards in 2008; else the primary and alternate FEL caps would begin and end one year earlier, and 2008-2011 engines would not be eligible for participation in the Tier 4 ABT program.

[4] Two alternate NOx standards and corresponding FEL caps are available for this category with corresponding alternate phase-in options.

and use of banked Tier 2 NO_x credits

[5] The effective date of the primary FEL cap follows the phase-in period of the selected NOx FEL cap.

[6]

[7] If neither the alternate phase-in option nor banked Tier 2 credits are used, either NOx standard and corresponding FEL may be applied for this category.

For manufacturers certifying engines in this power category using a percentage phase-in/phase-out approach instead of the ALT NO_x or ALT NO_x+NMHC standards in Table 1b of §2423(b)(1)(B), the alternate NO_x and NO_x+NMHC FEL caps in the 485 table apply only in the 2014-2015 model years if certifying in accordance with the provisions in §1039.102(d)(1) of the 2011 and later Test procedures, and only in the 2015 model year if certifying under 1039.102(d)(2) of the 2011 and later Test proced

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Table 2b -- Upper Limit for Tier 4 Family Emission Limits (FELs) and Alternate Allowances Part 2

Maximum Engine Power	*FEL Type*	*Model Year*	*PM*	*NOx*	*NMHC +NOx*
			grams per kilowatt-hour		
75≤kW<130	Phase-in	2012-2013/2014[5]	0.04	0.80	-
	Phase-out			-	6.6
	ALT NOx Std[4]	2012-2013		3.0[7]	-
		2012-2014		3.8	-
	ALT NOx+NMHC Std[4]	2012-2013/2014[5]		-	4.0[7]
	Primary	2014/2015[5] and later		0.80	-
	ALT 20% PM	2012-2015	0.30		-
	ALT 20% NOx	2012-2015[6]		3.8	-
	ALT 20% NO_x+NMHC Std[4]	2012-2015[6]	-	-	4.0
	ALT 5%	2016 and later	0.30	3.8	-
130≤kW≤560	Phase-in	2011-2013	0.04	0.80	-
	Phase-out			-	6.6/6.4[8]
	ALT NOx Std	2011-2013		2.7	-
	ALT NOx+NMHC Std	2011-2013		-	4.0
	Primary	2014 and later		0.80	-
	ALT 20% PM	2011-2014	0.20		-
	ALT 20% NOx	2011-2014[9]		3.8	-
	ALT 20% NOx+NMHC Std	2011-2014[9]	-	-	4.0
	ALT 5%	2015 and later	0.20	3.8	-
GEN>560kW	Interim	2011-2014	0.20	6.2	-
	Primary	2015 and later	0.05	1.07	-
	ALT 20%	2015-2018	0.10	3.5	-
	ALT 5%	2019 and later			-
ELSE>560kW	Interim	2011-2014	0.20	6.2	-
	Primary	2015 and later	0.07		-
	ALT 20%	2015-2018	0.10		-
	ALT 5%	2019 and later			-

Notes:

[4] Two alternate NOx standards and corresponding FEL caps are available for this category with corresponding alternate phase-in options.

[5] The effective date of the primary FEL cap follows the phase-in period of the selected NOx FEL cap.

[6]

[7] If neither the alternate phase-in option nor banked Tier 2 credits are used, either NOx standard and corresponding FEL may be applied for this category.

[8] The phase-out NMHC + NOX FEL cap is 6.6 g/kW-hr for engines <225 kW, and 6.4g/kW-hr for engines ≥225kW in this category.

[9] For manufacturers certifying engines in this power category using the percentage phase-in/phase-out approach instead of the ALT NOx standard or the ALT NOx+NMHC standard in Table 1b of §2423(b)(1)(B), the ALT NOx and ALT NOx+NMHC FEL caps in the table apply only for the 2014 model year.

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For manufacturers certifying engines in this power category using a percentage phase-in/phase-out approach instead of the ALT NOx or ALT NOx + NMHC standards in Table 1b of § 2423(b)(1)(B), the alternate NOx and NOx + NMHC FEL caps in the table apply only in the 2014-2015 model years if certifying in accordance with the provisions in §1039.102(d)(1) of the 2011 and later Test Procedures, and only in the 2015 model year if certifying to §1039.102(d)(2) of the 2011 and later Test Procedures.

(C) Split family provision. For generating or using credits in the 56≤kW≤560 power categories during the phase-in of Tier 4 standards, engine manufacturers may elect to split an engine family into two subfamilies (e.g., one which uses credits and one which generates credits for the same pollutant). The engine manufacturer must indicate in the application for certification that the engine family is to be split, and may calculate emission credits relative to different emissions standards (i.e., phase-in and phase-out standards) for different sets of engines within the engine family, but must certify the engine family to a single set of standards and FELs. The engine manufacturer shall calculate NMHC + NOx emission credits by adding the NOx FEL to the NMHC phase-in standard for comparison with the applicable NMHC + NOx phase-out standard. Any engine family certified under the provisions of this paragraph (C) must meet the applicable phase-in standard for NMHC. The engine manufacturer shall be responsible for assigning the number and configurations of engines within the respective subfamilies before the due date of the final report required in Part 1039, Subpart H of the 2008 and Later Test Procedures. The same label must be applied to each engine in the family, and must include the NOx FEL to which the engine is certified.

(3)(A) The opacity of smoke emissions from new 1996 through 1999 model year heavy-duty off-road compression-ignition engines 175 to 750 horsepower, inclusive, or from all new 2000 and later model year compression-ignition engines sold in this state, shall not exceed, based on the applicable measurement techniques specified in Part 89, Subpart B of the 2000 Plus Limited Test Procedures and Part 1039, Subpart B of the 2008 and Later Test Procedures, the following:

1. 20 percent during the engine acceleration mode.

2. 15 percent during the engine lugging mode.

3. 50 percent during the peaks in either mode.

(B) The following engines are exempt from the requirements of this paragraph (3):

1. Single-cylinder engines.

2. Propulsion marine compression-ignition engines.

3. Constant-speed engines.

4. Engines certified to a PM emission standard or FEL of 0.07 grams per kilowatt-hour or lower

(4) Low-emitting Blue Sky Series engines requirements.

(A) Voluntary standards. Engines subject to the standards in (b)(1)(A) may be designated "Blue Sky Series" engines by meeting the voluntary standards contained in Table 3, which apply to all certification and in-use testing. Blue Sky Series engines shall not be included in the Averaging, Banking, and Trading program. Table 3 follows:

Table 3. -- Voluntary Emission Standards (grams per kilowatt-hour)

Maximum Rated Power (kW)	NMHC + NOx	PM
kW<8	4.6	0.48
8≤kW<19	4.5	0.48
19≤kW<37	4.5	0.36
37≤kW<75	4.7	0.24
75≤kW<130	4.0	0.18
130≤kW≤560	4.0	0.12
kW>560	3.8	0.12

(B) Additional standards. Blue Sky Series engines are subject to all provisions that would otherwise apply under this part, except as specified in (b)(4)(C) of this section.

(C) Test Procedures. NOx, NMHC, and PM emissions are measured using the procedures set forth in 40 CFR part 86, subpart N (July 1, 1999), which is incorporated by reference, in lieu of the procedures set forth in subpart E of the 2000 Plus Limited Test Procedures. CO emissions may be measured using procedures set forth in 40 CFR part 86, subpart N (July 1, 1999), or in subpart E of the 2000 Plus Limited Test Procedures. Manufacturers may use an alternate procedure to demonstrate the desired level of control if approved in advance by the Executive Officer. Engines meeting the requirements to qualify as Blue Sky Series engines must be capable of maintaining a comparable level of emission control when tested using the procedures set forth in both Section 89.112(c) and subpart E of the 2000 Plus Limited Test Procedures. The numerical emission levels measured using the procedures from subpart E of the 2000 and Plus Limited Procedures may be up to 20 percent higher than those measured using procedures from 40 CFR part 86, subpart N (July 1, 1999), and still be considered comparable.

(5)(A) No crankcase emissions shall be discharged into the ambient atmosphere from any new 1996-1999 model year heavy-duty off-road compression-ignition engine or any Tier 2 or later off-road compression-ignition engine subject to the 2000 Plus Limited Test Procedures. This provision does not apply to petroleum-fueled diesel cycle engines using turbochargers, pumps, blowers, or superchargers for air induction.

(B) For off-road compression-ignition engines subject to the 2008 and Later Test Procedures, no crankcase emissions shall be discharged directly into the ambient atmosphere from any engine, unless the sum of those discharged emissions are added to the exhaust emissions (either physically or mathematically) during all emission testing. To be eligible for this option, a manufacturer must design its engines so that all crankcase emissions can be routed into the applicable sampling systems specified in the 2008 and Later Test Procedures, and must account for deterioration in crankcase emissions when determining exhaust deterioration factors. Crankcase emissions that are routed to the exhaust upstream of exhaust aftertreatment during all operation are not considered to be discharged directly into the ambient atmosphere. Furthermore, engines using charge-air compression that are certified to a transitional alternate FEL (Type ALT 20% in Table 2b) during the first four years of the Tier 4 standards for the applicable power category are exempt from this subsection, but must instead comply with the requirements in Section 2423(b)(5)(A).

(6) Engine manufacturers that voluntarily certify engines to the Tier 4 standards in Table 1b earlier than required under this article may, according to the provisions in the 2008 and Later Test Procedures, generate additional ABT credits, or as an alternative, offset future Tier 4 compliance requirements should the equipment manufacturer that was provided the engine decline to use its early introduction incentives according to the provisions in Section 2423(d)(9). Table 4, as follows, summarizes the incentives for the early introduction of Tier 4 engines and some of the conditions that determine eligibility.

Table 4. -- Early Introduction Incentives for Engine Manufacturers

Early Introduction	Power Category	Qualifying Standards[1] grams per kilowatt-hour	Per Engine Incentive
Final Tier 4 PM-Only[2]	19≤kW<56	0.03 PM	3 for 2 PM-Only
	56≤kW<560	0.02 PM	
Final Tier 4 All	19≤kW<56	0.03 PM/4.7 NMHC + NO_x	3 for 2
	56≤kW≤560	0.02 PM/0.40 NOx/0.19 NMHC	
	GEN>560	0.03 PM/0.67 NOx/0.19 NMHC	
	ELSE≥560	0.04 PM/3.5 NOx/0.19 NMHC	
Ultra Low NOx	kW≥19	Final Tier 4 PM & NMHC/0.20 NOx	2 for 1

Notes:

[1] All engines must meet the Tier 4 crankcase emissions requirements. Engines must certify using all test and other requirements otherwise required for final Tier 4 standards such as for transient and not-to-exceed limits.

[2] Offsets must be earned prior to the start of phase-in requirements (prior to 2013 for 19≤kW<56 engines, prior to 2012 for 56≤kW<130 engines, prior to 2011 for 130≤kW≤560 engines, prior to 2015 for >560 kW engines)

(7) Provisions for small-volume manufacturers. Small-volume engine manufacturers are entitled to special compliance provisions under this paragraph, but must notify the Executive Officer in writing before January 1, 2008, of the intent to use the provisions.

(A) Small-volume engine manufacturers may delay complying with certain otherwise applicable Tier 4 emission standards and requirements as described in the following table:

Table 5. -- Small-Volume Engine Manufacturer Provisions

Maximum Engine Power	Temporary Relief Replacement Standards	Delay End Date (Model Year)
kW<19	Tier 2	2011
19≤kW<37	Interim Tier 4	2016
37≤kW<56	See paragraph (7)(B) of this section for special provisions that apply for engines in this power range.	
56≤kW<130	Tier 3	2015

(B) The provisions of this paragraph (7) for engines 37≤kW<56 are applicable per one of the following options:

1. Manufacturers that comply with the 0.30 g/kW-hr PM standard in all model years from 2008 through 2012 without using PM credits may continue meeting that standard through 2015.

2. Manufacturers that choose not to comply with paragraph (7)(B)1. of this section may continue to comply with the standards and requirements in the 2000 Plus Limited Test Procedures for model years through 2012, but must begin complying in 2013 with the Tier 4 standards and requirements specified in Table 1b for model years 2013 and later.

(C) After the period of relief indicated in paragraphs (7)(A) and (B) of this section has expired, small-volume engine manufacturers must comply with the same Tier 4 standards and requirements as all other manufacturers.

(D) For engines not in the 19≤kW<56 power range, small volume engine manufacturers must meet the following conditions for the model years in which compliance with the otherwise applicable standards under this paragraph (7) is delayed:

1. Produce engines that meet all the emission standards and other requirements under the 2000 Plus Limited Test Procedures applicable for that model year, except as noted in this paragraph (7).

2. Meet the labeling requirements in the 2000 Plus Limited Test Procedures, but must use the following in place of the otherwise required statement of compliance in Section 2424(c)(2): "THIS ENGINE COMPLIES WITH CALIFORNIA REGULATIONS FOR [CURRENT MODEL YEAR] OFF-ROAD COMPRESSION-IGNITION ENGINES UNDER 13 CCR 2423(b)(7)." The referencing of similar federal requirements under this provision is permitted.

3. Small-volume engine manufacturers must notify the equipment manufacturer that the engines produced under this section are excluded from the production volumes associated with the equipment manufacturer flexibility program in Section 2423(d).

(E) For engines in the 19≤kW<56 power range, small-volume engine manufacturers must meet the following conditions for the model years in which compliance with the otherwise applicable standards under this paragraph (7) is delayed:

1. Produce engines in those model years that meet all the emission standards and other requirements that applied for model year 2008 engines in the same power category.

2. Meet the labeling requirements in Section 2424(c)(3), but use the following compliance statement instead of the compliance statement in Section 2423(c)(3): "THIS ENGINE COMPLIES WITH CALIFORNIA REGULATIONS FOR [CURRENT MODEL YEAR] OFF-ROAD COMPRESSION-IGNITION ENGINES UNDER 13 CCR 2423(b)(7)." The referencing of similar federal requirements under this provision is permitted.

3. Notify the equipment manufacturer that engines produced under this section are excluded from the production volumes associated with the equipment-manufacturer allowance program in Section 2423(d).

(F) The provisions of this paragraph (7) may not be used to circumvent the requirements of this article.

(8) Useful life. For purposes of certification, a manufacturer must demonstrate compliance with the standards set forth in this paragraph (b) over the full useful life of the engine, as defined in the applicable test procedures.

(9) NTE deficiencies. A manufacturer may petition the Executive Officer to accept an off-road compression-ignition engine as compliant with the NTE requirements specified in the 2008 and Later Test Procedures even though specific elements of those requirements may not be fully met. Such grants of compliance, otherwise known as deficiencies, shall be limited to engines that have functioning emission-control hardware capable of allowing the engine to comply with the NTE limits.

Deficiencies shall be granted by the Executive Officer according to the following stipulations:

(A) A manufacturer must apply for specific deficiencies at the time of, or prior to, submitting its application for certification. Deficiencies shall be assigned for an engine model within an engine family. The Executive Officer shall not approve deficiencies that are requested retroactively to cover engines already certified. The scope of each deficiency must be clearly identified in the certification application, and any auxiliary emission control device(s) used to control emissions to the lowest practical level must be identified with respect to each deficiency that is being requested.

(B) Deficiencies shall only be approved if compliance would be infeasible or unreasonable considering factors such as the technical feasibility of the given hardware, the availability of lead time, production cycles including the phase-in or phase-out of engines or vehicle designs, and planned computers upgrades. Other relevant factors may be considered.

(C) Deficiencies shall expire after a single model year and may be limited to specific engine configurations. The Executive Officer may approve a manufacturer's request for the same deficiency in the following model year if correcting the deficiency would require extreme hardware or software modifications and the manufacturer has demonstrated an acceptable level of effort toward complying.

(D) The number of deficiencies available to a manufacturer shall not be limited during the first three model years in which NTE limits apply to the manufacturer's engines. For the next four model years, up to three deficiencies per engine family shall be available to a manufacturer. Deficiencies of the same type that apply similarly to different power ratings within a family shall count as one deficiency per family. The Executive Officer may conditionally approve additional deficiencies during these four years, but may impose stipulations on their applicability as appropriate. Deficiencies shall not be approved beyond the seven-year period specified in this paragraph (8).

(10) Adjustable parameters. Manufacturers that design engines with adjustable parameters must meet all the requirements of this paragraph (b) for any adjustment in the physically adjustable range. An operating parameter is not considered adjustable if it is permanently sealed or if it is not normally accessible using ordinary tools. The Executive Officer may require that the adjustable parameters be set to any specification within the adjustable range during any testing, including certification testing, selective enforcement auditing, or in-use testing.

(11) Prohibited controls. A manufacturer shall not design engines with emission control devices, systems, or elements of design that cause or contribute to an unreasonable risk to public health, welfare, or safety while operating.

(12) Defeat devices. Engines equipped with a defeat device shall not be certified for sale in California. A defeat device is a component or system that reduces the effectiveness of emission controls under conditions that the engine may reasonably be expected to encounter during normal operation and use. This prohibition does not apply to auxiliary-emission control devices identified in the certification application if one of more of the following is true:

(A) The operating conditions where the auxiliary-emission control device is active were substantially encountered during all testing requirements as described in Part 1039, Subpart F of the 2008 and Later Test Procedures.

(B) The design of the auxiliary-emission control device is shown to be necessary for preventing engine (or equipment) damage or accidents.

(C) The auxiliary-emission control device only reduces the effectiveness of emissions control during engine starting.

(c)(1) The test procedures for determining certification and compliance with the standards for gaseous exhaust emissions from new 1996-1999 heavy-duty off-road compression-ignition engines sold in the state are set forth in the 1996-1999 Heavy-Duty Test Procedures.

(2)(A) The test procedures for determining certification and compliance with the standards for gaseous exhaust emissions and the standards for opacity of smoke emissions from new 2000 model year and later off-road compression-ignition engines for which the standards in paragraph (b)(1)(A) are applicable, and sold in the state, are set forth in the 2000 Plus Limited Test Procedures.

(B) The test procedures for determining certification and compliance with the standards for gaseous exhaust emissions, particulate exhaust emissions, opacity of smoke emissions, and not-to-exceed emissions from new 2008 model year and later off-road compression-ignition engines for which the limits in paragraph (b)(1)(B) are applicable, and sold in the state, are set forth in the 2008 and Later Test Procedures.

(3) The test procedures for determining certification and compliance with the standards for particulate exhaust emissions from new 1996 and later off-road compression-ignition engines for which the standards in paragraph (b)(1)(A) are applicable, and sold in the state, are set forth in the PM and Test Cycle Limited Test Procedures.

(4) The test procedures for determining certification and compliance with the standards for the opacity of smoke emissions from new 1996-1999 off-road compression-ignition engines sold in the state are set forth in the 1996-1999 Smoke Test Procedures.

(d) Implementation flexibility for equipment and vehicle manufacturers and post-manufacture marinizers. For a limited time, off-road equipment and vehicle manufacturers and post-manufacture marinizers may produce equipment with engines that are subject to less stringent emission standards than required by Tables 1a and 1b for new 2000 model year and later off-road equipment and vehicles and marine compression-ignition engines, subject to the requirements of paragraph (e) of this section. Separate provisions are provided for equipment with engines subject to the 2000 Plus Limited Test Procedures versus equipment with engines subject to the 2008 and Later Test Procedures, and are identified accordingly in the following subsections. Only manufacturers that have primary responsibility for designing and manufacturing equipment, and have manufacturing procedures for installing engines in equipment, are eligible to participate in the equipment manufacturer flexibility program provided by the 2008 and Later Test Procedures. Equipment manufacturers participating in this flexibility program must comply with the notification and reporting requirements specified in Section 2423(d)(7). Engines produced for this flexibility program using FELs greater than the applicable standards must be offset with sufficient ABT credits. The following allowances apply separately to each engine power category subject to standards under Section 2423(b)(1):

(1) Percent-of-production allowances.

(A) Equipment rated at or above 37kW and subject to the 2000 Plus Limited Test Procedures. A manufacturer may produce equipment and vehicles with engines rated at, or above, 37kW that are exempted from meeting current model year emission standards for a portion of its California-directed production volume. These percent-of-production flexibility allowances must be used within the seven years immediately following the date on which Tier 2 engine standards first apply to engines used in such equipment and vehicles, provided that the seven-year sum of the U.S.-directed portion of the manufacturer's percent-of-production flexibility allowances does not exceed 80 percent, expressed in cumulative yearly percentage increments, and provided that all such equipment and vehicles contain only engines that have been certified to the Tier 1 or Tier 2 standards;

(B) Equipment rated under 37kW and subject to the 2000 Plus Limited Test Procedures. A manufacturer or post-manufacture marinizer may produce equipment and vehicles and marine engines with engines rated under 37kW that are exempt from meeting current model year emission standards for a portion of its California-directed production volume. These percent-of-production flexibility allowances must be used within the seven years immediately following the date on which Tier 1 engine standards first apply to engines used in such equipment and vehicles and marine engines, provided that the seven-year sum of the U.S.-directed portions of the manufacturer's percent-of-production flexibility allowances, does not exceed 80 percent, expressed in cumulative yearly percentage increments;

(C) Equipment subject to the 2008 and Later Test procedures. A manufacturer may produce equipment and vehicles with engines that are exempt from meeting current model year emission standards for a portion of its California-directed production volume. These percent-of-production flexibility allowances must be used within one of the seven-year flexibility usage periods specified in Table 6 for each applicable power category, provided that the seven-year sum of the U.S.-directed portion of the manufacturer's percent-of-production flexibility allowances does not exceed 80 percent, expressed in cumulative yearly percentage increments, except as provided for in paragraph (d)(6) or (f). Equipment used as percent-of-production flexibility allowances must contain only engines that have been certified to, at least, the standards listed in Table 6, corresponding to the flexibility usage period selected by the manufacturer. All flexibility allowances for a power category must be used within the same flexibility usage period.

Table 6. -- Tier 4 Flexibility Allowance Options

Power Category	7 Year Usage Period	Flexibility Standard
<19 kW	2008-2014	Tier 2
19≤kW<56	2008-2014[1]	Tier 3[2]
	2012-2018	2008 Interim Tier 4
56≤kW<130	2012-2018	Tier 3
	2014-2020	2012 Interim Tier 4
130≤KW≤560	2011-2017	Tier 3
	2014-2020	2011 Interim Tier 4
>560 kW	2011-2017	Tier 2
	2015-2021	2011 Interim Tier 4

Notes:

[1] This usage period is not available for allowances greater than or equal to 37 kW unless interim Tier 4 standards have been met starting in 2008.

[2] Flexibility allowances under 37kW may contain engines certified to the Tier 2 standards.

(2)(A) Small volume allowances subject to the 2000 Plus Limited Test Procedures. An off-road equipment or vehicle manufacturer or post-manufacture marinizer may exceed the production percentages in paragraphs (d)(1)(A) and (B) of this section for a portion of its California-directed production, provided that in each regulated power category the manufacturer's total number of U.S.-directed off-road equipment and vehicles and marine diesel applications that contain engines which are exempt from meeting current model year emission standards over the years in which the percent-of-production allowance applies:

1. does not exceed 100 units times the number of years in which the percent-of-production allowance applies, and

2. does not exceed 200 units in any year, and

3. does not use engines from more than one engine family.

(B) Small volume allowances subject to the 2008 and Later Test Procedures. As an alternative to the percent-of-production allowance in Section 2423(d)(1)(C), an off-road equipment or vehicle manufacturer may produce equipment with engines that are exempt from meeting current model year emission standards for a portion of its California-directed production volume, provided that the exempt equipment is a subset of the manufacturer's U.S.-directed volume of exempt equipment and the manufacturer is in compliance with the following provisions:

1. Single engine family provision. A manufacturer may claim up to 700 U.S.-directed flexibility allowances within a power category during one of the seven-year flexibility usage periods specified in Table 6, but no more than 200 allowances in a single year within a power category, except as provided for in paragraph(d)(6) or (f). Engines within a power category that are used in these flexibility allowances must be from a single engine family within a given year.

2.a. Multiple engine family provision for flexibility allowances below 130 kW. A manufacturer may claim up to 525 U.S.-directed flexibility allowances within a power category during one of the seven-year flexibility usage periods specified in Table 6, but no more than 150 allowances in a single year within a power category, except as provided for in paragraph (d)(6) or (f). Engines within a power category that are used in these flexibility allowances may be from multiple engine families within a given year.

b. Multiple engine family provision for flexibility allowances at or above 130 kW. A manufacturer may produce up to 350 U.S.-directed flexibility allowances within a power category during one of the seven-year flexibility usage periods specified in Table 6, but no more than 100 allowances in a single year within a power category, except as provided for in paragraph (d)(6) of (f). Engines within a power category that are used in these flexibility allowances may be from multiple engine families within a given year.

(3)(A) Inclusion of previous-tier engines. Off-road equipment and vehicles and marine diesel engines built with previous tier or noncertified engines under the existing inventory provisions of the 2000 Plus Limited Test Procedures (40 CFR Section 89.1003(b)(4)) need not be included in determining compliance with paragraphs (d)(1)(A) and (B) and (d)(2)(A) of; this section.

(B) Inclusion of engines not subject to Tier 4 requirements. Off-road equipment and vehicles built with engines otherwise exempt from the requirements of the 2008 and Later Test Procedures are not required to be counted toward the percentage, or number, of claimed flexibility allowances under the provisions in Subsections (d)(1)(C) and (d)(2)(B). Such exempted engines include unused inventories produced prior to the effective date of the Tier 4 standards, excluding

stockpiled engines, and hand-startable, air cooled, direct-injection engines below 8 kW in 2008 and 2009 that do not meet the Tier 4 PM standard. Nonetheless, manufacturers may choose to include these engines in the count of total equipment produced from which the percentage of flexibility allowances in Subsection (d)(1)(C) is derived.

(4) Early-use of flexibility allowances. Manufacturers may start using a portion of the flexibility allowances in Subsections (d)(1)(C) and (d)(2)(B) for equipment and vehicles containing engines not yet subject to the Tier 4 standards, provided that the seven-year period for using flexibility allowances under the 2000 Plus Limited Test Procedures flexibility program has expired. All equipment and vehicles claimed as flexibility allowances under this early-use provision must contain engines that have been certified to, at least, the Tier 1 standards. Manufacturers must count these Tier 2 or Tier 3 equipment and vehicles toward the total percentage, or number, of flexibility allowances permitted under the provisions of Sections (d)(1)(C) and (d)(2)(B). The maximum cumulative early-use allowance is 10 percent under the percent-of-production provision in Section (d)(1)(C), or 100 units under the small volume provision in Section (d)(2)(B). Table 7 shows the applicable years for using early-use flexibility allowances. Table 7 follows:

Table 7. -- Years for Early-Use Flexibility Allowances

Maximum Engine Power	Calendar Years
kW<19	2007
19≤kW<37	2006-2011
37≤kW<56	2011
56≤kW<75	2011
75≤kW<130	2010-2011
130≤kW<225	2010
225≤kW<450	2008-2010
450≤kW≤560	2009-2010
>560 kW	--

(5) Labeling requirements. Allowances claimed under the Tier 2/3 or Tier 4 equipment flexibility programs must be labeled, as appropriate, per the following:

(A) Engine labeling. Except for engines used in flexibility allowances prior to January 1, 2007, engine manufacturers shall meet the labeling requirements provided in Section 2424 with the following substitutions:

For flexibility engines meeting previous year emission requirements, the engine manufacturer shall substitute the following for the statement of compliance required in Sections 2424(c)(1)(E)6. and 2424(c)(2):

"THIS ENGINE COMPLIES WITH CALIFORNIA EMISSION REQUIREMENTS UNDER 13 CCR 2423(d). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN FOR THE EQUIPMENT FLEXIBILITY PROVISIONS CITED MAY BE A VIOLATION OF STATE LAW SUBJECT TO CIVIL PENALTY." [Insert Engine Family Name]

For flexibility engines less than 37 kW and not subject to emission requirements under the Tier 2/3 program, the engine manufacturer shall substitute the following for the statement of compliance required in Section 2424(c)(1)(E)6.:

"THIS ENGINE QUALIFIES FOR USE IN EQUIPMENT RATED BELOW 37 KW BY PROVISION OF 13 CCR 2423(d). SELLING OR INSTALLING THIS ENGINE FOR ANY PURPOSE OTHER THAN FOR THE EQUIPMENT FLEXIBILITY PROVISIONS CITED MAY BE A VIOLATION OF CALIFORNIA LAW SUBJECT TO CIVIL PENALTY."

As an alternative for flexibility engines produced under the Tier 2/3 program, and for which the engine manufacturer offers proof to the Executive Officer that the otherwise required statements of compliance in this subsection would be unduly burdensome or costly to implement, engine manufacturers may instead use the following:

"THIS ENGINE CONFORMS TO CALIFORNIA OFF-ROAD COMPRESSION-IGNITION ENGINE REGULATIONS UNDER 13 CCR 2423(d)." [Insert Engine Family Name if Certified]

These revised statements of compliance do not preclude the referencing of similar federal requirements that would be satisfied simultaneously by meeting the provisions of Section 2423(d). Furthermore, the Executive Officer may, upon request, approve alternate labeling specifications that are equivalent to the specifications in this subsection.

(B) Equipment Labeling. For all allowances claimed under the Tier 4 flexibility program, equipment manufacturers shall affix a permanent label to the engine, or to a readily visible section of the equipment that cannot be easily removed. The label shall be in the English language, shall supplement the manufacturer's emission control information label, and shall include the following information:

1. The label heading "EMISSION CONTROL INFORMATION".

2. The equipment manufacturer's corporate name and trademark.

3. The calendar year in which the equipment is manufactured.

4. The name, e-mail address, and phone number of a person to contact for further information.

5. The following statement:

"THIS EQUIPMENT [or identify the type of equipment] HAS AN ENGINE THAT MEETS CALIFORNIA EMISSION STANDARDS UNDER 13 CCR 2423(d)."

This label content does not preclude the referencing of similar federal requirements that would be satisfied simultaneously by meeting the provisions of Section 2423(d).

(6) Technical hardship allowances. Equipment manufacturers may apply for additional flexibility allowances should extreme and unusual circumstances occur leading to technical obstacles in complying with the Tier 4 requirements. A manufacturer may request additional allowances for power categories 19≤kW≤560 if it claims allowances under the provisions of Section 2423(d)(1)(C), but may only request additional allowances for power categories 19≤kW<56 if it claims allowances under the provisions of Section 2423(d)(2)(B). Additional flexibility allowances shall not be provided when the engine and equipment are produced by the same manufacturer, or affiliate. The Executive Officer shall review requests for additional flexibility allowances according to the following stipulations:

(A) The manufacturer requesting additional allowances must demonstrate that the circumstances necessitating them were outside the control of the manufacturer and could not have been avoided with reasonable discretion. The manufacturer must also demonstrate that it has exercised prudent planning and has taken reasonable steps to minimize the scope of the request.

(B) Manufacturers applying for additional flexibility allowances must do so in writing to the Chief of the Mobile Source Operations Division, or designee, prior to the earliest date in which the applying manufacturer would be in violation of Section 2423(b)(1). All applications shall provide, at a minimum, the following information:

1. A description of the manufacturer's equipment design process.

2. A description of the relationship with the engine supplier regarding product design.

3. An explanation of the technical hardship leading to this request, why it cannot be addressed without additional flexibility allowances, and an explanation of the circumstances behind the technical hardship and why it was unavoidable.

4. A description of the information and products provided by the engine supplier related to equipment design, including specifications, performance data, prototypes, and the dates of delivery.

5. A comparison of the design processes of the equipment model(s) for which additional allowances are needed versus those of other models that do not need additional allowances, and an explanation of how the technical differences between the models justify the request for additional allowances.

6. A description of all efforts to find and use other compliant engines, or otherwise an explanation why none are available.

7. A description of the steps taken to minimize the scope of the manufacturer's request, and any other relevant information.

8. An estimation of the number of additional allowances needed for each equipment model covered by the request, subject to Sections 2423(d)(6)(C) and (d)(6)(D) below.

Notwithstanding, the Executive Officer may require additional information as deemed necessary before making a determination for relief.

(C) The following limits shall apply for additional flexibility allowances granted in connection to the percent-of-production provisions in Section 2423(d)(1)(C):

1. A manufacturer's California-directed share of additional flexibility allowances for each power category shall be a subset of its U.S.-directed allowances for the same power category, provided that the additional U.S.-directed allowances do not exceed 70 percent of the U.S.-directed volume of production for the power category for one year.

2. All primary percent-of-production allowances must be completely used up prior to the use of any additional flexibility allowances.

3. All additional allowances shall expire 24 months after the start of the applicable flexibility usage period for each power category, as specified in Table 6. These allowances shall only be used for the specific equipment models covered in the manufacturer's written application for relief.

(D) The following limits shall apply for additional flexibility allowances granted in connection to the small volume provisions in Section 2423(d)(2)(B):

1. Only small equipment manufacturers, as defined below, that have not been granted additional flexibility allowances for the 19≤kW<56 power category under Section 2423(d)(6)(C), are eligible to request additional flexibility allowance under this provision.

"Small equipment manufacturer," for the purpose of this provision, means a federally defined small-business equipment manufacturer that had an annual U.S.-directed production volume of equipment using off-road diesel engines 19≤kW<56 of no more than 3,000 units in 2002 and all earlier calendar years, and has 750 or fewer employees (500 or fewer employees for nonroad equipment manufacturers that produce no construction equipment or industrial trucks). For manufacturers owned by a parent company, the production limit applies to the production of the parent company and all its subsidiaries and the employee limit applies to the total number of employees of the parent company and all its subsidiaries.

2. All primary small volume allowances for the 19≤kW<56 power category must be completely used up for a given year prior to the use of additional flexibility allowances.

3. Additional allowances shall only be used for equipment with engines rated 19≤kW<37.

4. A manufacturer's California-directed share of additional flexibility allowances under this provision shall be a subset of its U.S.-directed allowances, which shall not exceed 1,100.

5. All additional allowances shall expire 36 months after the start of the applicable flexibility usage period for each power category, as specified in Table 6. The allowances shall only be used for the specific equipment models covered in the manufacturer's written application for relief. The additional allowances are not subject to small volume annual limits.

(7) Notification and reporting requirements for using Tier 4 flexibility allowances. As a prerequisite to using any Tier 4 flexibility allowances, the equipment manufacturer shall notify the ARB of its intent to use such allowances. The manufacturer shall also send an annual report after each year that flexibility allowances have been used to verify that the allowances claimed do not exceed the number of allowances permitted.

(A) Before January 1 of the first year that flexibility provisions will be used, a written notice informing ARB of the manufacturer's intent to use flexibility allowances must be sent to the Chief of the Mobile Source Operations Division, or designee, containing the following information:

1. The equipment manufacturer's name and address, and the name and address of the parent company, if applicable.

2. The name and telephone number of a person to contact for more information.

3. The calendar years for which the Tier 4 flexibility provisions shall apply.

4. The engine manufacturer's name and address that produces the engines which will be used in the equipment claimed as flexibility allowances.

5. An accurate estimate of the number of flexibility allowances in each power category that will be produced under the percent-of-production provisions in Section 2423(d)(1)(C), or the small volume provisions in Section 2423(d)(2)(B).

6. A tabulation of U.S.-directed flexibility allowances in each power category that have been sold in previous calendar years under the provisions of Section 2423(d) and 40 CFR 89.102(d).

(B) For each year that Tier 4 flexibility allowances are used, the equipment manufacturer shall submit, by March 31 of the following year, a written report to the Chief of the Mobile Source Operations Division, or designee, documenting the utilization of those allowances. This report shall include the total number of equipment sold by the manufacturer during the preceding year for each power category, based on actual U.S.-directed production information, and shall identify the flexibility allowances in each power category by reporting the percentages of U.S.-directed flexibility production corresponding to the number of equipment in each power category. The report shall also identify the cumulative yearly totals and percentages for all flexibility allowances sold for each power category. Alternatively, the percentage figures may be omitted from the report if the report states that percent-of-production allowances were not used. If available, end of year percentage figures for California-directed sales shall also be included in this report.

(8) Import restrictions on the use of Tier 4 flexibility allowances. Foreign equipment manufacturers may only import equipment with exempted flexibility engines into California according to the stipulations in Section 1039.626 of the 2008 and Later Test Procedures. These stipulations address the potential for abuse whereby individual importers could collectively import more flexibility allowances than permitted, based on the foreign equipment manufacturer's total production for the United States market. The stipulations include acceptance by the foreign equipment manufacturer of random audits by the ARB or its representatives, and the posting of a monetary bond for each imported engine to cover the cost of any potential enforcement actions. Foreign equipment manufacturers who comply with the stipulations will be eligible to receive the same flexibility allowances as domestic manufacturers.

(9) Early introduction incentives for equipment manufacturers. In addition to the equipment flexibility allowances provided in Subsections (d)(1)(C) and (d)(2)(B), equipment manufacturers, as provided in the 2008 and Later Test Procedures, may

earn additional allowances for the early introduction of equipment with engines meeting the Tier 4 standards in Table 1b. Equipment manufacturers installing engines at or above 19 kW that comply with the final Tier 4 PM and NOx standards could earn one flexibility allowance for each early Tier 4 compliant engine used in its equipment. Equipment manufacturers installing engines 56≤kW≤560 that comply with the final Tier 4 PM standard and the alternative NOx standard could earn one-half of a flexibility allowance for each early Tier 4 engine used in its equipment. Table 8, below, summarizes the incentives for the early introduction of Tier 4 compliant equipment and some of the conditions that determine eligibility. Should an equipment manufacturer decline flexibility allowances earned with this provision, the allowances would then be available to the engine manufacturer that had supplied the early introduction engine, subject to the provisions in Section 2423(b)(6).

Table 8. -- Early Introduction Incentives for Equipment Manufacturers

Power Category	Qualifying Standards (g/kW-hr)	Installation Deadline	Flexibility Allowance
19≤kW<56	0.03 PM/4.7 NMHC + NOx	December 31, 2012[1]	1 for 1
56≤kW≤130	0.02 PM/0.40 NOx/0.19 NMHC	December 31, 2011	1 for 1
	0.02 PM/3.4 NOx/0.19 NMHC[2]		1 for 2
130≤kW≤560	0.02 PM/0.40 NOx/0.19 NMHC	December 31, 2010	1 for 1
	0.02 PM/2.0 NOx/0.19 NMHC[2]		1 for 2
GEN>560	0.03 PM/0.67 NOx/0.19 NMHC		
ELSE>560	0.04 PM/3.5 NOx/0.19 NMHC	December 31, 2014	1 for 1

Notes:

[1] The installation date for 37≤kW≤56 engines purchased from manufacturers choosing to opt out of the 2008 model year Tier 4 standards and instead comply with the Tier 4 standards beginning in 2012 would be December 31, 2011.

[2] To be eligible, engines must meet the 0.02 g/kW-hr PM standard and the alternate NOx standards.

(e) Recordkeeping and calculation to verify compliance. The following shall apply to off-road equipment or vehicle manufacturers and post-manufacture marinizers who produce flexibility equipment or vehicles or marine diesel engines under both the Tier 2/3 and Tier 4 flexibility provisions of paragraph (d) of this section, except as otherwise noted:

(1) For each power category in which excepted off-road equipment or vehicles or marine diesel engines are produced, a calculation to verify compliance with the requirements of paragraph (d) of this section shall be made by the off-road equipment or vehicle manufacturer or post-manufacture marinizer. This calculation shall be made for flexibility allowances under the Tier 2/3 program no later than December 31

of the year following the last year in which allowances are used, and as indicated in Subsection (d)(7)(B) for flexibility allowances under the Tier 4 program. The calculation shall be based on actual national production information from the subject years. If both the percent-of-production and small volume allowances have been exceeded, then the manufacturer is in violation of Section 2420(a)(3), except as provided under Subsection (d)(6) and paragraph (f) of this section.

(2) An off-road equipment or vehicle manufacturer or post-manufacture marinizer shall keep records of all off-road equipment and vehicles and marine diesel engines sold in California under the provisions of paragraph (d) of this section, for each power category in which flexibility allowances are claimed. These records shall include equipment and engine model numbers, serial numbers, and dates of manufacture, engine rated power for Tier 2/3 flexibility engines, and maximum engine power for Tier 4 flexibility engines. In addition, the manufacturer shall keep records sufficient to demonstrate the verifications of compliance required in paragraph (e)(1) of this section and the notifications and reports specified in Section 2423(d)(7), as applicable. All records shall be kept until at least two full years for flexibility allowances under the Tier 2/3 program and five full years for flexibility allowances under the Tier 4 program after the final year in which allowances are available for each power category, and shall be made available to the Executive Officer upon request.

(f) Economic hardship relief. Off-road equipment and vehicle manufacturers and post-manufacture marinizers may request relief from the Executive Officer, or designee, subject to the following requirements:

(1) The application for relief must be submitted for approval to the Chief of the Mobile Source Operations Division, or designee, in writing prior to the earliest date in which the applying manufacturer would be in violation of Section 2423(b)(1). The off-road equipment or vehicle manufacturer applying for hardship relief must submit evidence for approval, showing that the following requirements have been met:

(A) The off-road equipment or vehicle manufacturer applying for hardship relief must not be the manufacturer of the engines used in the equipment for which relief is sought. This requirement does not apply to post-manufacture marinizers.

(B) The conditions causing the impending violation must not be substantially the fault of the applying manufacturer.

(C) The conditions causing the impending violation must be such that the off-road equipment or vehicle manufacturer applying for hardship relief will experience serious economic hardship if relief is not granted.

(D) The off-road equipment or vehicle manufacturer applying for hardship relief must demonstrate that no allowances under paragraph (d) of this section will be available to avoid the impending violation.

(2) Any relief granted must begin within one year after the implementation date of the standard applying to the engines being used in the equipment, or to the marine diesel engines, for which relief is requested, and may not exceed 12 months (24 months for small volume manufacturers) in duration.

(3) The Executive Officer may impose other conditions on the granting of relief, including provisions to recover the lost environmental benefit. The labeling requirements in the 2008 and Later Test Procedures apply.

(g) Alternative Flexibility for Post-Manufacture Marinizers. Post-manufacture marinizers may elect to delay the effective date of the Tier 1 standards for marine propulsion diesel engines rated under 37kW by one year, instead of using the provisions of paragraphs (d) and (f) of this section. Post-manufacture marinizers wishing to take advantage of this provision must inform the Executive Officer of their intent to do so in writing before the date that the standards would otherwise take effect.

(h) Allowance for the production of engines. To meet the demand for engines created under paragraph (d), (f), or (g) of this section, engine manufacturers may produce engines that do not meet current year emission requirements. However, engine manufacturers must receive written assurance from each equipment manufacturer, prior to production, that a certain number of these engines are needed for the equipment manufacturer's Tier 4 equipment flexibility allowances. Engine manufacturers shall provide to the Executive Officer annually, as part of the certification application, a list of the equipment manufacturers requesting such engines for their Tier 2/3 and Tier 4 equipment flexibility allowances. The list shall include the equipment manufacturers' names, engine models, and estimated national production volumes. A copy of the original correspondence from the equipment manufacturer requesting the production of flexibility engines shall be kept on file by the engine manufacturer in addition to, and in accordance with, the provisions of §1039.250 of the 2008 and Later Test Procedures, and shall be made available without delay to the Executive Officer upon request. Furthermore, all engines produced for sale in California under either of the transitional flexibility provisions for equipment manufacturers, must be covered by an Executive Order starting January 1, 2007. To obtain an Executive Order for these engines, the engine manufacturer shall comply with the following:

(1) Prior to the start of production, submit a letter to the Chief of the Mobile Source Operations Division, or designee, requesting certification for flexibility engines intended for sale; in California, and

(2) Provide written assurance that the flexibility engines to be produced will be identical in all material respects to those for which a valid Executive Order has been issued in a previous model year. The engine family name of the previously certified engine family must be included in the manufacturer's request for certification. Upon determination that the conditions in paragraphs (1) and (2) have been satisfied, the Executive Officer shall provide the engine manufacturer with an Executive Order

covering the requested flexibility engine families for the current model year. The engine family names included in the Executive Order shall either be the same as, or a subset of the previously certified engine family names, and shall remain the same for as long as the engines continue to qualify as flexibility allowances regardless of model year. These engine family names shall be used by the engine manufacturer to comply with the labeling requirements of 2423(d)(5)(A).

(i) [Reserved]

(j)(1) A new compression-ignition off-road engine intended solely to replace an engine in a piece of off-road equipment that was originally produced with an engine manufactured prior to the applicable implementation date as specified in Section 2423, shall not be subject to the emission requirements of Section 2423 provided that:

(A) the engine manufacturer has ascertained that no engine produced by itself or the manufacturer of the engine that is being replaced, if different, and certified to the requirements of this article, is available with the appropriate physical or performance characteristics to repower the equipment; and

(B) unless an alternative control mechanism is approved in advanced by the Executive Officer, the engine manufacturer or its agent takes ownership and possession of the engine being replaced; and

(C) the engine manufacturer does not use the replacement-engine exemption to circumvent the regulations; and

(D) the replacement engine is clearly labeled with the following language, or similar alternate language approved in advance by the Executive Officer:

"THIS ENGINE DOES NOT COMPLY WITH CALIFORNIA AND FEDERAL OFF-ROAD OR ON-HIGHWAY EMISSION REQUIREMENTS. SALE OR INSTALLATION OF THIS ENGINE FOR ANY PURPOSE OTHER THAN AS A REPLACEMENT ENGINE FOR AN ENGINE MANUFACTURED PRIOR TO JANUARY 1 [INSERT APPROPRIATE YEAR] IS A VIOLATION OF CALIFORNIA AND FEDERAL LAW SUBJECT TO CIVIL PENALTY."

(2) At the conclusion of each of the 2000 and later model years, the manufacturer must provide, by engine model, the actual number of replacement engines produced for California during the model year, and a description of the physical or performance characteristics of those models that indicate certified replacement engine(s) were not available as per paragraph (1).

(k) Any new engine certified to comply with California emission standards and test procedures for on-road applications may, upon approval by the Executive Officer, be considered to be in compliance with these regulations.

(l) Practices and labeling requirements for rebuilt engines. This subsection shall apply as provided in paragraph (1) below to all off-road compression-ignition engines subject to the requirements of Section 2423 that are rebuilt after December 31, 2006, including those engines that were originally manufactured on, or prior to, December 31, 2006.

(1) Practices. The rebuilding practices described in Part 89.130 of the incorporated 2000 Plus Limited Test Procedures, including the exemption for engines equal to or greater than 37 kW that meet the Tier 1 standard, and Part 1068.120 of the 2008 and Later Test Procedures shall apply. These practices are summarized in paragraphs (1)(A) and (1)(B) below, which are provided as respective references for the labeling requirements in paragraphs (2)(A) and (2)(B) of this subsection.

(A) Any person who rebuilds an engine that either remains installed in a piece of equipment during the rebuilding process or will be reinstalled after the rebuilding process has been completed shall rebuild the engine to the same certified configuration or the certified configuration of a later model year engine. For the purposes of this section, these engines shall be referred to as "rebuilt original engines."

(B) Any person who replaces the engine in a piece of equipment with a rebuilt engine (this includes engines that have been substantially assembled from parts originally belonging to one or more other engines) shall use a replacement engine with a certified configuration that is at least equivalent, from an emissions standpoint, to that of the engine being replaced. For the purposes of this section, these engines shall be referred to as "rebuilt replacement engines."

(2) Labeling Requirements.

(A) Rebuilt Original Engines. Any person who rebuilds engines for which the practices in paragraph (1)(A) of this subsection apply shall ensure that the rebuilt engines are labeled as follows:

1. An original engine that is rebuilt to the same emissions configuration employed by the engine at the time it was issued an Executive Order shall retain the emissions control label described in Section 2424. The rebuilder shall not remove or deface in any manner the original label and must take care to protect it from the effects of sandblasting, acid dipping, or any other restorative processes. Notwithstanding the preceding requirements and prohibitions of this paragraph (2)(A)1., the rebuilder shall substitute a new permanent label containing the text in paragraph (2)(A)2. below for the original emission control label if the rebuilder determines that the label has been irreparably corrupted due to extreme and unintentional circumstances (e.g., fire or collision). The rebuilder shall provide to the Executive Officer annually a list of all rebuilt engines for which original labels have been removed under this provision no later than two months after the end of each calendar year. The rebuilder shall retain all removed labels, or otherwise document the degree to

which the labels were damaged or missing (e.g., photographic proof of the corruption), for a period of no less than eight years following the date of renovation, and shall make these available to the Executive Officer upon request. The rebuilder shall be subject to civil penalty under State law should the Executive Officer determine that the original emission control label did not warrant replacement or that the rebuilder is abusing this provision;

2. An original engine that is rebuilt to a more stringent emissions configuration shall be permanently re-labeled using the following text:

"THIS ENGINE HAS BEEN REBUILT UNDER 13 CCR 2423(l) USING MATCHED COMPONENTS OF THE SAME SPECIFICATIONS AND CALIBRATIONS AS THOSE OF A CERTIFIED TIER [insert the numerical tier designation of the rebuilt engine] OFF-ROAD COMPRESSION-IGNITION ENGINE. IF PLACED INTO SERVICE IN AN OFF-ROAD APPLICATION, THIS ENGINE MUST BE INSTALLED IN EQUIPMENT ORIGINALLY SOLD WITH A TIER [insert the numerical tier designation of the rebuilt engine] OR EARLIER ENGINE. [insert the engine family name of the reference engine].

For the purpose of this label, "MATCHED" means a complete set of components corresponding to the certified emissions configuration being referenced (see the definition of "certified emissions configuration" in Section 2421(a)(13)). The reference engine is the engine family name corresponding to the certified emissions configuration to which the engine has been rebuilt. The label shall conform to the provisions of Section 2424 regarding location and visibility.

(B) Rebuilt Replacement Engines. Any person who rebuilds engines for which the practices in paragraph (1)(B) of this subsection apply shall ensure that the rebuilt engines are labeled as follows:

1. A replacement engine that is rebuilt to the same California emissions configuration employed by the engine at the time it was issued an Executive Order shall either retain the emission control label described in Section 2424 or be permanently re-labeled using the text in paragraph (2)(A)2. of this subsection. A replacement engine that is rebuilt to the same emissions configuration employed by the engine at the time it was issued a federal Certificate of Conformity, and for which no Executive Order exists, shall be permanently re-labeled using the text in paragraph (2)(A)2. of this subsection prior to being installed in equipment that was originally sold with a California certified engine;

2. A replacement engine that is rebuilt to a more stringent emissions configuration shall be permanently re-labeled using the text in paragraph (2)(A)2. above;

3. An incomplete rebuilt replacement engine shall be permanently re-labeled using the text specified below. For the purposes of this subsection, "incomplete rebuilt replacement engine" means a rebuilt replacement engine that is sold or offered for sale in California without all the necessary components to enable engine operation including, but not necessarily limited to, the fuel system and the air system:

"THIS ENGINE HAS BEEN REBUILT UNDER 13 CCR 2423(l) AS AN INCOMPLETE ENGINE USING ONLY MATCHED COMPONENTS OF THE SAME SPECIFICATIONS AND CALIBRATIONS AS THOSE FOUND IN OFF-ROAD COMPRESSION-IGNITION ENGINES CERTIFIED TO THE [insert the numerical tier or multiple tiers designation of the rebuilt engine]."

Any person who completes an incomplete rebuilt replacement engine with components that are not matched components, and the resulting engine is placed into service in California, is in violation of the rebuilding practices referenced under paragraph (1) of this subsection and subject to civil penalty under State law.

(C) Supplemental Labeling Requirements. Except as noted below, any person who sells or offers for sale any rebuilt engine subject to the provisions of subsection (l) shall affix a supplemental label to the rebuilt engine that:

1. states the name of the rebuilder, year of rebuild, and other pertinent information as determined by the rebuilder or specified by the Executive Officer; and

2. is clearly visible without the need to remove any engine components; and

3. does not obscure in any way the visibility of the original emission control label or the labels required under paragraphs (2)(A)2. or (2)(B)3. of this subsection; and

4. does not state or imply that the rebuilt engine is "new" or that it belongs to an engine family other than the one to which it was originally certified; and

5. has sufficient durability to remain intact and legible throughout all mandatory record keeping periods for rebuilt engines.

The requirement for a supplemental label shall be waived in cases where the rebuilder alternately chooses to incorporate the information in (C)1. above into the new permanent label specified in subsection (2)(A)2. or (2)(B)3.

(D) Rebuilt New Engines. Notwithstanding any other requirement of this subsection (l), any person who rebuilds an engine to comply with current-year emission requirements (including, but not limited to, durability and warranty), with

the intent to sell or offer for sale the rebuilt engine as "new" under the coverage of a new and unique Executive Order, shall replace the original emission control label on that engine with one identifying the engine as belonging to a family meeting current-year emission requirements in accordance with the provisions of Section 2424. If desired, the rebuilder of a such an engine may optionally affix to it a supplemental label, but such a label would be required to comply with the same requirements specified in paragraph (C) of this subsection for any other rebuilt engine.

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 43013, 43017, 43018, 43101, 43104 and 43211-43212, Health and Safety Code.

§ 2485.0.1. Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Purpose. The purpose of this airborne toxic control measure is to reduce public exposure to diesel particulate matter and other air contaminants by limiting the idling of diesel-fueled commercial motor vehicles.

(b) Applicability. This section applies to diesel-fueled commercial motor vehicles that operate in the State of California with gross vehicular weight ratings of greater than 10,000 pounds that are or must be licensed for operation on highways. This specifically includes:

(1) California-based vehicles; and

(2) Non-California-based vehicles.

(c) Requirements.

(1) Idling Restriction. On or after February 1, 2005, the driver of any vehicle subject to this section shall comply with the following requirements, except as noted in subsection (d) below:

(A) the driver shall not idle the vehicle's primary diesel engine for greater than 5.0 minutes at any location.

(B) the driver shall not operate a diesel-fueled auxiliary power system (APS) to power a heater, air conditioner, or any ancillary equipment on that vehicle during sleeping or resting in a sleeper berth for greater than 5.0 minutes at any location when within 100 feet of a restricted area.

(2) Use of Alternative Technologies.

(A) On or after January I, 2008, the driver shall not operate an internal combustion APS on any vehicle equipped with a 2007 and subsequent model year primary diesel engine unless the vehicle is:

1. equipped with an APS meeting the emissions performance requirements found in subsection (c)(3)(A), below; and

2. the vehicle is equipped with a label meeting the requirements pursuant to section 35.B.4 of the "California Exhaust Emission

Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," as incorporated by reference in title 13, CCR, section 1956.8(b).

(B) On or after January I, 2008, the driver shall not operate a fuel-fired heater on any vehicle equipped with a 2007 and subsequent model year primary diesel engine unless the fuel-fired heater meets the emissions performance requirements found in subsection (c)(3)(B), below;

(C) On or after January 1, 2008, the driver of a vehicle equipped with a 2006 or older model year primary diesel engine may use and operate in California any certified internal combustion APS with or without the additional PM control specified in subsection (c)(3)(A)1, or any other certified alternative idling reduction technology.

(3) Compliance Requirements. As an alternative to idling the primary engine, diesel engines/vehicles may, as an option. be equipped with alternative technologies, as listed and defined below in (A), (B), and (C) of this subsection. If so equipped, these technologies are subject to the following requirements:

(A) Internal Combustion APS.

1. In order to operate in California, an APS utilizing an internal combustion engine must comply with applicable California off-road and/or federal non-road emission standards and test procedures for its fuel type and power category. In addition, diesel-fueled APSs installed on vehicles equipped with primary engines certified to the 2007 and subsequent model year heavy-duty diesel engine standards, pursuant to section 1956.8(a)(2)(A) of title 13, CCR, shall either,

a. be equipped with a verified Level 3 in-use strategy for particulate matter control (see title 13, CCR, sections 2700 to 2710), or

b. have its exhaust routed directly into the vehicle's exhaust pipe, upstream of the diesel particulate matter aftertreatment device.

2. With advance Executive Officer approval, a certifying/verifying APS manufacturer may petition for an alternate compliance strategy other than described in (A)1. a. or b. in this subsection above. However, this provision is limited to manufacturers that can demonstrate, to the satisfaction of the Executive Officer, that their alternative strategy is equivalent (or "cleaner"), from an emissions standpoint, compared to the requirement described in (A)1.a. or b. in

this subsection above. As an example, strategics that can use the available electric power infrastructure, instead of solely operating a diesel-fueled APS for engine and/or cab heating and cooling, may be able to use such a strategy to demonstrate compliance with these requirements.

(B) Fuel-Fired Heaters. Fuel-fired heaters must comply with the applicable California emission standards and test procedures as specified in the Low Emission Vehicle program requirements found in title 13, CCR, subsections 1961(a)(15) and (d), or in Part I.E.1.13 of the "California Exhaust Emission Standards and Test Procedures for 2005 through 2008 Model Zero-Emission Vehicles, and 2001 through 2008 Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," and the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," ," as incorporated by reference in title 13, CCR, section 1961(d). However, the specified requirement that limits fuel-fired heaters from being operated above 40°F does not apply.

(C) Other Idle Reduction Technologies. Other technologies that will reduce idling emissions may also be used, including the use of batteries, fuel cells, power inverter/chargers for on-shore electrical power, on-shore electric power infrastructure also known as truck stop electrification, and other technologies that produce minimal or no emissions. With the exception of battery and fuel cell powered APSs, power inverter/chargers, and electric power infrastructure, the use of other technologies are subject to advance Executive Officer approval and must be at least as effective in reducing idling emissions as the technologies described in subsections (c)(3)(A), above, or the NOx idling emission standard specified in title 13, CCR, section 1956.8(a)(6)(C). The Executive Officer shall use good engineering judgment and test data to determine if an idle reduction technology provides idling emission controls equivalent to the standards specified in subsection (c)(3)(A) above, or in title 13, CCR, section 1956.8(a)(6)(C).

(D) Labeling Requirements. 2007 and subsequent model year commercial diesel vehicles equipped with an internal combustion APS meeting the requirements specified in subsection (c)(3)(A) shall have a label affixed to the hood of the vehicle to allow operation of the APS in California. The labels shall meet the requirements specified in section 35.B.4 of the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," as incorporated by reference in title 13, CCR, section 1956.8(b).

(d) Exceptions.

(1) Except when a vehicle is located within 100 feet of a restricted area. subsection (c)(1)(A) does not apply, if the vehicle is equipped with

(A) a primary diesel engine meeting the optional NOx idling emission standard pursuant to title 13, CCR, section 1956.8(a)(6)(C); and

(B) a label meeting the requirements pursuant to section 35.B.4 of the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles," as incorporated by reference in title 13, CCR, section 1956.8(b).

(2) Subsection (c)(1) does not apply for the period or periods during which

(A) a bus is idling for

1. up to 10.0 minutes prior to passenger boarding, or

2. when passengers are onboard;

(B) prior to January 1, 2008, idling of the primary diesel-engine is necessary to power a heater, air conditioner, or any ancillary equipment during sleeping or resting in a sleeper berth. This provision does not apply when operating within 100 feet of a restricted area;

(C) idling when the vehicle must remain motionless due to traffic conditions, an official traffic control device, or an official traffic control signal over which the driver has no control, or at the direction of a peace officer, or operating a diesel-fueled APS or other device at the direction of a peace officer;

(D) idling when the vehicle is queuing that at all times is beyond 100 feet from any restricted area;

(E) idling of the primary diesel engine, operating a diesel-fueled APS, or operating other devices when forced to remain motionless due to immediate adverse weather conditions affecting the safe operation of the vehicle or due to mechanical difficulties over which the driver has no control;

(F) idling to verify that the vehicle is in safe operating condition as required by law and that all equipment is in good working order, either as part of a daily vehicle inspection or as otherwise needed, provided that such engine idling is mandatory for such verification;

(G) idling of the primary diesel engine, operating a diesel-fueled APS, or operating other devices is mandatory for testing, servicing, repairing, or

diagnostic purposes, including regeneration or maintenance of the exhaust emission control device during engine idling when the dashboard indicator light, if so equipped, is illuminated indicating that regeneration or maintenance is in progress;

(H) idling when positioning or providing a power source for equipment or operations, other than transporting passengers or propulsion, which involve a power take off or equivalent mechanism and is powered by the primary engine for:

1. controlling cargo temperature, operating a lift, crane, pump, drill, hoist, mixer (such as a ready mix concrete truck), or other auxiliary equipment;
2. providing mechanical extension to perform work functions for which the vehicle was designed and where substitute alternate means to idling are not reasonably available; or
3. collection of solid waste or recyclable material by an entity authorized by contract, license, or permit by a school or local government;

(I) idling of the primary diesel engine, operating a diesel-fueled APS, or operating other devices when operating defrosters, heaters, air conditioners, or other equipment solely to prevent a safety or health emergency;

(J) idling of the primary diesel engine, operating a diesel-fueled APS, or operating other devices by authorized emergency vehicles while in the course of providing services for which the vehicle is designed;

(K) idling of military tactical vehicles during periods of training, testing, and deployment; and

(L) idling when operating equipment such as a wheelchair or people assist lift as prescribed by the Americans with Disabilities Act.

(M) idling of armored cars in the course of providing services for which the vehicle is designed; and

(N) idling of workover rigs while performing work for which the vehicle is designed

(e) Relationship to Other Law.
Nothing in this section allows idling in violation of other applicable law, including, but not limited to:

(1) California Vehicle Code Section 22515;

(2) Title 13, Section 2480. California Code of Regulations;

(3) California Health and Safety Code Section 40720; or

(4) any applicable ordinance. rule, or requirement as stringent as, or more stringent than, this section.

(f) Enforcement. This section may be enforced by the Air Resources Board; peace officers as defined in California Penal Code, title 3, chapter 4.5, Sections 830 et seq. and their respective law enforcement agencies' authorized representatives; and air pollution control or air quality management districts.

(g) Penalties. For violations of subsection (c)(1), (c)(2) or (c)(3), the driver of a subject vehicle is subject to a minimum civil penalty of 300 dollars and to criminal penalties as specified in the Health and Safety Code and the Vehicle Code.

(h) Definitions.

The following definitions apply to this section:

(1) “Armored car” is as defined in Vehicle Code Section 115

(2) "Authorized emergency vehicle" is as defined in Vehicle Code Section 165.

(3) "Auxiliary power system" or "APS" means any device that is permanently dedicated to the vehicle on which it is installed and provides electrical, mechanical, or thermal energy to the primary diesel engine, truck cab and/or sleeper berth, bus's passenger compartment or any other commercial vehicle's cab, as an alternative to idling the primary diesel engine.

(4) "Bus" means any vehicle defined in Title 13, California Code of Regulations, Section 2480, subsections (h) (13)-(16), inclusive or as defined in the Vehicle Code Section 233.

(5) “Child care facility” is a facility that meets the definition of a “child day care facility” in Health and Safety Code section 1596.750 and that is subject to the requirements of Health and Safety Code sections 1596.7 to 1597.71.

(6) "Commercial Motor Vehicle" means any vehicle or combination of vehicles defined in Vehicle Code Section 15210(b) and any other motor truck or bus with a gross vehicle weight rating of 10,001 pounds or more, except the following:

(A) a zero emission vehicle; or

(B) a pickup truck as defined in Vehicle Code Section 471.

(7) "Driver" is as defined in Vehicle Code Section 305.

(8) “Executive Officer” means the Executive Officer of the California Air Resources Board or his or her delegate.

(9) "Fuel-fired heater" means a fuel burning device that creates heat for the purpose of (1) warming the cab or sleeper berth compartment of a vehicle or (2) warming the engine oil and/or coolant for easy start-up of the vehicle's engine but does not contribute to the propulsion of the vehicle.

(10) "Gross vehicle weight rating" is as defined in Vehicle Code Section 350.

(11) "Highway" is as defined in Vehicle Code Section 360.

(12) "Idling" means the vehicle engine is running at any location while the vehicle is stationary.

(13) “Motor Carrier” means a person providing transportation of goods or passengers for compensation.

(14) "Motor truck" or "motortruck" means a motor vehicle designed, used, or maintained primarily for the transportation of property.

(15) "Official traffic control device" is as defined in Vehicle Code Section 440.

(16) "Official traffic control signal" is as defined in Vehicle Code Section 445.

(17) "Owner" means the person or persons registered as the owner of the vehicle by the California Department of Motor Vehicles or its equivalent in another state, province, or country (presumed at the time of violation to be the person or persons identified as the owner on the registration document or title carried on the vehicle). For the purposes of this section, the definition of an owner excludes a lessor or a renter who leases or rents vehicles without a driver for a fixed rate or price, and does not operate or permit to operate the vehicle at the time of violation.

(18) “Person” means an individual, corporation, business trust, estate, trust, partnership, limited liability company, association, joint venture, government, governmental subdivision, agency, instrumentality, public corporation, or any other legal or commercial entity.

(19) "Primary diesel engine" means the diesel-fueled engine used for vehicle propulsion.

(20) "Queuing" means (A) through (C)

(A) the intermittent starting and stopping of a vehicle;

(B) while the driver, in the normal course of doing business, is waiting to perform work or a service; and

(C) when shutting the vehicle engine off would impede the progress of the queue and is not practicable.

(D) Queuing does not include the time a driver may wait motionless in line in anticipation of the start of a workday or opening of a location where work or a service will be performed.

(21) "Restricted area" means any real property zoned for individual or multifamily housing units that has one or more of such units on it.

(22) "Safety or health emergency" means:
(A) a sudden, urgent, or usually unforeseen, occurrence; or
(B) a foreseeable occurrence relative to a medical or physiological condition.

(23) "Senior care facility" is a facility that meets the definition of "residential care facility for the elderly" in Health and Safety Code section 1569.2(k) and that is subject to the requirements of the California Residential Care Facilities for the Elderly Act (Health and Safety Code sections 1569 to 1569.889).

(24) "Sleeper berth" is as defined in Title 13, California Code of Regulations. Section 1265.

(25) "Vehicle" is as defined in the Vehicle Code Section 670.

(26) "Workover rig" is as defined in Section 2449 of Title 13, California Code of Regulations.

(i) Severability. If any section, paragraph, subparagraph, sentence, clause, phrase, or portion of the section is, for any reason, held invalid, unconstitutional, or unenforceable by any court of competent jurisdiction, such portion shall be deemed as a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions of this section.

NOTE: Authority cited: Sections 39600, 39601, 39614(b)(6)(A), 39658, 39667, 43000.5(d), 43013(b), 43013(h), 43018(b) and 43018(c), Health and Safety Code; and *Western Oil & Gas Assn. v. Orange County Air Pollution Control Dist.* (1975), 14 Cal.3d.411. Reference: Sections 39002, 39003, 39027, 39500, 39600, 39650, 39655, 39656, 39657, 39658, 39659, 39662, 39665, 39674, 39675, 42400, 42400.1, 42400.2, 42400.3, 42402, 42402.1. 42402.2, 42402.3, 42403.5, 42410, 43013, 43018 and 43704, Health and Safety Code; Sections 305, 336, 350, 440, 445, 545, 546, 642, 680, 21400,

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REQUEST
LSM

22452, 22515, 27153, 40001 and 40001(b)(5), Vehicle Code; and *Western Oil & Gas Assn. v. Orange County Air Pollution Control Dist.* (1975), 14 Cal.3d.411.

Appendix A-2-2

Proposed Regulation Order:
Emergency Vehicle Emissions Regulations

Part II

Adopt New Sections 1900.0.1, 1961.2.1, 1961.3.1, 1962.2.1, 1962.3,1, 1965.0.1, 1969.0.1, 1976.0.1, 1978.0.1, 2037.0.1, 2038.0.1, 2112.0.1, 2139.0.1, 2140.0.1, 2147.0.1, 2317.0.1, 2903.0.1 Title 13, California Code of Regulations

[Note: The entire text of sections 1900.0.1 through 2903.01 through set forth below is new language in "normal type" proposed to be added to title 13, California Code of Regulations]

Chapter 1. Motor Vehicle Pollution Control Devices

Section 1900.0.1	Definitions. (Alternative)
Section 1961.2.1	Exhaust Emission Standards and Test Procedures--2015 through 2025 Model Year Passenger Cars and Light-Duty Trucks, and 2015 through 2028 Model Year Medium-Duty Vehicles. (Alternative)
Section 1961.3.1	Greenhouse Gas Exhaust Emission Standards and Test Procedures - 2017 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles. (Alternative)
Section 1962.2.1	Zero-Emission Vehicle Standards for 2018 through 2025 Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. (Alternative)
Section 1962.3.1	Electric Vehicle Charging Requirements. (Alternative)
Section 1965.0.1	Emission Control, Smog Index, and Environmental Performance Labels - 1979 and Subsequent Model-Year Motor Vehicles. (Alternative)
Section 1969.0.1	Motor Vehicle Service Information--1994 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Engines and Vehicles, and 2007 and Subsequent Model Heavy-Duty Engines. (Alternative)
Section 1976.0.1	Standards and Test Procedures for Motor Vehicle Fuel Evaporative Emissions. (Alternative)
Section 1978.0.1	Standards and Test Procedures for Vehicle Refueling Emissions. (Alternative)
Section 2037.0.1	Defects Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles. (Alternative)
Section 2038.0.1	Performance Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles. (Alternative)

Chapter 2. Enforcement of Vehicle Emission Standards and Surveillance Testing

Section 2112.0.1	Definitions. (Alternative)
Section 2139.0.1	Testing. (Alternative)
Section 2140.0.1	Notification and Use of Test Results. (Alternative)
Section 2147.0.1	Demonstration of Compliance with Emission Standards. (Alternative)

Chapter 8. Clean Fuels Program

Section 2317.0.1 Satisfaction of Designated Clean Fuel Requirements with a Substitute Fuel. (Alternative)

Chapter 16. Certification Fees for Mobile Sources

Section 2903.0.1 Definitions. (Alternative)

Title 13, California Code of Regulations

Adopt Section 1900.0.1 of title 13, California Code of Regulations, to read as follows:

§ 1900.0.1 Definitions. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The definitions of this section supplement and are governed by the definitions set forth in chapter 2 (commencing with section 39010), part 1, division 26 of the Health and Safety Code, unless a specific definition set forth therein has been revised in section (b) below to conform to federal law pursuant to Health and Safety Code section 39601. The definitions set forth in the applicable model-year new vehicle certification and assembly-line test procedures adopted in this chapter are hereby incorporated by reference.

(b) In addition to the definitions incorporated under subdivision (a), the following definitions shall govern the provisions of this chapter;

(1) "Add-on part" means any aftermarket part which is not a modified part or a replacement part.

(2) "Consolidated part" means a part which is designed to replace a group of original equipment parts and which is functionally identical of those original equipment parts in all respects which in any way affect emissions (including durability).

(3) "Emission standard" as it applies to compliance with the requirements applicable to motor vehicles and motor vehicle engines set forth in Article 2, Chapter 1, Division 3 of Title 13, California Code of Regulations, and the associated remedies provided in the Health and Safety Code for noncompliance, means:

(a) a numerical limit on the amount of a given pollutant that a motor vehicle or motor vehicle engine may emit into the atmosphere; or

(b) a requirement that a motor vehicle or motor vehicle engine be equipped with a certain type of pollution-control device or some other design feature related to the control of emissions.

(4) "Evaporative emission standards" are a subset of emission standards that refer to the specific motor vehicle fuel evaporative emission standards and test procedures incorporated by reference in title 13, CCR section 1976 to which a vehicle is certified.

(5) "Exhaust emission standards" or "tailpipe emission standards" are a subset of emission standards that collectively refer to the specific standards to which a motor vehicle or motor vehicle engine is certified.

(6) "Emissions-related part" means 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 June 1, 1990.

(7) "Gaseous fuels" means any liquefied petroleum gas, liquefied natural gas, or compressed natural gas fuels for use in motor vehicles.

(8) "Heavy-duty engine" means an engine which is used to propel a heavy-duty vehicle.

(9) "Heavy-duty vehicle" means any motor vehicle having a manufacturer's gross vehicle weight rating greater than 8,500 pounds, except passenger cars.

(10) "Identical device" means a crankcase emission control device identical in all respects, including design, materials, manufacture, installation and operation, with a device which has been certified by the Air Resources Board or the Motor Vehicle Pollution Control Board pursuant to the Health and Safety Code, but which is manufactured by a person other than original manufacturer of the device.

(11) "Independent low volume manufacturer" means a manufacturer with California annual sales of less than 10,000 new passenger cars, light-duty trucks and medium-duty vehicles following aggregation of sales pursuant to this section 1900(b)(8). Annual sales shall be determined as the average number of sales sold for the three previous consecutive model years for which a manufacturer seeks certification; however, for a manufacturer certifying for the first time in California, annual sales shall be based on projected California sales for the model year. A manufacturer's California sales shall consist of all vehicles or engines produced by the manufacturer and delivered for sale in California, except that vehicles or engines produced by the manufacturer and marketed in California by another manufacturer under the other manufacturer's nameplate shall be treated as California sales of the marketing manufacturer. The annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, one of which is 10% or greater part owned by another, except in circumstances for which the Executive Officer determines that 10% or greater ownership by one of the firms does not result in responsibility for overall direction of both firms; or (2) vehicles produced by any two or more firms if a third party has equity ownership of 10% or more in each of the firms; or (3) vehicles produced by two or more

firms having a common corporate officer(s) who is (are) responsible for the overall direction of the companies; or (4) vehicles imported or distributed by all firms where the vehicles are manufactured by the same entity and the importer or distributor is an authorized agent of the entity.

(12) "Intermediate volume manufacturer" means any pre-2001 model year manufacturer with California sales between 3,001 and 60,000 new light- and medium-duty vehicles per model year based on the average number of vehicles sold by the manufacturer each model year from 1989 to 1993; any 2001 through 2002 model year manufacturer with California sales between 4,501 and 60,000 new light- and medium-duty vehicles per model year based on the average number of vehicles sold by the manufacturer each model year from 1989 to 1993; any 2003 through 2017 model year manufacturer with California sales between 4,501 and 60,000 new light- and medium-duty vehicles based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification; and any 2018 and subsequent model year manufacturer with California sales between 4,501 and 20,000 new light- and medium-duty vehicles based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification. For a manufacturer certifying for the first time in California, model year sales shall be based on projected California sales. A manufacturer's California sales shall consist of all vehicles or engines produced by the manufacturer and delivered for sale in California, except that vehicles or engines produced by the manufacturer and marketed in California by another manufacturer under the other manufacturer's nameplate shall be treated as California sales of the marketing manufacturer.

For purposes of applying the 2005 through 2017 model year zero-emission vehicle requirements for intermediate-volume manufacturers under section 1962(b) or 1962.1(b), as applicable, the annual sales from different firms shall be aggregated in the case of (1) vehicles produced by two or more firms, each one of which either has a greater than 50% equity ownership in another or is more than 50% owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of greater than 50% in each firm.

For purposes of applying the 2009 through 2016 model year Greenhouse Gas requirements for intermediate volume manufacturers under section 1961.1, the annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, each one of which either has a greater than 10% equity ownership in another or is more than 10% owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of greater than 10% in each firm.

For the 2018 and subsequent model years, the annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, one of which is 33.4% or greater part owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of 33.4% or more in each of the firms; or (3) vehicles produced by two or more firms having a common corporate officer(s) who is (are) responsible for the overall direction of the companies; or (4) vehicles imported or distributed by any firms where the vehicles are manufactured by the same entity and the importer or distributor is an authorized agent of the entity.

(13) "Large volume manufacturer" means any 2000 and subsequent model year manufacturer that is not a small volume manufacturer, or an independent low volume manufacturer, or an intermediate volume manufacturer.

(14) "Light-duty truck" means any 2000 and subsequent model motor vehicle certified to the standards in section 1961(a)(1), or 1961.2 rated at 8,500 pounds gross vehicle weight or less, and any other motor vehicle, rated at 6,000 pounds gross vehicle weight or less, which is designed primarily for purposes of transportation of property or is a derivative of such a vehicle, or is available with special features enabling off-street or off-highway operation and use.

(15) "Medium-duty passenger vehicle" means any medium-duty vehicle with a gross vehicle weight rating of less than 10,000 pounds that is designed primarily for the transportation of persons. The medium-duty passenger vehicle definition does not include any vehicle which: (1) is an "incomplete truck" i.e., is a truck that does not have the primary load carrying device or container attached; or (2) has a seating capacity of more than 12 persons; or (3) is designed for more than 9 persons in seating rearward of the driver's seat; or (4) is equipped with an open cargo area of 72.0 inches in interior length or more. A covered box not readily accessible from the passenger compartment will be considered an open cargo area, for purposes of this definition.

(16) "Medium-duty vehicle" means any pre-1995 model year heavy-duty vehicle having a manufacturer's gross vehicle weight rating of 8,500 pounds or less; any 1992 through 2006 model-year heavy-duty low-emission, ultra-low-emission, super-ultra-low-emission or zero-emission vehicle certified to the standards in section 1960.1(h)(2) having a manufacturer's gross vehicle weight rating of 14,000 pounds or less; any 1995 through 2003 model year heavy-duty vehicle certified to the standards in section 1960.1(h)(1) having a manufacturer's gross vehicle weight rating of 14,000 pounds or less; and any 2000 and subsequent model heavy-duty low-emission, ultra-low-emission, super-ultra-low-emission or zero-emission vehicle certified to the standards in section 1961(a)(1), 1961.2, 1962, 1962.1, or 1962.2 having a manufacturer's gross vehicle weight rating between 8,501 and 14,000 pounds.

(17) "Modified part" means any aftermarket part intended to replace an original equipment emission-related part and which is not functionally identical to the original equipment part in all respects which in any way affect emissions, excluding a consolidated part.

(18) "Motorcycle Engine" means an engine which is used to propel a new, street-use motorcycle.

(19) [Reserved]

(20) "Passenger car" means any motor vehicle designed primarily for transportation of persons and having a design capacity of twelve persons or less.

(21) "Reactivity adjustment factor" means a fraction applied to the NMOG emissions from a vehicle powered by a fuel other than conventional gasoline for the purpose of determining a gasoline-equivalent NMOG level. The reactivity adjustment factor is defined as the ozone-forming potential of clean fuel vehicle exhaust divided by the ozone-forming potential of gasoline vehicle exhaust.

(22) "Recall" means:

(A) The issuing of notices directly to consumers that vehicles in their possession or control should be corrected, and/or

(B) Efforts to actively locate and correct vehicles in the possession or control of consumers.

(23) "Replacement part" means any aftermarket part intended to replace an original equipment emissions-related part and which is functionally identical to the original equipment part in all respects which in any way affect emissions (including durability), or a consolidated part.

(24) "Subgroup" means a set of vehicles within an engine family distinguishable by characteristics contained in the manufacturer's application for certification.

(25) "Small volume manufacturer" means, with respect to the 2001 and subsequent model-years, a manufacturer with California sales less than 4,500 new passenger cars, light-duty trucks, medium-duty vehicles, heavy-duty vehicles and heavy-duty engines based on the average number of vehicles sold for the three previous consecutive model years for which a manufacturer seeks certification as a small volume manufacturer; however, for manufacturers certifying for the first time in California model-year sales shall be based on projected California sales. A manufacturer's California sales shall consist of all vehicles or engines produced by the manufacturer and delivered for sale in California, except that vehicles or engines produced by the manufacturer and marketed in California by another manufacturer under the other manufacturer's nameplate shall be treated as California sales of the marketing manufacturer. Except as provided in the next paragraph, for the 2009 through 2017 model years, the annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, one of which is 10% or greater part owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of 10% or more in each of the firms; or (3) vehicles produced by two or more firms having a common corporate officer(s) who is (are) responsible for the overall direction of the companies; or (4) vehicles imported or distributed by any firms where the vehicles are manufactured by the same entity and the importer or distributor is an authorized agent of the entity. Notwithstanding the provisions of this paragraph, upon application to the Executive Officer, a manufacturer may be classified as a "small volume manufacturer" for the 2013 through 2017 model years if the Executive Officer determines that it is operationally independent of the firm that owns 10% or more of the applicant or has a greater than 10% equity ownership in the applicant based on the criteria provided in the last paragraph of this subsection (b)(22).

For purposes of compliance with the zero-emission vehicle requirements, heavy-duty vehicles and engines shall not be counted as part of a manufacturer's sales. For purposes of applying the 2005 through 2017 model year zero-emission vehicle requirements for small-volume manufacturers under sections 1962(b) and 1962.1(b), the annual sales from different firms shall be aggregated in the case of (1) vehicles produced by two or more firms, each one of which either has a greater than 50% equity ownership in another or is more than 50% owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of greater than 50% in each firm. Notwithstanding the provisions of this paragraph, upon application to the Executive Officer, a manufacturer may be classified as a "small volume manufacturer" for the 2013 through 2017 model years if the Executive Officer determines that it is operationally independent of the firm that owns 50% or more of the applicant or has a greater than 50% equity ownership in the applicant based on the criteria provided in the last paragraph of this subsection (b)(22).

Except as provided in the next paragraph, for the 2018 and subsequent model years, the annual sales from different firms shall be aggregated in the following situations: (1) vehicles produced by two or more firms, one of which is 33.4% or greater part owned by another; or (2) vehicles produced by any two or more firms if a third party has equity ownership of 33.4% or more in each of the firms; or (3) vehicles produced by two or more firms having a common corporate officer(s) who is (are) responsible for the overall direction of the companies; or (4) vehicles imported or distributed by any firms where the vehicles are manufactured by the same entity and the importer or distributor is an authorized agent of the entity. Notwithstanding the provisions of this paragraph, upon application to the Executive Officer, a manufacturer may be classified as a "small volume manufacturer" for the 2018 and subsequent model years if the Executive Officer determines that it is operationally independent of the firm that owns 33.4% or more of the applicant or has a greater than 33.4% equity ownership in the applicant based on the criteria provided in the last paragraph of this subsection (b)(22).

For the purposes of this paragraph, all manufacturers whose annual sales are aggregated together under the provisions of this subsection (b)(22) shall be defined as "related manufacturers." Notwithstanding such aggregation, the Executive Officer may make a determination of operational independence if all of the following criteria are met for at least 24 months preceding the application submittal: (1) for the three years preceding the year in which the initial application is submitted, the average California sales for the applicant does not exceed 4,500 vehicles per year; (2) no financial or other support of economic value is provided by related manufacturers for purposes of design, parts procurement, R&D and production facilities and operation, and any other transactions between related manufacturers are conducted under normal commercial arrangements like those conducted with other parties, at competitive pricing rates to the manufacturer; (3) related manufacturers maintain separate and independent research and development, testing, and production facilities; (4) the applicant does not use any vehicle powertrains or platforms developed or produced by related manufacturers; (5) patents are not held jointly with related manufacturers; (6) related manufacturers maintain separate business administration, legal, purchasing, sales, and marketing departments, as well as autonomous decision-making on commercial matters; (7) the overlap of the Board of Directors between related manufacturers is limited to 25% with no sharing of top operational management, including president, chief executive officer, chief financial officer, and chief operating officer, and provided that no individual overlapping director or combination of overlapping directors exercises exclusive management control over either or both companies; and (8) parts or components supply between related companies must be established through open market process, and to the extent that the manufacturer sells parts/components to non-related manufacturers, it does so through the open market a competitive pricing. Any manufacturer applying for operational independence must submit to ARB an Attestation Engagement from an independent certified public accountant or firm of such accountants verifying the accuracy of the information contained in the application, as defined by and in accordance with the procedures established in 40 C.F.R. § 80.125, as last amended January 19, 2007, which is incorporated herein by reference. The applicant must submit information to update any of the above eight criteria as material changes to any of the criteria occur. If there are no material changes to any of the criteria, the applicant must certify that to the Executive Officer annually. With respect to any such changes, the Executive Officer may consider extraordinary conditions (e.g., changes to economic conditions, unanticipated market changes, etc.) and may continue to find the applicant to be operationally independent. In the event that a manufacturer loses eligibility as a "small volume manufacturer" after a material change occurs, the manufacturer must begin compliance with the primary emissions program in the third model year after the model year in which the

manufacturer loses its eligibility. The Executive Officer may, in his or her discretion, re-establish lost "small volume manufacturer" status if the manufacturer shows that it has met the operational independence criteria for three consecutive years.

Note: Authority cited: Sections 39010, 39600, 39601, 43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 39002, 39003, 39010, 39500, 40000, 43000, 43013, 43018.5, 43100, 43101, 43101.5, 43102, 43103, 43104, 43106 and 43204, Health and Safety Code; and Section 27156, Vehicle Code.

Title 13, California Code of Regulations

Adopt Section 1961.2.1 of title 13, California Code of Regulations, to read as follows:

§ 1961.2.1. Exhaust Emission Standards and Test Procedures - 2015 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

Introduction. This section 1961.2.1 contains the California "LEV III" exhaust emission standards for 2015 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles. A manufacturer must demonstrate compliance with the exhaust standards in subsection (a) applicable to specific test groups, and with the composite phase-in requirements in subsection (b) applicable to the manufacturer's entire fleet.

Before the 2015 model year, a manufacturer that produces vehicles that meet the standards in subsection (a) has the option of certifying the vehicles to those standards, in which case the vehicles will be treated as LEV III vehicles for purposes of the fleet-wide phase-in requirements. Similarly, 2015 - 2019 model-year vehicles may be certified to the "LEV II" exhaust emission standards in subsection 1961(a)(1), in which case the vehicles will be treated as LEV II vehicles for purposes of the fleet-wide phase-in requirements.

A manufacturer has the option of certifying engines used in incomplete and diesel medium-duty vehicles with a gross vehicle weight rating of greater than 10,000 lbs. GVW to the heavy duty engine standards and test procedures set forth in title 13, CCR, subsections 1956.8(c) and (h).

All medium-duty vehicles with a gross vehicle weight rating of less than or equal to 10,000 lbs. GVW, including incomplete otto-cycle medium-duty vehicles and medium-duty vehicles that use diesel cycle engines, must be certified to the LEV III chassis standards and test procedures set forth in this section in 2020 and subsequent model years.

Pooling Provision.

For each model year, a manufacturer must demonstrate compliance with this section 1961.2.1 based on one of two options applicable throughout the model year, either:

Option 1: the total number of passenger cars, light-duty trucks, and medium-duty vehicles that are certified to the California exhaust emission standards in subsection (a) and subsection 1961(a)(1), and are produced and delivered for sale in California; or

Option 2: the total number of passenger cars, light-duty trucks, and medium-duty vehicles that are certified to the California exhaust emission standards in subsection (a) and subsection 1961(a)(1), and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's criteria pollutant emission standards set forth in this section for that model year pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

A manufacturer that selects compliance Option 2 must notify the Executive Officer of that selection in writing prior to the start of the applicable model year or must comply with Option 1. Once a manufacturer has selected compliance Option 2, that selection applies unless the manufacturer selects Option 1 and notifies the Executive Officer of that selection in writing before the start of the applicable model year.

When a manufacturer is demonstrating compliance using Option 2 for a given model year, the term "in California" as used in this section means California, the District of Columbia, and all states that have adopted California's criteria pollutant emission standards set forth in this section for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

(a) Exhaust Emission Standards.

(1) *"LEV III" Exhaust Standards.* The following standards are the maximum exhaust emissions for the full useful life from new 2015 and subsequent model year "LEV III" passenger cars, light-duty trucks, and medium-duty vehicles, including fuel-flexible, bi-fuel and dual-fuel vehicles when operating on the gaseous or alcohol fuel they are designed to use. 2015 – 2019 model-year LEV II LEV vehicles may be certified to the 150,000 mile NMOG+NOx emission standards for LEV160, LEV395, or LEV630, as applicable, in this subsection (a)(1) and the corresponding NMOG+NOx numerical values in subsection (a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in subsection 1961(a)(1) and the corresponding NMOG numerical values in subsection 1961(a)(4) and LEV II ULEV vehicles may be certified to the 150,000 mile NMOG+NOx emission standards for ULEV125, ULEV340, or ULEV570, as applicable, in this subsection (a)(1) and the corresponding NMOG+NOx numerical values in subsection (a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in subsection 1961(a)(1) and the corresponding NMOG numerical values in subsection 1961(a)(4). 2015 – 2019 model-year LEV II SULEV vehicles that receive a partial ZEV allowance in accordance with the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes" and 2015 – 2016 model year vehicles that are allowed to certify to LEV II SULEV standards using "carryover" of emission test data under the provisions in subsection (b)(2) may be certified to the 150,000 mile NMOG+NOx emission standards for SULEV30, SULEV170, or SULEV230, as applicable, in this subsection

(a)(1) and the corresponding NMOG+NOx numerical values in subsection (a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in subsection 1961(a)(1) and the corresponding NMOG numerical values in subsection 1961(a)(4). LEV II SULEV vehicles that do not either receive a partial ZEV allowance or (2) certify to LEV II SULEV standards in the 2015 – 2016 model years using "carryover" of emission test data may not certify to combined NMOG+NOx standards. LEV II vehicles that certify to combined NMOG+NOx standards will be treated as LEV II vehicles for purposes of the fleet-wide phase-in requirements.

LEV III Exhaust Mass Emission Standards for New 2015 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles[3]

Vehicle Type	*Durability Vehicle Basis (mi)*	*Vehicle Emission Category*[2]	*NMOG + Oxides of Nitrogen*[4] *(g/mi)*	*Carbon Monoxide (g/mi)*	*Formaldehyde (mg/mi)*	*Particulates*[1] *(g/mi)*
All PCs; LDTs 8500 lbs. GVWR or less; and MDPVs Vehicles in this category are tested at their loaded vehicle weight	150,000	LEV160	0.160	4.2	4	0.01
		ULEV125	0.125	2.1	4	0.01
		ULEV70	0.070	1.7	4	0.01
		ULEV50	0.050	1.7	4	0.01
		SULEV30	0.030	1.0	4	0.01
		SULEV20	0.020	1.0	4	0.01
MDVs 8501 - 10,000 lbs. GVWR, excluding MDPVs Vehicles in this category are tested at their adjusted loaded vehicle weight	150,000	LEV395[5,6]	0.395	6.4	6	0.12
		ULEV340[5,6]	0.340	6.4	6	0.06
		ULEV250	0.250	6.4	6	0.06
		ULEV200	0.200	4.2	6	0.06
		SULEV170	0.170	4.2	6	0.06
		SULEV150	0.150	3.2	6	0.06
MDVs 10,001-14,000 lbs. GVWR Vehicles in this category are tested at their adjusted loaded vehicle weight	150,000	LEV630[5,6]	0.630	7.3	6	0.12
		ULEV570[5,6]	0.570	7.3	6	0.06
		ULEV400	0.400	7.3	6	0.06
		ULEV270	0.270	4.2	6	0.06
		SULEV230	0.230	4.2	6	0.06
		SULEV200	0.200	3.7	6	0.06

[1] These standards shall apply only to vehicles not included in the phase-in of the particulate standards set forth in subsection (a)(2).

[2] The numeric portion of the category name is the NMOG+NOx value in thousandths of grams per mile.

[3] These standards apply at both low altitude and high altitude except as noted in footnote 4.

[4] The LEV III NMOG+NOx 150,000-mile exhaust mass emission standards for passenger cars and light-duty trucks that apply at high-altitude conditions are: 0.160 g/mi for LEV160 and ULEV125; 0.105 g/mi for ULEV70; 0.070 g/mi for ULEV50; and 0.050 g/mi for SULEV30 and SULEV20.

[5] These vehicle emission categories are only applicable for the 2015 through 2021 model years.

[6] The following NOx standards also apply for certification testing with emission-data vehicles: 0.2 g/mi for LEV395 and ULEV340; 0.4 g/mi for LEV630 and ULEV570.

(2) "LEV III" Particulate Standards.

(A) *Particulate Standards for Passenger Cars, Light-Duty Trucks, and Medium- Duty Passenger Vehicles*. Beginning in the 2017 model year, a manufacturer, except a small volume manufacturer, shall certify a percentage of its passenger car, light-duty truck, and medium-duty passenger vehicle fleet to the following particulate standards according to the following phase-in schedule. These standards are the maximum particulate emissions allowed at full useful life. All vehicles certifying to these particulate standards must certify to the LEV III exhaust emission standards set forth in subsection (a)(1).

LEV III Particulate Emission Standard Values and Phase-in for Passenger Cars, Light-Duty Trucks, and Medium- Duty Passenger Vehicles		
Model Year	**% of vehicles certified to a 3 mg/mi standard**	**% of vehicles certified to a 1 mg/mi standard**
2017	10	0
2018	20	0
2019	40	0
2020	70	0
2021	100	0
2022	100	0
2023	100	0
2024	100	0
2025	75	25
2026	50	50
2027	25	75
2028 and subsequent	0	100

(B) Particulate Standards for Medium-Duty Vehicles Other than Medium-Duty Passenger Vehicles.

1. Beginning in the 2017 model year, a manufacturer, except a small volume manufacturer, shall certify a percentage of its medium-duty vehicle fleet to the following particulate standards. These standards are the maximum particulate emissions allowed at full useful life. All vehicles certifying to these particulate standards must certify to the LEV III exhaust emission standards set forth in subsection (a)(1). This subsection (a)(2)(B)1. shall not apply to medium-duty passenger vehicles.

LEV III Particulate Emission Standard Values for Medium-Duty Vehicles, Other than Medium-Duty Passenger Vehicles	
Vehicle Type[1]	**Particulates (mg/mi)**
MDVs 8501 - 10,000 lbs. GVWR, excluding MDPVs	8
MDVs 10,001 - 14,000 lbs. GVWR	10

[1] Vehicles in these categories are tested at their adjusted loaded vehicle weight.

2. A manufacturer of medium-duty vehicles, except a small volume manufacturer, shall certify at least the following percentage of its medium-duty vehicle fleet to the particulate standards in subsection (a)(2)(B)1. according to the following phase-in schedule. This subsection (a)(2)(B)2. shall not apply to medium-duty passenger vehicles.

LEV III Particulate Emission Standard Phase-in for Medium-Duty Vehicles, Other than Medium-Duty Passenger Vehicles	
Model Year	**Total % of MDVs certified to the 8 mg/mi PM Standard or to the 10 mg/mi PM Standard, as applicable**
2017	10
2018	20
2019	40
2020	70
2021 and subsequent	100

(C) *Particulate Standards for Small Volume Manufacturers.* In the 2021 through 2027 model years, a small volume manufacturer shall certify 100 percent of its passenger car, light-duty truck, and medium-duty passenger vehicle fleet to the 3 mg/mi particulate standard. In the 2028 and subsequent model years, a small volume manufacturer shall certify 100 percent of its passenger car, light-duty truck, and medium-duty passenger vehicle fleet to the 1 mg/mi particulate standard. In the 2021 and subsequent model years, a small volume manufacturer shall certify 100 percent of its medium-duty vehicles 8501 - 10,000 lbs. GVWR, excluding MDPVs, to the 8 mg/mi particulate standard. In the 2021 and subsequent model years, a small volume manufacturer shall certify 100 percent of its medium-duty vehicles 10,001 - 14,000 lbs. GVWR to the 10 mg/mi particulate standard. These standards are the maximum particulate emissions allowed at full useful life. All vehicles certifying to these particulate standards must certify to the LEV III exhaust emission standards set forth in subsection (a)(1).

(D) Alternative Phase-in Schedule for Particulate Standards.

1. *Alternative Phase-in Schedules for the 3 mg/mi Particulate Standard for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.* A manufacturer may use an alternative phase-in schedule to comply with the 3 mg/mi particulate standard phase-in requirements as long as: (1) the percent of PC+LDT+MDPV vehicles meeting the 3 mg/mi particulate standard in the 2019 model year is greater than or equal to the highest percent of PC+LDT+MDPV vehicles meeting the 3 mg/mi particulate standard in the 2016, 2017, and 2018 model years individually; the percent of PC+LDT+MDPV vehicles meeting the 3 mg/mi particulate standard in the 2020 model year is greater than or equal to the highest percent of PC+LDT+MDPV vehicles meeting the 3 mg/mi particulate standard in the 2016, 2017, and 2018 model years individually; and (3) equivalent PM emission reductions are achieved by the 2021 model year from passenger cars, light-duty trucks, and medium-duty passenger vehicles. Model year emission reductions shall be calculated by multiplying the percent of PC+LDT+MDPV vehicles meeting the 3 mg/mi particulate standard in a given model year (based on a manufacturer's projected sales volume of vehicles in each category) by 5 for the 2017 model year, 4 for the 2018 model year, 3 for the 2019 model year, 2 for the 2020 model year, and 1 for the 2021 model year. The yearly results for PC+LDT+MDPV vehicles shall be summed together to determine a cumulative total for PC+LDT+MDPV vehicles. In the 2021 model year, the

cumulative total must be equal to or greater than 490, and 100 percent of the manufacturer's passenger cars, light-duty trucks, and medium-duty passenger vehicles must be certified to the 3 mg/mi particulate standard, to be considered equivalent. A manufacturer may add vehicles introduced before the 2017 model year (e.g., the percent of vehicles introduced in 2016 would be multiplied by 5) to the cumulative total.

2. *Alternative Phase-in Schedules for the 1 mg/mi Particulate Standard for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.* A manufacturer may use an alternative phase-in schedule to comply with the 1 mg/mi particulate standard phase-in requirements as long as equivalent PM emission reductions are achieved by the 2028 model year from passenger cars, light-duty trucks, and medium- duty passenger vehicles. Model year emission reductions shall be calculated by multiplying the percent of PC+LDT+MDPV vehicles meeting the 1 mg/mi particulate standard in a given model year (based on a manufacturer's projected sales volume of vehicles in each category) by 4 for the 2025 model year, 3 for the 2026 model year, 2 for the 2027 model year, and 1 for the 2028 model year. The yearly results for PC+LDT+MDPV vehicles shall be summed together to determine a cumulative total for PC+LDT+MDPV vehicles. In the 2028 model year, the cumulative total must be equal to or greater than 500, and 100 percent of the manufacturer's passenger cars, light-duty trucks, and medium-duty passenger vehicles must be certified to the 1 mg/mi particulate standard to be considered equivalent. A manufacturer may add vehicles introduced before the 2025 model year (e.g., the percent of vehicles introduced in 2024 would be multiplied by 4) to the cumulative total.

3. Alternative Phase-in Schedules for the Particulate Standards for Medium-Duty Vehicles Other than Medium-Duty Passenger Vehicles. A manufacturer may use an alternative phase-in schedule to comply with the particulate standard phase-in requirements as long as equivalent PM emission reductions are achieved by the 2021 model year from medium-duty vehicles other than medium-duty passenger vehicles. Model year emission reductions shall be calculated by multiplying the total percent of MDVs certified to the 8 mg/mi PM standard or to the 10 mg/mi PM standard, as applicable, in a given model year (based on a manufacturer's projected sales volume of vehicles in each category) by 5 for the 2017 model year, 4 for the 2018 model year, 3 for the 2019 model year, 2 for the 2020 model year, and 1 for the 2021 model year. The yearly results for MDVs shall be summed together to determine a cumulative total for MDVs. In the 2021 model year, the cumulative total must be equal to or greater than 490, and 100 percent of the manufacturer's MDVs must be certified to the 8 mg/mi PM standard or to the 10 mg/mi PM standard, as applicable, to be considered equivalent. A manufacturer may add vehicles introduced before the 2017 model year (e.g., the percent of vehicles introduced in 2016 would be multiplied by 5) to the cumulative total.

(3) *NMOG+NOx Standards for Bi-Fuel, Fuel-Flexible, and Dual-Fuel Vehicles.* For fuel-flexible, bi-fuel, and dual-fuel PCs, LDTs and MDVs, compliance with the NMOG+NOx exhaust mass emission standards must be based on exhaust emission tests both when the vehicle is operated on the gaseous or alcohol fuel it is designed to use, and when the vehicle is operated on gasoline. A manufacturer must demonstrate compliance with the applicable exhaust mass emission standards for NMOG+NOx, CO, and formaldehyde set forth in the table in subsection (a)(1) when certifying the vehicle for operation on the gaseous or alcohol fuel, as applicable, and on gasoline or diesel, as applicable.

A manufacturer may measure NMHC in lieu of NMOG when fuel-flexible, bi-fuel and dual-fuel vehicles are operated on gasoline, in accordance with the "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." Testing at 50°F is not required for fuel-flexible, bi-fuel, and dual-fuel vehicles when operating on gasoline.

(4) *50°F Exhaust Emission Standards.* All passenger cars, light-duty trucks, and medium-duty vehicles, other than natural gas and diesel-fueled vehicles, must demonstrate compliance with the following 4,000-mile exhaust emission standards for NMOG+NOx and formaldehyde (HCHO) measured on the FTP (40 CFR, Part 86, Subpart B) conducted at a nominal test temperature of 50°F, as modified by Part II, Section D of the "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." A manufacturer may demonstrate compliance with the NMOG+NOx and HCHO certification standards contained in this subparagraph by measuring NMHC exhaust emissions or issuing a statement of compliance for HCHO in accordance with Section D.10 and Section G.3.1.2, respectively, of the "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." Emissions of CO measured at 50°F at 4,000 miles shall not exceed the standards set forth in subsection (a)(1) applicable to vehicles of the same emission category and vehicle type subject to a cold soak and emission test at 68° to 86° F.

(A) Standards for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles Certified to the LEV III Standards.

50°F Exhaust Emission Standards for LEV III Passenger Cars, Light- Duty Trucks, and Medium-Duty Passenger Vehicles			
Vehicle Emission Category	*NMOG + NOx (g/mi)*		*HCHO (g/mi)*
	Gasoline	Alcohol Fuel	Both Gasoline and Alcohol Fuel
LEV160	0.320	0.320	0.030
ULEV125	0.250	0.250	0.016
ULEV70	0.140	0.250	0.016
ULEV50	0.100	0.140	0.016
SULEV30	0.060	0.125	0.008
SULEV20	0.040	0.075	0.008

(B) Standards for Medium-Duty Vehicles (Excluding MDPVs) Certified to the LEV III Standards.

50°F Exhaust Emission Standards for LEV III Medium-Duty Vehicles (Excluding MDPVs)			
Vehicle Emission Category	*NMOG + NOx (g/mi)*		*HCHO (g/mi)*
	Gasoline	Alcohol Fuel	Both Gasoline and Alcohol Fuel
LEV395	0.790	0.790	0.064
ULEV340	0.680	0.680	0.032
ULEV250	0.500	0.500	0.032
ULEV200	0.400	0.500	0.016
SULEV170	0.340	0.425	0.016
SULEV150	0.300	0.375	0.016
LEV630	1.260	1.260	0.080
ULEV570	1.140	1.140	0.042
ULEV400	0.800	0.800	0.042
ULEV270	0.540	0.675	0.020
SULEV230	0.460	0.575	0.020
SULEV200	0.400	0.500	0.020

(5) *Cold CO Standard.* The following standards are the 50,000 mile cold temperature exhaust carbon monoxide emission levels from new 2015 and subsequent model-year passenger cars, light-duty trucks, and medium-duty passenger vehicles:

2015 AND SUBSEQUENT MODEL-YEAR COLD TEMPERATURE CARBON MONOXIDE EXHAUST EMISSIONS STANDARDS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY PASSENGER VEHICLES

(grams per mile)

Vehicle Type	*Carbon Monoxide*
All PCs, LDTs 0-3750 lbs. LVW;	10.0
LDTs, 3751 lbs. LVW - 8500 lbs. GVWR; MDPVs 10000 lbs. GVWR and less	12.5

These standards apply to vehicles tested at a nominal temperature of 20°F (-7°C) in accordance with 40 CFR Part 86 Subpart C, as amended by the "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." Natural gas, diesel-fueled and zero-emission vehicles are exempt from these standards.

(6) *Highway NMOG + NOx Standard.* The maximum emissions of non-methane organic gas plus oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B or 40 CFR §1066.840), as modified by the "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," must not be greater than the applicable LEV III NMOG+NOx standard set forth in subsection (a)(1). Both the sum of the NMOG+NOx emissions and the HWFET standard must be rounded in accordance with ASTM E29-67 to the nearest 0.001 g/mi before being compared.

(7) Supplemental Federal Test Procedure (SFTP) Off-Cycle Emission Standards.

(A) *SFTP NMOG+NOx and CO Exhaust Emission Standards for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.* Manufacturers shall certify 2015 and subsequent model year LEVs, ULEVs, and SULEVs in the PC, LDT, and MDPV classes to either the *SFTP NMOG+NOx and CO Stand-Alone Exhaust Emission Standards* set forth in subsection (a)(7)(A)1., or in accordance with the *SFTP NMOG+NOx and CO Composite Exhaust Emission Standards and Fleet-Average Requirements* set forth in subsection (a)(7)(A)2. A manufacturer may also certify 2014 model LEVs, ULEVs, or SULEVs in the PC, LDT, or MDPV classes to LEV III SFTP standards, in which case, the manufacturer shall be subject to the LEV III SFTP emission standards and requirements, including the sales-weighted fleet- average NMOG+NOx composite emission standard applicable to 2015 model vehicles if choosing to comply with the *SFTP NMOG+NOx and CO Composite Exhaust Emission Standards and Fleet-Average Requirements* set forth in subsection (a)(7)(A)2.. The manufacturer shall notify the Executive Officer of its selected emission standard type in the Application for Certification of the first test group certifying to SFTP NMOG+NOx and CO emission standards on a 150,000 mile durability basis. Once an emission standard type for NMOG+NOx and CO is selected for a fleet, and

the Executive Officer is notified of such selection, the selection must be kept through the 2025 model year for the entire fleet, which includes LEV II vehicles if selecting to comply with subsection (a)(7)(A)2.. The manufacturer may not change its selection until the 2026 model year. Test groups not certifying to the 150,000-mile SFTP NMOG+NOx and CO emission standards pursuant to this subsection (a)(7)(A) shall be subject to the 4,000-mile SFTP NMOG+NOx and CO emission standards set forth in subsection 1960.1(r).

1. *SFTP NMOG+NOx and CO Exhaust Stand-Alone Emission Standards*. The following standards are the maximum SFTP NMOG+NOx and CO exhaust emissions through full useful life from 2015 and subsequent model-year LEV III LEVs, ULEVs, and SULEVs when operating on the same gaseous or liquid fuel they use for FTP certification. These standards only apply to 2015 through 2016 model year fuel-flexible vehicles ≤ 6,000 lbs. GVWR and 2015 through 2017 model year fuel-flexible vehicles > 6,000 lbs. GVWR when operating on the LEV III certification gasoline specified in Part II, Section A.100.3.1.2 of the "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." 2017 and subsequent model year multi-fueled vehicles (including bi-fueled, dual-fueled and fuel-flexible vehicles) ≤ 6,000 lbs. GVWR as well as 2018 and subsequent model year multi-fueled vehicles > 6,000 lbs. GVWR, including vehicles certifying with carryover data, shall comply with all requirements established for each consumed fuel (or blend of fuels in the case of fuel-flexible vehicles).

SFTP NMOG+NOx and CO Stand-Alone Exhaust Emission Standards for 2015 and Subsequent Model LEV III Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles						
Vehicle Type	*Durability Vehicle Basis (mi)*	*Vehicle Emission Category* [1]	US06 Test *(g/mi)*		*SC03 Test*	
			NMOG + NOx	*CO*	*NMOG + NOx*	*CO*
All PCs; LDTs 0- 8,500 lbs. GVWR; and MDPVs Vehicles in these categories are tested at their loaded vehicle weight (curb weight plus 300 pounds).	150,000	LEV	0.140	9.6	0.100	3.2
		ULEV	0.120	9.6	0.070	3.2
		SULEV (Option A)[2]	0.060	9.6	0.020	3.2
		SULEV	0.050	9.6	0.020	3.2

[1] *Vehicle Emission Category*. Manufacturers must certify all vehicles, which are certifying to a LEV III FTP emission category on a 150,000-mile durability basis, to the emission standards of the equivalent, or a more stringent, SFTP emission category set forth on this table. That is, all LEV III LEVs certified to 150,000-mile FTP emission standards shall comply with the SFTP

LEV emission standards in this table, all LEV III ULEVs certified to 150,000-mile FTP emission standards shall comply with the SFTP ULEV emission standards in this table, and all LEV III SULEVs certified to 150,000-mile FTP emission standards shall comply with the SFTP SULEV emission standards in this table.

[2] *Optional SFTP SULEV Standards.* A manufacturer may certify light-duty truck test groups from 6,001 to 8,500 lbs. GVWR and MDPV test groups to the SULEV, option A, emission standards set forth in this table for the 2015 through 2020 model year, only if the vehicles in the test group are equipped with a particulate filter and the manufacturer extends the particulate filter emission warranty mileage to 200,000 miles. Passenger cars and light-duty trucks 0-6,000 lbs. GVWR are not eligible for this option.

2. *SFTP NMOG+NOx and CO Composite Exhaust Emission Standards.* For the 2015 and subsequent model years, a manufacturer selecting this option must certify LEV II and LEV III LEVs, ULEVs, and SULEVs, such that the manufacturer's sales-weighted fleet-average NMOG+NOx composite emission value does not exceed the applicable NMOG+NOx composite emission standard set forth in the following table. In addition, the CO composite emission value of any LEV III test group shall not exceed the CO composite emission standard set forth in the following table. SFTP compliance shall be demonstrated using the same gaseous or liquid fuel used for FTP certification. These standards only apply to 2015 through 2016 model year fuel-flexible vehicles ≤ 6,000 lbs. GVWR and 2015 through 2017 model year fuel-flexible vehicles > 6,000 lbs. GVWR when operating on the LEV III certification gasoline specified in Part II, Section A.100.3.1.2 of the "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." 2017 and subsequent model year multi-fueled vehicles (including bi-fueled, dual-fueled and fuel-flexible vehicles) ≤ 6,000 lbs. GVWR as well as 2018 and subsequent model year multi- fueled vehicles > 6,000 lbs. GVWR, including vehicles certifying with carryover data, shall comply with all requirements established for each consumed fuel (or blend of fuels in the case of fuel-flexible vehicles).

For each test group subject to this subsection, manufacturers shall calculate a Composite Emission Value for NMOG+NOx and, for LEV III test groups, a separate Composite Emission Value for CO, using the following equation:

Composite Emission Value = 0.28 x US06 + 0.37 x SC03 + 0.35 x FTP [Eq. 1]

where "US06" = the test group's NMOG+NOx or CO emission value, as applicable, determined through the US06 test;

"SC03" = the test group's NMOG+NOx or CO emission value, as applicable, determined through the SC03 test; and

"FTP" = the test group's NMOG+NOx or CO emission value, as applicable, determined through the FTP test.

If no vehicles in a test group have air conditioning units, the FTP cycle emission value can be used in place of the SC03 cycle emission value in Equation 1. To determine compliance with the SFTP NMOG+NOx composite emission standard applicable to the model year, manufacturers shall use a sales-weighted fleet average of the NMOG+NOx composite emission values of every applicable test group. The sales-weighted fleet average shall be calculated using a combination of carry-over and new certification SFTP composite emission values (converted to NMOG+NOx, as applicable). LEV II test groups will use their emission values in the fleet average calculation but will not be considered LEV III test groups. Compliance with the CO composite emission standard cannot be demonstrated through fleet averaging. The NMOG+NOx sales-weighted fleet-average composite emission value for the fleet and the CO composite emission value for each test group shall not exceed:

SFTP NMOG+NOx and CO Composite Emission Standards for 2015 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles (g/mi) [1]

Model Year	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025+
All PCs; LDTs 8,500 lbs. GVWR or less; and MDPVs[3]	***Sales-Weighted Fleet Average NMOG+NOx Composite Exhaust Emission Standards***[2,4,5,6]										
	0.140	0.110	0.103	0.097	0.090	0.083	0.077	0.070	0.063	0.057	0.050
Vehicles in this category are tested at their loaded vehicle weight (curb weight plus 300 pounds) except LEV II vehicles, which are subject to the test weights specified in §1960.1(r), title 13, CCR.	***CO Composite Exhaust Emission Standard***[7]										
	4.2										

[1] *Mileage for Compliance.* All test groups certifying to LEV III FTP emission standards on a 150,000-mile durability basis shall also certify to the SFTP on a 150,000-mile durability basis, as tested in accordance with the "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."

[2] *Determining NMOG+NOx Composite Emission Values of LEV II Test Groups and Cleaner Federal Vehicles.* For test groups certified to LEV II FTP emission standards, SFTP emission values shall be converted to NMOG+NOx and projected out to the same full useful life mileage as their LEV II FTP certification, 120,000 miles or 150,000 miles using deterioration factors or aged components. In lieu of deriving a deterioration factor specific to SFTP test cycles, carry-over LEV II test groups may use the applicable deterioration factor from the FTP cycle in order to determine the carry-over composite emission values for the purpose of the NMOG+NOx sales-weighted fleet-average calculation. If an SFTP full-useful life emission value is used to comply with the LEV II SFTP 4k standards, that value may be used in the sales-weighted fleet- average without applying an additional deterioration factor. For federally-certified test groups certifying in California in accordance with Section H.1.4 of the "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," the full-useful life emission value used to comply with federal full-useful life SFTP requirements may be used in the sales-weighted fleet-average without applying an additional deterioration factor. For gasoline-fueled vehicles, NMHC emission values for the US06 and SC03 test cycles shall be converted to NMOG emission values by multiplying by a factor of 1.03. LEV II test groups that contain vehicles at or below 6,000 lbs. GVWR shall certify to SFTP bins as described in footnote 4 at the same full useful life mileage as their LEV II FTP certification starting model year 2017 and in each subsequent model year, thereafter. LEV II test groups that only contain vehicles above 6,000 lbs. GVWR shall certify to SFTP bins as described in footnote 4 at the same full useful life mileage as their LEV II FTP certification starting model year 2018 and in each subsequent model year, thereafter. Test groups certifying to bins shall be subject to the in-use requirements in section (a)(8)(c).

[3] MDPVs are excluded from SFTP NMOG+NOx and CO emission standards and the sales-weighted fleet average until they are certified to LEV III FTP 150,000-mile NMOG+NOx and CO requirements.

[4] LEV III test groups shall certify to bins in increments of 0.010 g/mi. Beginning with the 2018 model year, vehicles may not certify to bin values above a maximum of 0.180 g/mi.

[5] *Calculating the sales-weighted average for NMOG+NOx.* For each model year, the manufacturer shall calculate and report to the Executive Officer, its sales-weighted fleet-average NMOG+NOx composite emission value as follows.

$$\frac{\left[\sum_{i=1}^{n}(\text{number of vehicles in the test group})_i \times (\text{composite value of bin})_i\right]}{\sum_{i=1}^{n}(\text{number of vehicles in the test group})_i}$$

[Eq.2]

where "n" = a manufacturer's total number of PC, LDT, and, if applicable, MDPV certification bins, in a given model year including carry-over certification bins, certifying to SFTP composite emission standards in that model year;

"number of vehicles in the test group" = the number of vehicles produced and delivered for sale in California in the certification test group; and

"Composite Value of Bin" = the numerical value selected by the manufacturer for the certification bin that serves as the emission standard for the vehicles in the test group with respect to all testing for test groups certifying to SFTP on a 150,000-mile durability basis, and the SFTP carry-over composite emission value, as described in footnote 2 of this table, for carry-over LEV II test groups. For each test group, the manufacturer shall report to the Executive Officer the composite value of bin and the number of vehicles within the test group.

[6] *Calculation of Fleet Average Total NMOG+NOx Credits or Debits.* A manufacturer shall calculate the total NMOG+NOx credits or debits, as follows:

[(NMOG+NOx Composite Emission Standard) – (Manufacturer's Sales-Weighted Fleet-Average Composite Emission Value)]

x (Total Number of Vehicles Produced and Delivered for Sale in California in the 0-8,500 lbs GVWR plus MDPVs classes, if applicable) [Eq. 3]

A negative number constitutes total NMOG+NOx debits, and a positive number constitutes total NMOG+NOx credits accrued by the manufacturer for the given model year. Total NMOG+NOx credits earned in a given model year retain full value through the fifth model year after they are earned. At the beginning of the sixth model year, the total NMOG+NOx credits have no value. A manufacturer may trade credits with other manufacturers

A manufacturer shall equalize total NMOG+NOx debits within three model years after they have been incurred by earning NMOG+NOx credits in an amount equal to the total NMOG+NOx debits. If total NMOG+NOx debits are not equalized within the three model-year period, the manufacturer is subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the total NMOG+NOx debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code section 43211, the number of vehicles not meeting the state board's emission standards is determined by dividing the NMOG+NOx debits for the model year by the NMOG+NOx composite emission standard in effect during the model year in which the debits were incurred.

7 *Calculating the CO composite emission value.* Composite emission values for CO shall be calculated in accordance with Equation 1 above. Unlike the NMOG+NOx composite emission standards, manufacturers may not comply with the CO composite emission standard through fleet averaging; each individual test group must comply with the standard. Test groups certified to 4,000-mile SFTP emission standards and federally-certified test groups certifying in California in accordance with Section H subparagraph 1.4 of "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" are not subject to this CO emission standard.

(B) *SFTP PM Exhaust Emission Standards for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.* The following standards are the maximum PM exhaust emissions through the full useful life from 2017 and subsequent model-year LEV III LEVs, ULEVs, and SULEVs in the PC, LDT, and MDPV classes when operating on the same gaseous or liquid fuel they use for FTP certification. In the case of fuel-flexible vehicles ≤ 6,000 lbs. GVWR certified to LEV III FTP standards prior to model year 2017 and fuel-flexible vehicles > 6,000 lbs. GVWR certified to LEV III FTP standards prior to model year 2018, these standards only apply when the vehicles is operating on the LEV III certification gasoline specified in Part II, Section A.100.3.1.2 of the "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." 2017 and subsequent model year multi-fueled vehicles (including bi- fueled, dual-fueled and fuel-flexible vehicles) ≤ 6,000 lbs. GVWR and 2018 and subsequent model year multi-fueled vehicles > 6,000 lbs. GVWR, including vehicles certifying with carryover data, shall comply with all requirements established for each consumed fuel (or blend of fuels in the case of fuel-flexible vehicles). Manufacturers must certify LEVs, ULEVs, and SULEVs in the PC, LDT, and MDPV classes, which are certifying to LEV III FTP PM emission standards in subsection (a)(2) on a 150,000-mile durability basis, to the *SFTP PM Exhaust Emission Standards* set forth in this subsection (a)(7)(B).

SFTP PM Exhaust Emission Standards for 2017 and Subsequent Model LEV III Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles[1]

Vehicle Type	*Test Weight*	*Mileage for Compliance*	*Test Cycle*	*PM[2] (mg/mi)*	
				2018 and Prior Model Years	*2019 and Subsequent Model Years*
All PCs and LDTs through 8,500 lbs GVWR; MDPVs	Loaded vehicle weight	150,000	US06	10	6

[1] All PCs, LDTs, and MDPVs certified to LEV III FTP PM emission standards in subsection (a)(2) on a 150,000- mile durability basis shall comply with the SFTP PM Exhaust Emission Standards in this table.

[2] *Relaxed Interim Certification Standard.* Manufacturers shall certify 2018 and prior model test groups to a relaxed interim US06 PM certification standard of 10 mg/mi. However, all 2019 and subsequent model vehicles certifying to the LEV III FTP PM standard, including those from carryover test groups, shall be subject to the 6 mg/mi US06 PM standard.

(C) *SFTP NMOG+NOx and CO Exhaust Emission Standards for Medium-Duty Vehicles.* The following standards are the maximum NMOG+NOx and CO composite emission values for full useful life of 2016 and subsequent model-year medium-duty LEV III ULEVs and SULEVs from 8,501 through 14,000 pounds GVWR when operating on the same gaseous or liquid fuel they use for FTP certification. In the case of flex-fueled vehicles certified to LEV III FTP standards prior to model year 2018, SFTP compliance shall be demonstrated using the LEV III certification gasoline specified in Part II, Section A.100.3.1.2 of the "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." 2018 and subsequent model year multi-fueled vehicles (including bi-fueled, dual-fueled and fuel-flexible vehicles), including vehicles certifying with carryover data, shall comply with all requirements established for each consumed fuel (or blend of fuels in the case of fuel-flexible vehicles). The following composite emission standards do not apply to MDPVs subject to the emission standards presented in subsections (a)(7)(A) and (a)(7)(B).

SFTP NMOG+NOx and CO Composite Exhaust Emission Standards for 2016 and Subsequent Model ULEVs and SULEVs in the Medium-Duty Vehicle Class

Vehicle Type	*Mileage for Compliance*	*HP/GVWR*[2]	*Test Cycle*[3,4,5]	*Vehicle Emission Category*[6]	*Composite Emission Standard*[1] *(g/mi)*	
					NMOG + NOx	*Carbon Monoxide*
MDVs 8,501 - 10,000 lbs GVWR	150,000	≤ 0.024	US06 Bag 2, SC03, FTP	ULEV	0.550	22.0
				SULEV	0.350	12.0
		> 0.024	Full US06, SC03, FTP	ULEV	0.800	22.0
				SULEV	0.450	12.0
MDVs 10,001-14,000 lbs GVWR	150,000	n/a	Hot 1435 UC (Hot 1435 LA92), SC03, FTP	ULEV	0.550	6.0
				SULEV	0.350	4.0

[1] Manufacturers shall use Equation 1 in subsection (a)(7)(A)2.to calculate SFTP Composite Emission Values for each test group subject to the emission standards in this table. For MDVs 10,001-14,000 lbs. GVWR, the emission results from the UC test shall be used in place of results from the US06 test.

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[2] *Power to Weight Ratio.* If all vehicles in a test group have a power to weight ratio at or below a threshold of 0.024, they may opt to run the US06 Bag 2 in lieu of the full US06 cycle. The cutoff is determined by using a ratio of the engine's maximum rated horsepower, as established by the engine manufacturer in the vehicle's Application for Certification, to the vehicle's GVWR in pounds and does not include any horsepower contributed by electric motors in the case of hybrid electric or plug-in hybrid electric vehicles. Manufacturers may opt to test to the full cycle regardless of the calculated ratio; in such case, manufacturers shall meet the emission standards applicable to vehicles with power-to-weight ratios greater than 0.024.

[3] *Test Weight.* Medium-duty vehicles are tested at their adjusted loaded vehicle weight (average of curb weight and GVWR).

[4] *Road Speed Fan.* Manufacturers have the option to use a road speed modulated fan as specified in 40-CFR § 86.107– 96(d)(1) or §1066.105, as applicable, instead of a fixed speed fan for MDV SFTP testing.

[5] If a manufacturer provides an engineering evaluation for a test group showing that SC03 emissions are equivalent to or lower than FTP emissions, the FTP emission value may be used in place of the SC03 emission value when determining the composite emission value for that test group.

[6] *Vehicle Emission Categories.* For MDVs 8,501-10,000 lbs. GVWR certified prior to the 2018 model year, for each model year, the percentage of MDVs certified to an SFTP emission category set forth in this section shall be equal to or greater than the total percentage certified to the FTP ULEV250, ULEV200, SULEV170, and SULEV150 emission categories; of these vehicles, the percentage of MDVs certified to an SFTP SULEV emission category shall be equal to or greater than the total percentage certified to both the FTP SULEV170 and SULEV150 emission categories. For MDVs 10,001-14,000 lbs. GVWR, for each model year, the percentage of MDVs certified to an SFTP emission category set forth in this section shall be equal to or greater than the total percentage certified to the FTP ULEV400, ULEV270, SULEV230, and SULEV200 emission categories; of these vehicles, the percentage of MDVs certified to an SFTP SULEV emission category shall be equal to or greater than the total percentage certified to both the FTP SULEV230 and SULEV200 emission categories. 2018 and subsequent model year MDVs 8,501-10,000 lbs. GVWR certifying to the FTP ULEV250 and ULEV200 emission categories, including vehicles certifying with carryover data, shall comply with the SFTP ULEV standards set forth in this subsection (a)(7)(C), and those certifying to FTP SULEV170 and SULEV150, including vehicles certifying with carryover data, shall comply with the SFTP SULEV standards set forth in this subsection (a)(7)(C). 2018 and subsequent model year MDVs 10,001-14,000 lbs. GVWR certifying to FTP ULEV400 and ULEV270 emission categories, including vehicles certifying with carryover data, shall comply with the SFTP ULEV standards set forth in this subsection (a)(7)(C), and those certifying to SULEV230 and SULEV200, including vehicles certifying with carryover data, shall comply with the SFTP SULEV standards set forth in this subsection (a)(7)(C).

(D) *SFTP PM Exhaust Emission Standards for Medium-Duty Vehicles.* The following standards are the maximum PM composite emission values for the full useful life of 2017 and subsequent model-year LEV III LEVs, ULEVs, and SULEVs when operating on the same gaseous or liquid fuel they use for FTP certification. In the case of fuel-flexible vehicles certified to LEV III FTP standards prior to model year 2018, SFTP compliance shall be demonstrated using the LEV III certification gasoline specified in Part II, Section A.100.3.1.2 of the "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." 2018 and subsequent model year multi-fueled vehicles (including bi-fueled, dual-fueled and fuel-flexible vehicles), including vehicles certifying with carryover data, shall comply with all requirements established for each consumed fuel (or blend of fuels in the case of fuel-flexible vehicles). The following composite emission standards do not apply to MDPVs subject to the emission standards set forth in subsections (a)(7)(A) and (a)(7)(B).

SFTP PM Exhaust Emission Standards for 2017 and Subsequent Model Medium-Duty Vehicles[1]					
Vehicle Type	*Test Weight*	*Mileage for Compliance*	*Hp/GVWR[2]*	*Test Cycle[3,4,5]*	*PM (mg/mi)*
MDVs 8,501-10,000 lbs GVWR	Adjusted loaded vehicle weight	150,000	≤ 0.024	US06 Bag 2	7
			>0.024	US06	10
MDVs 10,001-14,000 lbs GVWR	Adjusted loaded vehicle weight	150,000	n/a	Hot 1435 UC (Hot 1435 LA92)	7

[1] Except for MDPVs subject to the emission standards set forth in subsection (a)(7)(B), MDVs certified to 150,000-mile FTP PM emission standards in subsection (a)(2) shall comply with the SFTP PM Exhaust Emission Standards in this table.

[2] *Power to Weight Ratio.* If all vehicles in a test group have a power to weight ratio at or below a threshold of 0.024, they may opt to run the US06 Bag 2 in lieu of the full US06 cycle. The cutoff is determined by using a ratio of the engine's horsepower to the vehicle's GVWR in pounds and does not include any horsepower contributed by electric motors in the case of hybrid electric or plug-in hybrid electric vehicles. Manufacturers may opt to test to the full cycle regardless of the calculated ratio; in such case, manufacturers shall meet the emission standards applicable to vehicles with power-to-weight ratios greater than 0.024.

[3] *Road Speed Fan.* Manufacturers have the option to use a road speed modulated fan as specified in 40-CFR § 86.107– 96(d)(1) or §1066.105, as applicable, instead of a fixed speed fan for MDV SFTP testing.

[4] Manufacturers shall use Equation 1 above to calculate SFTP Composite PM Emission Values for each test group subject to the emission standards in this table. For MDVs 8,501-10,000 lbs. GVWR certifying to the US06 Bag 2 PM emission standard, the emission results from the US06 Bag 2 test shall be used in place of results from the full US06 test. For MDVs 10,001-14,000 lbs. GVWR, the emission results from the UC test shall be used in place of results from the US06 test.

[5] If a manufacturer provides an engineering evaluation for a test group demonstrating that SC03 PM emissions are equivalent to or lower than FTP PM emissions, the FTP PM emission value may be used in lieu of the SC03 PM emission value when determining the composite emission value for that test group.

(8) Interim In-Use Compliance Standards.

(A) *LEV III NMOG+NOx Interim In-Use Compliance Standards.* The following interim in-use compliance standards shall apply for the first two model years that a test group is certified to LEV III standards that are more stringent than the standards to which the test group was certified in a prior model year.

1. *NMOG+NOx Interim In-Use Compliance Standards for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.* For the 2015 through 2019 model years, these standards shall apply.

Emission Category	*Durability Vehicle Basis (miles)*	*LEV III PCs, LDTs, and MDPVs*
		NMOG + NOx (g/mi)
LEV160	150,000	n/a
ULEV125	150,000	n/a
ULEV70	150,000	0.098
ULEV50	150,000	0.070
SULEV30	150,000	0.042[1]
SULEV20	150,000	0.028[1]

[1]not applicable to test groups that receive PZEV credits

2. *NMOG+NOx Interim In-Use Compliance Standards for Medium-Duty Vehicles, Excluding Medium-Duty Passenger Vehicles.* For the 2015 through 2020 model years, these standards shall apply.

Emission Category	*Durability Vehicle Basis (miles)*	*LEV III MDVs (excluding MDPVs) 8,501 - 10,000 lbs. GVW*	*LEV III MDVs 10,001 - 14,000 lbs. GVW*
		NMOG + NOx (g/mi)	*NMOG + NOx (g/mi)*
LEV395	150,000	n/a	n/a
ULEV340	150,000	n/a	n/a
ULEV250	150,000	0.370	n/a
ULEV200	150,000	0.300	n/a
SULEV170	150,000	0.250	n/a
SULEV150	150,000	0.220	n/a
LEV630	150,000	n/a	n/a
ULEV570	150,000	n/a	n/a
ULEV400	150,000	n/a	0.600
ULEV270	150,000	n/a	0.400
SULEV230	150,000	n/a	0.340
SULEV200	150,000	n/a	0.300

(B) *LEV III Particulate Interim In-Use Compliance Standards.* The following interim in-use compliance standards shall apply for the first two model years that a test group is certified to the LEV III standards.

1. *LEV III Particulate Interim In-Use Compliance Standards for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.* For the 2017 through 2020 model years, the interim in-use compliance standard for vehicles certifying to the 3 mg/mi particulate standard is 6 mg/mi. For the 2025 through 2028 model years, the interim in-use compliance standard for vehicles certifying to the 1 mg/mi particulate standard is 2 mg/mi.

2. *LEV III Particulate Interim In-Use Compliance Standards for Medium- Duty Vehicles, excluding Medium-Duty Passenger Vehicles.* For the 2017 through 2020 model years, the interim in-use compliance standard for vehicles certifying to the 8 mg/mi particulate standard shall be 16 mg/mi and the interim in-use compliance standard for vehicles certifying to the 10 mg/mi particulate standard shall be 20 mg/mi.

(C) SFTP Interim In-Use Compliance Standards.

1. 2016 and prior model year light-duty and medium-duty passenger vehicle test groups that contain vehicles at or below 6,000 lbs. GVWR, 2017 and prior model year light-duty and medium-duty passenger vehicle test groups with only vehicles above 6,000 lbs. GVWR, and 2019 and prior model year medium-duty vehicle test groups may use an in-use compliance standard for NMOG+NOx for the first two model years that they are certified to LEV III NMOG+NOx standards or a LEV III SFTP NMOG+NOx bin.

   a. For light-duty vehicle test groups and medium-duty passenger vehicle test groups certifying to the standards in subsection (a)(7)(A)1, in-use compliance emission standards for NMOG+NOx shall be 1.4 times the applicable certification standard.

   b. For light-duty vehicle test groups and medium-duty passenger vehicle test groups certifying to the standards in subsection (a)(7)(A)2, in-use compliance emission standards for NMOG+NOx shall be 1.4 times the Composite Value of the bin to which a test group is certified.

   c. For medium-duty vehicle tests groups certifying to the standards in subsection (a)(7)(C), in-use compliance emission standards for NMOG+NOx shall be 1.4 times the applicable certification standard.

2. 2023 and prior model year light-duty and medium-duty passenger vehicle test groups that certify to a LEV III SFTP PM exhaust emission standard in subsection (a)(7)(B) may use an in-use compliance standard for SFTP PM regardless of the model year that the test groups first certified to the LEV III SFTP PM standard. 2022 and prior model year medium-duty vehicle test groups may use an in-use compliance standard for PM for the first two model years that they are certified to a LEV III SFTP PM exhaust emission standard in subsection (a)(7)(D).

   a. For light-duty vehicle test groups and medium-duty passenger vehicle test groups certifying to SFTP PM exhaust emission standards in subsection (a)(7)(B), in-use compliance emission standards for PM shall be 10 mg/mi.

   b. For medium-duty vehicle test groups certifying to SFTP PM Exhaust Emission Standards in subsection (a)(7)(D), in-use compliance emission standards for PM shall be 5.0 mg/mi higher than the applicable certification standard.

(9) *Requirement to Generate Additional NMOG+NOx Fleet Average Credit.* For a vehicle that is certified to the LEV III standards in subsection (a)(1), which does not generate a partial ZEV allocation according to the criteria set forth in section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes" and the "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," a manufacturer may subtract 5 mg/mi from the NMOG+NOx emission standards value set forth in subsection (b)(1)(B)1.c when calculating the manufacturer's fleet average, provided that the manufacturer extends the performance and defects warranty period to 15 years or 150,000 miles, whichever occurs first, except that the time period is to be 10 years for a zero emission energy storage device (such as battery, ultracapacitor, or other electric storage device).

(10) *Requirement to Generate a Partial ZEV Allowance.* For the 2015 through 2017 model years, a manufacturer that certifies to the LEV III SULEV30 or the LEV III SULEV20 standards may also generate a partial ZEV allocation according to the criteria set forth in section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes."

(11) *NMOG Credit for Direct Ozone Reduction Technology.* A manufacturer that certifies vehicles equipped with direct ozone reduction technologies shall be eligible to receive NMOG credits that can be applied to the NMOG exhaust emissions of the vehicle when determining compliance with the standard. In order to receive credit, the manufacturer must submit the following information for each vehicle model for which it gets credit, including, but not limited to:

(A) a demonstration of the airflow rate through the direct ozone reduction device and the ozone-reducing efficiency of the device over the range of speeds encountered in the Unified Cycle Driving Schedule contained in Part II G. of the "California 2015 and Subsequent Model Criteria Pollutant Emission Standards and Test Procedures for and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty trucks and Medium-duty Vehicles";

(B) an evaluation of the durability of the device for the full useful life of the vehicle; and

(C) a description of the on-board diagnostic strategy for monitoring the performance of the device in-use. Using the above information, the Executive Officer shall determine the value of the NMOG credit based on the calculated change in the one-hour peak ozone level using an approved airshed model. This credit can only be used for determining compliance with the exhaust standards in subsection (a)(1) or subsection 1961(a)(1), as applicable.

(12) When a Federally-Certified Vehicle Model is Required in California.

(A) *General Requirement.* Whenever a manufacturer federally-certifies a 2015 or subsequent model-year passenger car, light-duty truck, or medium-duty vehicle model to the standards for a particular emissions bin that are more stringent than the standards for an applicable California emission category, the equivalent California model may only be certified to (i) the California standards for a vehicle emissions category that are at least as stringent as the standards for the corresponding federal emissions bin, or (ii) the exhaust emission standards to which the federal model is certified. However, where the federal exhaust emission standards for the particular emissions bin and the California standards for a vehicle emissions category are equally stringent, the California model may only be certified to either the California standards for that vehicle emissions category or more stringent California standards. The federal emission bins are those contained in Tables S04-1 and S04-2 of 40 CFR §86.1811-04(c), as adopted February 10, 2000, and in Table 2 of 40 CFR §86.1811.17(b), as adopted April 28, 2014. The criteria for applying this requirement are set forth in Part I. Section H.1 of the "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."

(B) *Exception for clean fuel fleet vehicles.* Subsection (a)(12)(A) does not apply in the case of a federally-certified vehicle model that is only marketed to fleet operators for applications that are subject to clean fuel fleet requirements established pursuant to section 246 of the federal Clean Air Act (42 U.S.C. sec. 7586). In addition, the Executive Officer shall exclude from the requirement a federally-certified vehicle model where the manufacturer demonstrates to the Executive Officer's reasonable satisfaction that the model will primarily be sold or leased to clean fuel fleet operators for such applications, and that other sales or leases of the model will be incidental to marketing to those clean fuel fleet operators.

(13) *Emission Standard for a Fuel-Fired Heater.* Whenever a manufacturer elects to utilize an on-board fuel-fired heater on any passenger car, light-duty truck or medium-duty vehicle, the fuel-fired heater must meet ULEV125 standards for passenger cars and light-duty trucks less than 8,500 pounds GVWR as set forth in subsection (a)(1). The exhaust emissions from the fuel-fired heater shall be determined in accordance with the ""California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes" or the "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 applicable. If the on-board fuel-fired heater is capable of operating at ambient temperatures above 40°F, the measured emission levels of the on-board fuel-fired heater shall be added to the emissions measured on the FTP (40 CFR, Part 86, Subpart B), as amended by the "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" to determine compliance with the exhaust emission standards in subsection (a)(1).

(b) Emission Standards Phase-In Requirements for Manufacturers.

(1) Fleet Average NMOG + NOx Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

(A) The fleet average non-methane organic gas plus oxides of nitrogen exhaust mass emission values from the passenger cars, light-duty trucks, and medium-duty passenger vehicles that are produced and delivered for sale in California each model year by a manufacturer other than a small volume manufacturer shall not exceed:

FLEET AVERAGE NON-METHANE ORGANIC GAS PLUS OXIDES OF NITROGEN EXHAUST MASS EMISSION REQUIREMENTS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY PASSENGER VEHICLES (150,000 mile Durability Vehicle Basis)		
Model Year	*Fleet Average NMOG + NOx (grams per mile)*	
	All PCs; LDTs 0-3750 lbs. LVW	*LDTs 3751 lbs. LVW - 8500 lbs. GVWR; All MDPVs*
2014[1]	0.107	0.128
2015	0.100	0.119
2016	0.093	0.110
2017	0.086	0.101
2018	0.079	0.092
2019	0.072	0.083
2020	0.065	0.074
2021	0.058	0.065
2022	0.051	0.056
2023	0.044	0.047
2024	0.037	0.038
2025+	0.030	0.030

[1] For the 2014 model year, a manufacturer may comply with the fleet average NMOG+NOx values in this table in lieu of complying with the NMOG fleet average values in subsection 1961(a)(b)(1)(A). A manufacturer must either comply with the NMOG+NOx fleet average requirements for both its PC/LDT1 fleet and its LDT2/MDPV fleet or comply with the NMOG fleet average requirements for both its PC/LDT1 fleet and its LDT2 fleet. A manufacturer must calculate its fleet average NMOG+NOx values using the applicable full useful life standards.

1. A manufacturer that selects compliance Option 2 must provide to the Executive Officer separate values for the number of vehicles in each test group produced and delivered for sale in the District of Columbia and for each individual state within the average.

2. *PZEV Anti-Backsliding Requirement.* In the 2018 and subsequent model years, a manufacturer must produce and deliver for sale in California a minimum percentage of its passenger car and light-duty truck fleet that certifies to SULEV30 and SULEV20 standards. This minimum percentage must be equal to the average percentage of PZEVs produced and deliver for sale in California for that manufacturer for the 2015 through 2017 model year. A manufacturer may calculate this average percentage using the projected sales for these model years in lieu of actual sales. The percentage of a manufacturer's passenger car and light-duty truck fleet that certifies to SULEV30 and SULEV20 standards averaged across the applicable model year and the two previous model years shall be used to determine compliance with this requirement, beginning with the 2020 model year.

(B) Calculation of Fleet Average NMOG + NOx Value.

1. Basic Calculation.

a. Each manufacturer's PC and LDT1 fleet average NMOG + NOx value for the total number of PCs and LDT1s produced and delivered for sale in California shall be calculated as follows:

(Σ [Number of vehicles in a test group excluding off-vehicle charge capable hybrid electric vehicles x applicable emission standard] +
Σ [Number of off-vehicle charge capable hybrid electric vehicles in a test group x HEV NMOG+NOx contribution factor]) ÷
Total Number of PCs plus LDT1s Produced and Delivered for sale in California, Including ZEVs and HEVs

b. Each manufacturer's LDT2 and MDPV fleet average NMOG+NOx value for the total number of LDT2s and MDPVs produced and delivered for sale in California shall be calculated as follows:

(Σ [Number of vehicles in a test group excluding off-vehicle charge capable hybrid electric vehicles x applicable emission standard] +
Σ [Number of off-vehicle charge capable hybrid electric vehicles in a test group x HEV NMOG factor]) ÷
Total Number of LDT2s plus MDPVs Produced and Delivered for sale in California, Including ZEVs and HEVs

c. The applicable emission standards to be used in the above equations are as follows:

Model Year	Emission Category	Emission Standard Value[1] (g/mi)	
		All PCs; LDTs 0-3750 lbs. LVW	**LDTs 3751-5750 lbs. LVW; All MDPVs**
2015 and subsequent model year federally-certified vehicles	All	Sum of the full useful life NMOG and NOx Federal Emission Standards to which Vehicle is Certified	Sum of the full useful life NMOG and NOx Federal Emission Standards to which Vehicle is Certified
Model Year	**Emission Category**	**All PCs; LDTs 0-3750 lbs. LVW**	**LDTs 3751 lbs. LVW - 8500 lbs. GVWR;**
2015 through 2019 model year vehicles certified to the "LEV II" standards in subsection 1961(a)(1); 2015 and subsequent model year vehicles certified to the "LEV III" standards in subsection 1961.2(a)(1)	LEV II LEVs; LEV160s	0.160	0.160
	LEV II ULEVs; LEV125s	0.125	0.125
	ULEV70s	0.070	0.070
	ULEV50s	0.050	0.050
	LEV II SULEVs; SULEV30s	0.030	0.030
	SULEV20s	0.020	0.020
	LEV II LEVs; LEV395s	n/a	0.395
	LEV II ULEVs	n/a	0.343
	ULEV340s	n/a	0.340
	ULEV250s	n/a	0.250
	ULEV200s	n/a	0.200
	SULEV170s	n/a	0.170
	SULEV150s	n/a	0.150

[1] For LEV III vehicle test groups that meet the extended emission warranty requirements in subsection (a)(9), the applicable emission standard value shall be the emission standard value set forth in this table minus 5 mg/mi.

2. *NMOG+NOx Contribution Factor for Off-vehicle Charge Capable HEVs.* The HEV NMOG+NOx contribution factor for light-duty off-vehicle charge capable hybrid electric vehicles is calculated as follows. For the purpose of applying this formula to light- duty off-vehicle charge capable hybrid electric vehicles that are certified to the LEV II standards set forth in subsection 1961(a)(1), a LEV II LEV shall use the formula for LEV160, a LEV II ULEV shall use the formula for ULEV125, and a LEV II SULEV shall use the formula for SULEV30.

LEV160 HEV Contribution Factor = 0.160 - [(Zero-emission VMT Allowance) x 0.035]

ULEV125 HEV Contribution Factor = 0.125 - [(Zero-emission VMT Allowance) x 0.055]

ULEV70 HEV Contribution Factor = 0.070 - [(Zero-emission VMT Allowance) x 0.020]

ULEV50 HEV Contribution Factor = 0.050 - [(Zero-emission VMT Allowance) x 0.020]

SULEV30 HEV Contribution Factor = 0.030 - [(Zero-emission VMT Allowance) x 0.010]

SULEV20 HEV Contribution Factor = 0.020 - [(Zero-emission VMT Allowance) x 0.020]

Where the Zero-emission VMT Allowance for 2015 through 2017 model year off-vehicle charge capable HEVs is determined in accordance with section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero- Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes." For the 2018 and subsequent model years, the Zero- emission VMT Allowance is equal to the sum of the Zero-Emission Vehicles Miles Traveled TZEV Allowance and the Allowance for US06 Capability in section C.3.3 of the "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 applicable. For the purposes of this subsection (b)(1)(B)2, the maximum allowable Zero-emission VMT Allowance that may be used in these equations is 1.0.

(C) Phase-In Requirements for Small Volume Manufacturers.

1. In the 2015 through 2016 model years, a small volume manufacturer shall not exceed a fleet average NMOG+NOx value of 0.160 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.160 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with subsection (b)(1)(B). In the 2017 through 2021 model years, a small volume manufacturer shall not exceed a fleet average NMOG+NOx value of 0.125 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.125 g/mi for LDTs from 3751 lbs. LVW - 8,500 lbs. GVW and MDPVs calculated in accordance with subsection (b)(1)(B). In 2022 and subsequent model years, a small volume manufacturer shall not exceed a fleet average NMOG+NOx value of 0.051 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.051 g/mi for LDTs from 3751 lbs. LVW - 8,500 lbs. GVW and MDPVs calculated in accordance with subsection (b)(1)(B). For the 2015 through 2021 model years, a small volume manufacturer may certify its vehicles to the LEV II exhaust standards in section 1961. All vehicles certified by a small volume manufacturer for the 2022 and subsequent model years must meet the LEV III exhaust standards in this section.

2. If a manufacturer's average California sales exceeds 4500 units of new PCs, LDTs, MDVs, heavy-duty vehicles, and heavy-duty engines based on the average number of vehicles sold for the three previous consecutive model years, the manufacturer shall no longer be treated as a small volume manufacturer. If this is the first time the manufacturer exceeds the 4500 unit sales limit, the manufacturer must comply with the fleet average requirements applicable to a large volume manufacturer, as specified in subsection (b)(1)(A) beginning with the fourth model year after the last of the three consecutive model years. If during this four year lead time period the manufacturer's sales drop below the 4500 unit sales limit and then increase again above the 4500 unit sales limit, the four year lead time period shall be calculated based on the first model year in which the manufacturer again exceeds the 4500 unit sales limit. Except as noted above – i.e., if this is not the first time the manufacturer has exceeded the 4500 unit sales limit – the manufacturer shall comply with the fleet average requirements applicable to larger manufacturers as specified in subsection (b)(1)(A) beginning with the following model year after the last of the three consecutive model years.

3. If a manufacturer's average California sales fall below 4500 units of new PCs, LDTs, MDVs and heavy duty engines based on the average number of vehicles sold for the three previous consecutive model years, the manufacturer shall be treated as a small volume manufacturer and shall be subject to the requirements for small volume manufacturers beginning with the next model year.

(D) *Treatment of ZEVs.* ZEVs classified as LDTs (>3750 lbs. LVW) that have been counted toward the ZEV requirement for PCs and LDTs (0-3750 lbs. LVW) as specified in sections 1962.1 and 1962.2 shall be included as LDT1s in the calculation of a fleet average NMOG+NOx value.

(2) *LEV III Phase-In Requirement for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles*

For the 2015 and 2016 model years, the LEV II SULEV emission standards set forth in section 1961(a)(1) that are applicable to PCs, LDTs, and MDPVs shall only apply to those PCs, LDT1s, LDT2s, and MDPVs that certify to SULEV emission standards using "carryover" of emission test data from a previous model year in accordance with U.S. EPA OMS Advisory Circular A/C No. 17F, issued November 16, 1982, and last amended January 21, 1988, incorporated herein by reference. Beginning in the 2017 model year, the LEV II SULEV emission standards set forth in section 1961(a)(1) that are applicable to PCs, LDTs, and MDPVs shall only apply to those PCs, LDT1s, LDT2s, and MDPVs that receive partial ZEV allowances in accordance with the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes." A manufacturer, other than a small volume manufacturer, must certify 100 percent of its PC, LDT, and MDPV fleet to the LEV III standards in subsection (a)(1) in 2020 and subsequent model years. A small volume manufacturer must certify 100 percent of its PC, LDT, and MDPV fleet to the LEV III standards in subsection (a)(1) in 2022 and subsequent model years.

(3) *LEV III Phase-In Requirements for Medium-Duty Vehicles, Other than Medium- Duty Passenger Vehicles.*

(A) *Requirement for Manufacturers Other than Small Volume Manufacturers.* A manufacturer of MDVs, other than a small volume manufacturer, shall certify its MDV fleet according to the following phase-in schedule:

Model Year	*Vehicles Certified to §1961.2.1(a)(1)[1] (%)*				*Vehicles Certified to §1956.8(c) or (h) (%)*
	LEV II LEV; LEV III LEV395 or LEV630	LEV II ULEV; LEV III ULEV340 or ULEV570	LEV III ULEV250 or ULEV400	LEV III SULEV170 or SULEV230	ULEV
2015	40	60	0	0	100
2016	20	60	20	0	100
2017	10	50	40	0	100
2018	0	40	50	10	100
2019	0	30	40	30	100
2020	0	20	30	50	100
2021	0	10	20	70	100
2022 +	0	0	10	90	100

[1] The LEV II LEV and LEV II ULEV emission categories are only applicable for the 2015 through 2019 model years. The LEV III LEV395, LEV630, ULEV340, and ULEV570 emission categories are only applicable for the 2015 through 2021 model years.

(B) *Requirements for Small Volume Manufacturers.* In the 2015 through 2017 model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV LEV II LEV standards or to the LEV III LEV395 or LEV III LEV630 standards, as applicable, in a quantity equivalent to 100% of its MDV fleet. In the 2018 through 2021 model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV LEV II ULEV standards or to the LEV III ULEV340 or LEV III ULEV570 standards, as applicable, in a quantity equivalent to 100% of its MDV fleet. In the 2022 and subsequent model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV LEV III ULEV250 or LEV III ULEV400 standards, as applicable, in a quantity equivalent to 100% of its MDV fleet. Engines certified to these MDV standards are not eligible for emissions averaging.

(C) Alternate Phase-In Schedules for LEV III MDVs.

1. Alternate Phase-In Schedules for LEV III MDVs for All Manufacturers.

a. For the 2016 and subsequent model years, the fleet average non methane organic gas plus oxides of nitrogen exhaust mass emission values from the medium-duty vehicles produced and delivered for sale in California each model year shall not exceed:

FLEET AVERAGE NON-METHANE ORGANIC GAS PLUS OXIDES OF NITROGEN EXHAUST MASS EMISSION REQUIREMENTS FOR MEDIUM-DUTY VEHICLES (150,000 mile Durability Vehicle Basis)		
Model Year	Fleet Average NMOG + NOx (g/mi)	
	MDVs 8,501 - 10,000 lbs. GVWR	MDVs 10,001-14,000 lbs. GVWR
2016	0.333	0.548
2017	0.310	0.508
2018	0.278	0.451
2019	0.253	0.400
2020	0.228	0.349
2021	0.203	0.298
2022+	0.178	0.247

b. Each manufacturer's fleet average NMOG+NOx value for the total number of MDVs 8,501 - 10,000 lbs. GVWR produced and delivered for sale in California shall be calculated as follows:

(Σ [Number of MDVs 8,501 - 10,000 lbs. GVWR in a test group excluding off-vehicle charge capable hybrid electric vehicles x applicable emission standard] +
Σ [Number of off-vehicle charge capable hybrid electric vehicles in a test group x HEV NMOG+NOx contribution factor]) ÷
Total Number of MDVs 8,501 - 10,000 lbs. GVWR Produced and Delivered for sale in California, Including ZEVs and HEVs

c. Each manufacturer's fleet average NMOG+NOx value for the total number of MDVs 10,001-14,000 lbs. GVWR produced and delivered for sale in California shall be calculated as follows:

(Σ [Number of MDVs 10,001 - 14,000 lbs. GVWR in a test group excluding off-vehicle charge capable hybrid electric vehicles x applicable emission standard] +
Σ [Number of off-vehicle charge capable hybrid electric vehicles in a test group x HEV NMOG+NOx contribution factor]) ÷
Total Number of MDVs 10,001 - 14,000 lbs. GVWR Produced and Delivered for sale in California, Including ZEVs and HEVs

d. The applicable emission standards to be used in the above equations are as follows:

Model Year	Emission Category	Emission Standard Value (g/mi)
2016 and subsequent model year federally- certified vehicles	All	Sum of the full useful life NMOG and NOx Federal Emission Standards or full useful life NMOG+NOx Federal Emission Standard to which Vehicle is Certified
2016 through 2019 model year vehicles certified to the "LEV II" standards in subsection 1961(a)(1)	All	Sum of the full useful life NMOG and NOx LEV II Emission Standards to which Vehicle is Certified
2016 and subsequent model year vehicles certified to the "LEV III" standards in subsection (a)(1)	All	Full useful life NMOG+NOx LEV III Emission Standards to which Vehicle is Certified

e. *NMOG+NOx Contribution Factor for Off-vehicle Charge Capable HEVs.* The HEV NMOG+NOx contribution factors for medium-duty off-vehicle charge capable hybrid electric vehicles are calculated as follows.

The Zero-emission VMT Allowance for 2016 and 2017 model year off-vehicle charge capable HEVs is determined in accordance with section C.3 of the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes." For the 2018 and subsequent model years, the Zero- emission VMT Allowance is equal to the sum of the Zero-Emission Vehicles Miles Traveled TZEV Allowance and the Allowance for US06 Capability in section C.3.3 of the "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 applicable. For the purposes of this subsection (b)(3)(C)1.e, the maximum allowable Zero-emission VMT Allowance that may be used in these equations is 1.0.

i. *NMOG+NOx Contribution Factor for Off-vehicle Charge Capable HEVs 8,501 - 10,000 lbs. GVWR.* The HEV NMOG+NOx contribution factors for medium-duty off-vehicle charge capable hybrid electric vehicles 8,501 - 10,000 lbs. GVWR are calculated as follows.

For the purpose of applying this formula to medium-duty off-vehicle charge capable hybrid electric vehicles 8,501 - 10,000 lbs. GVWR that are certified to the LEV II standards set forth in subsection 1961(a)(1), a LEV II LEV shall use the formula for LEV395, a LEV II ULEV shall use the formula for ULEV340, and a LEV II SULEV shall use the formula for ULEV200.

LEV395 HEV Contribution Factor = 0.395 - [(Zero-emission VMT Allowance) x 0.055]

ULEV340 HEV Contribution Factor = 0.340 - [(Zero-emission VMT Allowance) x 0.090]

ULEV250 HEV Contribution Factor = 0.250 - [(Zero-emission VMT Allowance) x 0.050]

ULEV200 HEV Contribution Factor = 0.200 - [(Zero-emission VMT Allowance) x 0.030]

SULEV170 HEV Contribution Factor = 0.170 - [(Zero-emission VMT Allowance) x 0.020]

SULEV150 HEV Contribution Factor = 0.150 - [(Zero-emission VMT Allowance) x 0.020]

ii. *NMOG+NOx Contribution Factor for Off-vehicle Charge Capable HEVs 10,001 - 14,000 lbs. GVWR.* The HEV NMOG+NOx contribution factors for medium-duty off-vehicle charge capable hybrid electric vehicles 10,001 - 14,000 lbs. GVWR are calculated as follows.

For the purpose of applying this formula to medium-duty off-vehicle charge capable hybrid electric vehicles 10,001 - 14,000 lbs. GVWR that are certified to the LEV II standards set forth in subsection 1961(a)(1), a LEV II LEV shall use the formula for LEV630, a LEV II ULEV shall use the formula for ULEV570, and a LEV II SULEV shall use the formula as follows.

LEV II SULEV HEV Contribution Factor = 0.327 - [(Zero-emission VMT Allowance) x 0.057]

LEV630 HEV Contribution Factor = 0.630 - [(Zero-emission VMT Allowance) x 0.060]

ULEV570 HEV Contribution Factor = 0.570 - [(Zero-emission VMT Allowance) x 0.170]

ULEV400 HEV Contribution Factor = 0.400 - [(Zero-emission VMT Allowance) x 0.130]

ULEV270 HEV Contribution Factor = 0.270 - [(Zero-emission VMT Allowance) x 0.040]

SULEV230 HEV Contribution Factor = 0.230 - [(Zero-emission VMT Allowance) x 0.030]

SULEV200 HEV Contribution Factor = 0.200 - [(Zero-emission VMT Allowance) x 0.030]

2. Alternate Phase-In Schedules for LEV III MDVs for Manufacturers with a Limited Number of Test Groups. For the 2016 and subsequent model years, a manufacturer that produces and delivers for sale in California four or fewer medium-duty test groups may comply with the following alternate phase-in schedule for LEV III medium-duty vehicles.

   a. A manufacturer that produces and delivers for sale in California four medium- duty test groups may comply with the following alternate phase-in schedule for LEV III medium-duty vehicles.

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Model Year	*Number of Test Groups Certified to §1961.2.1(a)(1)*				*Vehicles Certified to §1956.8(c) or (h) (%)*
	LEV II LEV; LEV III LEV395 or LEV630	LEV II ULEV; LEV III ULEV340 or ULEV570	LEV III ULEV250 or ULEV400	LEV III SULEV170 or SULEV230	ULEV
2016-2017	1	2	1	0	100
2018	0	2	2	0	100
2019	0	1	2	1	100
2020	0	1	1	2	100
2021	0	0	1	3	100
2022 +	0	0	0	4	100

b. A manufacturer that produces and delivers for sale in California three medium-duty test groups certified to subsection (a)(1) may comply with the following alternate phase-in schedule for LEV III medium-duty vehicles.

Model Year	*Number of Test Groups Certified to §1961.2.1(a)(1)*				*Vehicles Certified to §1956.8(c) or (h) (%)*
	LEV II LEV; LEV III LEV395 or LEV630	LEV II ULEV; LEV III ULEV340 or ULEV570	LEV III ULEV250 or ULEV400	LEV III SULEV170 or SULEV230	ULEV
2016	1	2	0	0	100
2017	0	2	1	0	100
2018	0	1	2	0	100
2019-2020	0	1	1	1	100
2021	0	0	1	2	100
2022 +	0	0	0	3	100

c. A manufacturer that produces and delivers for sale in California two medium- duty test groups certified to subsection (a)(1) may comply with the following alternate phase- in schedule for LEV III medium-duty vehicles.

Model Year	*Number of Test Groups Certified to §1961.2(a)(1)*				*Vehicles Certified to §1956.8(c) or (h) (%)*
	LEV II LEV; LEV III LEV395 or LEV630	LEV II ULEV; LEV III ULEV340 or ULEV570	LEV III ULEV250 or ULEV400	LEV III SULEV170 or SULEV230	ULEV
2016	1	1	0	0	100
2017-2019	0	1	1	0	100
2020-2021	0	0	1	1	100
2022 +	0	0	0	2	100

d. A manufacturer that produces and delivers for sale in California one medium- duty test groups certified to subsection (a)(1) may comply with the following alternate phase- in schedule for LEV III medium-duty vehicles.

Model Year	*Number of Test Groups Certified to §1961.2.1(a)(1)*				*Vehicles Certified to §1956.8(c) or (h) (%)*
	LEV II LEV; LEV III LEV395 or LEV630	LEV II ULEV; LEV III ULEV340 or ULEV570	LEV III ULEV250 or ULEV400	LEV III SULEV170 or SULEV230	ULEV
2016-2018	0	1	0	0	100
2019-2021	0	0	1	0	100
2022 +	0	0	0	1	100

(D) *Identifying a Manufacturer's MDV Fleet.* Each manufacturer's MDV fleet shall be defined as the total number of California-certified MDVs produced and delivered for sale in California. The percentages shall be applied to the manufacturer's total production of California engine-certified medium-duty vehicles delivered for sale in California. A manufacturer that elects to certify to the optional medium-duty engine standards in subsections 1956.8(c) or (h) shall not count those engines in the manufacturer's total production of California-certified medium-duty vehicles for purposes of this subsection.

(E) For a manufacturer that elects to certify to the optional medium-duty engine standards in title 13, CCR subsections 1956.8(c) or (h), all such MDVs, including those produced by a small volume manufacturer, shall be subject to the emissions averaging provisions applicable to heavy-duty diesel or Otto-cycle engines as set forth in the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines," or the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines, incorporated by reference in subsections 1956.8(b) or (d), as applicable.

(4) SFTP Phase-In Requirements.

(A) *Phase-In Requirement for Passenger Cars, Light-Duty Trucks, and Medium- Duty Passenger Vehicles.* A test group certifying to LEV III FTP emission categories on a 150,000-mile durability basis shall also certify to SFTP requirements on a 150,000-mile durability basis.

Manufacturers shall have two options for phase in to the SFTP NMOG+NOx and CO emission standards.

1. Under Option 1, beginning with the 2015 model year, a manufacturer shall certify its PCs, LDTs, and MDPVs to the SFTP NMOG+NOx and CO emission standards in subsection (a)(7)(A)1. when the vehicles are also certifying to a LEV III FTP emission category at 150,000-mile durability.

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2. Under Option 2, for 2015 and subsequent model years, a manufacturer shall certify its fleet of PCs, LDTs, and MDPVs such that the manufacturer's sales-weighted fleet- average NMOG+NOx composite emission value and each test group's CO composite emission value does not exceed the applicable composite emission standards in effect for that model year in accordance with subsection (a)(7)(A)2.

Beginning with the 2017 model year, a manufacturer shall certify its PCs, LDTs, and MDPVs certifying to LEV III FTP PM emission standards on a 150,000-mile durability basis to the SFTP PM emission standards in subsection (a)(7)(B).

(B) *Phase-In Requirements for Medium-Duty Vehicle Manufacturers.* Phase-in for NMOG+NOx and CO emission standards begins with the 2016 model year. For MDVs 8,501-10,000 lbs. GVWR certified prior to the 2018 model year, for each model year, the percentage of MDVs certified to an SFTP emission category set forth in this section shall be equal to or greater than the total percentage certified to the FTP ULEV250, ULEV200, SULEV170, and SULEV150 emission categories; of these vehicles, the percentage of MDVs certified to an SFTP SULEV emission category shall be equal to or greater than the total percentage certified to both the FTP SULEV170 and SULEV150 emission categories. For MDVs 10,001-14,000 lbs. GVWR, for each model year, the percentage of MDVs certified to an SFTP emission category set forth in this section shall be equal to or greater than the total percentage certified to the FTP ULEV400, ULEV270, SULEV230, and SULEV200 emission categories; of these vehicles, the percentage of MDVs certified to an SFTP SULEV emission category shall be equal to or greater than the total percentage certified to both the FTP SULEV230 and SULEV200 emission categories. 2018 and subsequent model year MDVs 8,501-10,000 lbs. GVWR certifying to the FTP ULEV250 and ULEV200 emission categories, including vehicles certifying with carryover data, shall comply with the SFTP ULEV standards set forth in subsection (a)(7)(C), and those certifying to FTP SULEV170 and SULEV150, including vehicles certifying with carryover data, shall comply with the SFTP SULEV standards set forth in subsection (a)(7)(C). 2018 and subsequent model year MDVs 10,001-14,000 lbs. GVWR certifying to FTP ULEV400 and ULEV270 emission categories, including vehicles certifying with carryover data, shall comply with the SFTP ULEV standards set forth in subsection (a)(7)(C), and those certifying to SULEV230 and SULEV200, including vehicles certifying with carryover data, shall comply with the SFTP SULEV standards set forth in subsection (a)(7)(C).

In addition, 2017 and subsequent model MDVs certifying to LEV III FTP PM emission standards on a 150,000-mile durability basis must also certify to the SFTP emission standards set forth in subsection (a)(7)(D).

(C) *Identifying a Manufacturer's Medium-Duty Vehicle Fleet.* For the 2016 and subsequent model years, each manufacturer's MDV fleet shall be defined as the total number of California-certified MDVs, other than MDPVs, produced and delivered for sale in California. For 2016 and subsequent model years, a manufacturer that elects to certify engines to the optional medium-duty engine emission standards in section 1956.8 shall not count those engines in the manufacturer's total production of California-certified medium-duty vehicles for purposes of this subparagraph.

(c) Calculation of NMOG + NOx Credits/Debits

(1) Calculation of NMOG+NOx Credits and Debits for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

(A) In 2015 and subsequent model years, a manufacturer shall calculate its credits or debits using the following equation.

[(Fleet Average NMOG+NOx Requirement) - (Manufacturer's Fleet Average NMOG+NOx Value)] x
(Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs).

(B) In 2015 and subsequent model years, a manufacturer that achieves fleet average NMOG+NOx values lower than the fleet average NMOG+NOx requirement for the corresponding model year shall receive credits in units of g/mi NMOG + NOx . A manufacturer with 2015 and subsequent model year fleet average NMOG+NOx values greater than the fleet average requirement for the corresponding model year shall receive debits in units of g/mi NMOG + NOx equal to the amount of negative credits determined by the aforementioned equation. The total g/mi NMOG+NOx credits or debits earned for PCs and LDTs 0-3750 lbs. LVW, and for LDTs 3751 lbs. LVW - 8500 lbs. GVWR and for MDPVs shall be summed together. The resulting amount shall constitute the g/mi NMOG+NOx credits or debits accrued by the manufacturer for the model year.

(2) Calculation of NMOG+NOx Credits and Debits for Medium-Duty Vehicles Other than MDPVs.

A manufacturer that elects to comply with the phase-in requirements for LEV III medium-duty vehicles other than MDPVs in subsection (b)(3)(A) or subsection (b)(3)(B) shall calculate vehicle-equivalent NMOG+NOx credits in accordance with subsection (c)(2)(A). A manufacturer that elects to comply with the alternative phase-in schedule for LEV III medium- duty vehicles other than MDPVs in subsection (b)(3)(C) shall calculate fleet average NMOG+NOx credits in accordance with subsection (c)(2)(B).

(A) Calculation of Vehicle-Equivalent NMOG + NOx Credits for Medium-Duty Vehicles Other than MDPVs.

1. In 2016 and subsequent model years, a manufacturer that produces and delivers for sale in California MDVs, other than MDPVs, in excess of the equivalent requirements for LEV III vehicles certified to the exhaust emission standards set forth in subsection (a)(1), shall receive "Vehicle-Equivalent Credits" (or "VECs") calculated in accordance with the following equation, where the term "produced" means produced and delivered for sale in California:

(1.00) x {[(No. of LEV395s and LEV630s Produced excluding HEVs) + (No. of LEV395 HEVs x HEV VEC factor for LEV395s) + (No. of LEV630 HEVs x HEV VEC factor for LEV630s)] – (No. of LEV395s and LEV630s Required to be Produced)} +

(1.14) x {[(No. of ULEV340s and ULEV570s Produced excluding HEVs) + (No. of ULEV340 HEVs x HEV VEC factor for ULEV340s) + (No. of ULEV570 HEVs x HEV VEC factor for ULEV570s)] – (No. of ULEV340s and ULEV570s Required to be Produced)} +

(1.37) x {[(No. of ULEV250s and ULEV400s Produced excluding HEVs) + (No. of ULEV250 HEVs x HEV VEC factor for ULEV250s) + (No. of ULEV400 HEVs x HEV VEC factor for ULEV400s)] - (No. of ULEV250s and ULEV400s Required to be Produced)} +

(1.49) x {[(No. of ULEV200s and ULEV270s Produced excluding HEVs) + (No. of ULEV200 HEVs x HEV VEC factor for ULEV200s) +

(No. of ULEV270 HEVs x HEV VEC factor
for ULEV270s)] - (No. of ULEV200s and
ULEV270s Required to be Produced)} +

(1.57) x {[(No. of SULEV170s and SULEV230s Produced
excluding HEVs) + (No. of SULEV170 HEVs x HEV VEC
factor for SULEV170s) +
(No. of SULEV230 HEVs x HEV VEC factor
for SULEV230s)] - (No. of SULEV170s and
SULEV230s Required to be Produced)} +

(1.62) x {[(No. of SULEV150s and SULEV200s Produced
excluding HEVs) + (No. of SULEV150 HEVs x HEV VEC
factor for SULEV150s) +
(No. of SULEV200 HEVs x HEV VEC factor
for SULEV200s)] - (No. of SULEV150s and
SULEV200s Required to be Produced)}
+[(2.00) x (No. of ZEVs Certified and
Produced as MDVs)].

2. MDV HEV VEC factor. The MDV HEV factor is calculated as follows:

For LEV395s: $$1 + \frac{(\text{LEV395standard-ULEV340standard}) \times \text{Zero-emission VMT Allowance}}{\text{LEV395standard}}$$

For ULEV340s: $$1 + \frac{(\text{ULEV340standard-ULEV250standard}) \times \text{Zero-emission VMT Allowance}}{\text{ULEV340standard}}$$

For ULEV250s: $$1 + \frac{(\text{ULEV250standard-ULEV200standard}) \times \text{Zero-emission VMT Allowance}}{\text{ULEV250standard}}$$

For ULEV200s: $$1 + \frac{(\text{ULEV200standard-SULEV170standard}) \times \text{Zero-emission VMT Allowance}}{\text{ULEV standard}}$$

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For SULEV170s: $$1 + \frac{(\text{SULEV170standard-SULEV150standard}) \times \text{Zero-emission VMT Allowance}}{\text{SULEV170standard}}$$

For SULEV150s: $$1 + \frac{(\text{SULEV150standard-ZEV standard}) \times \text{Zero-emission VMT Allowance}}{\text{SULEV150standard}}$$

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For LEV630s: $$1 + \frac{(\text{LEV630standard-ULEV570standard}) \times \text{Zero-emission VMT Allowance}}{\text{LEV630standard}}$$

For ULEV570s: $$1 + \frac{(\text{ULEV570standard-ULEV400standard}) \times \text{Zero-emission VMT Allowance}}{\text{ULEV570standard}}$$

For ULEV400s: $$1 + \frac{(\text{ULEV400standard-ULEV270standard}) \times \text{Zero-emission VMT Allowance}}{\text{ULEV400standard}}$$

For ULEV270s: $$1 + \frac{(\text{ULEV270standard-SULEV230standard}) \times \text{Zero-emission VMT Allowance}}{\text{ULEV270standard}}$$

For SULEV230s: $$1 + \frac{(\text{SULEV230standard-SULEV200standard}) \times \text{Zero-emission VMT Allowance}}{\text{SULEV230standard}}$$

For SULEV200s: $$1 + \frac{(\text{SULEV200standard-ZEV standard}) \times \text{Zero-emission VMT Allowance}}{\text{SULEV200standard}}$$

where "Zero-emission VMT Allowance" for an HEV is determined in accordance with section C of the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962.1, or the "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," incorporated by reference in section 1962.2, as applicable, except that for the purposes of this subsection (c)(2)(B), the maximum allowable Zero-emission VMT Allowance that may be used in these equations is 1.0.

3. A manufacturer that fails to produce and deliver for sale in California the equivalent quantity of MDVs certified to LEV III exhaust emission standards, shall receive "Vehicle-Equivalent Debits" (or "VEDs") equal to the amount of negative VECs determined by the equation in subsection (c)(2)(A).

(B) Calculation of Fleet Average NMOG+NOx Credits and Debits for Medium-Duty Vehicles Other than MDPVs.

1. In 2016 and subsequent model years, a manufacturer shall calculate its medium-duty vehicle fleet average credits or debits using the following equation.

[(Fleet Average NMOG+NOx Requirement) - (Manufacturer's Fleet Average NMOG+NOx Value)] x
(Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs).

2. In 2016 and subsequent model years, a manufacturer that achieves fleet average NMOG+NOx values lower than the fleet average NMOG+NOx requirement for the corresponding model year shall receive credits in units of g/mi NMOG+NOx. A manufacturer with 2016 and subsequent model year fleet average NMOG+NOx values greater than the fleet average requirement for the corresponding model year shall receive debits in units of g/mi NMOG+NOx equal to the amount of negative credits determined by the aforementioned equation. The total g/mi NMOG+NOx credits or debits earned for MDVs 8,501-10,000 lbs. GVWR excluding MDPVs, and for MDVs 10,001-14,000 lbs. GVWR shall be summed together. The resulting amount shall constitute the g/mi NMOG+NOx credits or debits accrued by the manufacturer for the model year. Medium-duty fleet average credits and debits earned in accordance with subsection (c)(2)(B) may not be summed together with fleet average credits and debits earned for passenger cars, light-duty trucks, and medium-duty passenger vehicles in accordance with subsection (c)(1).

(C) Only ZEVs certified as MDVs and not used to meet the ZEV requirement shall be included in the calculation of VECs or the calculation of NMOG+NOx credits and debits.

(3) Procedure for Offsetting Debits.

(A) A manufacturer shall equalize emission debits by earning g/mi NMOG+NOx emission credits or VECs in an amount equal to the g/mi NMOG+NOx debits or VEDs, or by submitting a commensurate amount of g/mi NMOG+NOx credits or VECs to the Executive Officer that were earned previously or acquired from another manufacturer. A manufacturer shall equalize NMOG+NOx debits for PCs, LDTs, and MDPVs and VEC debits or NMOG+NOx debits, as applicable, for MDVs within three model years. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code §43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the emission debits are not equalized by the end of the specified time period. A manufacturer demonstrating compliance under Option 2 in subsection (b)(1)(A)1.a., must calculate the emission debits that are subject to a civil penalty under Health and Safety Code section 43211 separately for California, the District of Columbia, and for each individual state that is included in the fleet average greenhouse gas requirements in subsection (b)(1)(A)1.a. The manufacturer must calculate these emission debits separately for California, the District of Columbia, and each individual state using the formula in subsections (c)(1) and (c)(2), except that the "Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs" shall be calculated separately for the District of Columbia and each individual state.

For the purposes of Health and Safety Code §43211, the number of passenger cars, light-duty trucks, and medium-duty passenger vehicles not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi NMOG+NOx emission debits for the model year by the g/mi NMOG+NOx fleet average requirement for PCs and LDTs 0-3750 lbs. LVW and for LDTs 3751 lbs. LVW - 8500 lbs. GVW and MDPVs applicable for the model year in which the debits were first incurred; and the number of medium-duty vehicles not meeting the state board's emission standards shall be equal to the amount of VEDs incurred or shall be determined by dividing the total amount of g/mi NMOG+NOx emission debits for the model year by the g/mi NMOG+NOx fleet average requirement for MDVs 8,501-10,000 lbs. GVW and for MDVs 10,001 lbs. – 14,000 lbs. GVW applicable for the model year in which the debits were first incurred.

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For the 2015 and subsequent model years,

(B) The emission credits earned in any given model year shall retain full value through five subsequent model years. Credits will have no value if not used by the beginning of the sixth model year after being earned.

(4) *Changing NMOG Credits and Debits to NMOG+NOx Credits and Debits.* The value of any emission credits that have not been used prior to the start of the 2015 model year and any emission debits that have not been equalized prior to the start of the 2015 model year earned shall be converted to NMOG+NOx credits at the start of the 2015 model year by multiplying their values by a factor of 3.0. These credits and debits are subject to the provisions in subsection 1961(c)(3).

(5) *Changing Vehicle-Equivalent Credits and Debits to NMOG+NOx Fleet Average Credits and Debits.* The value of any vehicle-equivalent credits and debits earned in accordance with subsection (c)(2) or subsection 1961(c)(2) shall be converted to NMOG+NOx fleet average credits and debits using the provisions in subsection (c)(2)(B), for each model year in which the credits or debits are accrued. For the purpose of applying the formula in subsection (c)(2)(B)1., for credits and debits earned in accordance with subsection 1961(c)(2), the Fleet Average NMOG+NOx Requirement is 0.364 g/mi for MDVs between 8,501-10,000 lbs. GVWR and 0.592 g/mi for MDVs between 10,001-14,000 lbs. GVWR. These credits and debits are subject to the provisions in subsection (c)(3) or subsection 1961(c)(3), as applicable, based on the model year in which they are first earned as vehicle-equivalent credits or debits.

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(d) *Test Procedures.* The certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "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 amended December 6, 2012, the "California Non-Methane Organic Gas Test Procedures for 1993 through 2016 Model Year Vehicles," as amended September 2, 2015, and the "California Non-Methane Organic Gas Test Procedures for 2017 and Subsequent Model Year Vehicles," as adopted September 2, 2015, which are all incorporated herein by reference. In the case of hybrid electric vehicles and on-board fuel-fired heaters, the certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962.1, and the "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," incorporated by reference in section 1962.2.

(e) *Abbreviations.* The following abbreviations are used in this section:

"ALVW" means adjusted loaded vehicle weight

"ASTM" means American Society of Testing and Materials.

"CO" means carbon monoxide.

"FTP" means Federal Test Procedure. "g/mi" means grams per mile.

"GVW" means gross vehicle weight.

"GVWR" means gross vehicle weight rating.

"HEV" means hybrid-electric vehicle.

"LDT" means light-duty truck.

"LDT1" means a light-duty truck with a loaded vehicle weight of 0-3750 pounds.

"LDT2" means a light-duty truck with a loaded vehicle weight of 3751 pounds to a gross vehicle weight rating of 8500 pounds.

"LEV" means low-emission vehicle.

"LPG" means liquefied petroleum gas.

"LVW" means loaded vehicle weight.

"MDPV" means medium-duty passenger vehicle.

"MDV" means medium-duty vehicle.

"NMHC" means non-methane hydrocarbons. "mg/mi" means milligrams per mile.

"NMHC" means non-methane hydrocarbons.

"Non-Methane Organic Gases" or "NMOG" means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

"NOx" means oxides of nitrogen.

"PC" means passenger car.

"SULEV" means super-ultra-low-emission vehicle.

"ULEV" means ultra-low-emission vehicle.

"VEC" means vehicle-equivalent credits.

"VED" means vehicle-equivalent debits.

"VMT" means vehicle miles traveled.

"ZEV" means zero-emission vehicle.

(f) Severability. Each provision of this section is severable, and in the event that any provision of this section is held to be invalid, the remainder of both this section and this article remains in full force and effect.

Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43101, 43104, 43105 and 43106, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204 and 43205, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 1961.3.1 of title 13, California Code of Regulations, to read as follows:

§ 1961.3.1 Greenhouse Gas Exhaust Emission Standards and Test Procedures--2017 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

Introduction.

This section 1961.3.1 sets the greenhouse gas emission levels from new 2017 and subsequent model year passenger cars, light-duty trucks, and medium-duty passenger vehicles. Light-duty trucks from 3751 lbs. LVW - 8500 lbs. GVW that are certified to the Option 1 LEV II NOx Standard in section 1961(a)(1) are exempt from these greenhouse gas emission requirements, however, passenger cars, light-duty trucks 0-3750 lbs. LVW, and medium-duty passenger vehicles are not eligible for this exemption.

Emergency vehicles may be excluded from these greenhouse gas emission requirements. The manufacturer must notify the Executive Officer that they are making such an election, in writing, prior to the start of the applicable model year or must comply with this section 1961.3.1.

(a) Greenhouse Gas Emission Requirements.

(1) Fleet Average Carbon Dioxide Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

For the purpose of determining compliance with this subsection (a)(1), the applicable fleet average CO_2 mass emission standards for each model year is the sales-weighted average of the calculated CO_2 exhaust mass emission target values for each manufacturer. For each model year, the sales-weighted fleet average CO_2 mass emissions value shall not exceed the sales-weighted average of the calculated CO_2 exhaust mass emission target values for that manufacturer.

(A) Fleet Average Carbon Dioxide Target Values for Passenger Cars.

The fleet average CO_2 exhaust mass emission target values for passenger cars that are produced and delivered for sale in California each model year shall be determined as follows:

1. For passenger cars with a footprint of less than or equal to 41 square feet, the gram per mile CO_2 target value shall be selected for the appropriate model year from the following table:

Model Year	*CO_2 Target Value (grams/mile)*
2017	195.0
2018	185.0
2019	175.0
2020	166.0
2021	157.0
2022	150.0
2023	143.0
2024	137.0
2025 and subsequent	131.0

2. For passenger cars with a footprint of greater than 56 square feet, the gram per mile CO_2 target value shall be selected for the appropriate model year from the following table:

Model Year	*CO_2 Target Value (grams/mile)*
2017	263.0
2018	250.0
2019	238.0
2020	226.0
2021	215.0
2022	205.0
2023	196.0
2024	188.0
2025 and subsequent	179.0

3. For passenger cars with a footprint that is greater than 41 square feet and less than or equal to 56 square feet, the gram per mile CO_2 target value shall be calculated using the following equation and rounded to the nearest 0.1 grams/mile:

Target gCO_2/mile = $[a \times f] + b$
Where: f is the vehicle footprint and coefficients a and b are selected from the following table for the applicable model year.

Model Year	*a*	*b*
2017	4.53	8.9
2018	4.35	6.5
2019	4.17	4.2
2020	4.01	1.9
2021	3.84	-0.4
2022	3.69	-1.1
2023	3.54	-1.8
2024	3.4	-2.5
2025 and subsequent	3.26	-3.2

(B) Fleet Average Carbon Dioxide Target Values for Light-Duty Trucks and Medium-Duty Passenger Vehicles. The fleet average CO_2 exhaust mass emission target values for light-duty trucks and medium-duty passenger vehicles that are produced and delivered for sale in California each model year shall be determined as follows:

1. For light-duty trucks and medium-duty passenger vehicles with a footprint of less than or equal to 41 square feet, the gram per mile CO_2 target value shall be selected from the following table:

Model Year	*CO_2 Target Value (grams/mile)*
2017	238.0
2018	227.0
2019	220.0
2020	212.0
2021	195.0
2022	186.0
2023	176.0
2024	168.0
2025 and subsequent	159.0

2. For light-duty trucks and medium-duty passenger vehicles with a footprint of greater than 41 square feet and less than or equal to the maximum footprint value specified in the table below for each model year, the gram/mile CO_2 target value shall be calculated using the following equation and rounded to the nearest 0.1 grams/mile:

Target gCO_2/mile = [*a* x *f*] + *b*
Where: *f* is the vehicle footprint and coefficients *a* and *b* are selected from the following table for the applicable model year.

Model year	*Maximum Footprint*	*a*	*b*
2017	50.7	4.87	38.3
2018	60.2	4.76	31.6
2019	66.4	4.68	27.7
2020	68.3	4.57	24.6
2021	73.5	4.28	19.8
2022	74.0	4.09	17.8
2023	74.0	3.91	16.0
2024	74.0	3.74	14.2
2025 and subsequent	74.0	3.58	12.5

3. For light-duty trucks and medium-duty passenger vehicles with a footprint that is greater than the minimum footprint value specified in the table below and less than or equal to the maximum footprint value specified in the table below for each model year, the gram/mile CO_2 target value shall be calculated using the following equation and rounded to the nearest 0.1 grams/mile:

Target gCO_2/mile = [*a* x *f*] + *b*
Where: *f* is the vehicle footprint and coefficients *a* and *b* are selected from the following table for the applicable model year.

Model year	*Minimum Footprint*	*Maximum Footprint*	*a*	*b*
2017	50.7	66.0	4.04	80.5
2018	60.2	66.0	4.04	75.0

4. For light-duty trucks and medium-duty passenger vehicles with a footprint that is greater than the minimum value specified in the table below for each model year, the gram/mile CO_2 target value shall be selected for the applicable model year from the following table:

Model year	*Minimum Footprint*	*CO_2 target value (grams/mile)*
2017	66.0	347.0
2018	66.0	342.0
2019	66.4	339.0
2020	68.3	337.0
2021	73.5	335.0
2022	74.0	321.0
2023	74.0	306.0
2024	74.0	291.0
2025 and subsequent	74.0	277.0

(C) Calculation of Manufacturer-Specific Carbon Dioxide Fleet Average Standards. For each model year, each manufacturer must comply with fleet average CO_2 standards for passenger cars and for light-duty trucks plus medium-duty passenger vehicles, as applicable, calculated for that model year as follows. For each model year, a manufacturer must calculate separate fleet average CO_2 values for its passenger car fleet and for its combined light-duty truck plus medium-duty passenger vehicle fleet using the CO_2 target values in subsection (a)(A). These calculated CO_2 values are the manufacturer-specific fleet average CO_2 standards for passenger cars and for light-duty trucks plus medium-duty passenger vehicles, as applicable, which apply for that model year.

1. A CO_2 target value shall be calculated in accordance with subparagraph (a)(1)(A) or (a)(1)(B), as applicable, for each unique combination of model type and footprint value.

2. Each CO_2 target value, determined for each unique combination of model type and footprint value, shall be multiplied by the total production of that model type/footprint combination for the applicable model year.

3. The resulting products shall be summed, and that sum shall be divided by the total production of passenger cars or total combined production of light-duty trucks and medium-duty passenger vehicles, as applicable, in that model year. The result shall be rounded to the nearest whole gram per mile. This result shall be the applicable fleet average CO_2 standard for the manufacturer's passenger car fleet or its combined light-duty truck and medium-duty passenger vehicle fleet, as applicable.

(2) Nitrous Oxide (N_2O) and Methane (CH_4) Exhaust Emission Standards for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles. Each manufacturer's fleet of combined passenger automobile, light-duty trucks, and medium-duty passenger vehicles must comply with N_2O and CH_4 standards using either the provisions of subsection (a)(2)(A), subsection (a)(2)(B), or subsection (a)(2)(C). Except with prior approval of the Executive Officer, a manufacturer may not use the provisions of both subsection (a)(2)(A) and subsection (a)(2)(B) in the same model year. For example, a manufacturer may not use the provisions of subsection (a)(2)(A) for their passenger automobile fleet and the provisions of subsection (a)(2)(B) for their light-duty truck and medium-duty passenger vehicle fleet in the same model year. The manufacturer may use the provisions of both subsections (a)(2)(A) and (a)(2)(C) in the same model year. For example, a manufacturer may meet the N_2O standard in subsection (a)(2)(A)1. and an alternative CH_4 standard determined under subsection (a)(2)(C).

(A) Standards Applicable to Each Test Group.

1. Exhaust emissions of N_2O shall not exceed 0.010 grams per mile at full useful life, as measured on the FTP (40 CFR, Part 86, Subpart B), as amended by the "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." Manufacturers may optionally determine an alternative N_2O standard under subsection (a)(2)(C).

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2. Exhaust emissions of CH_4 shall not exceed 0.030 grams per mile at full useful life, as measured on the FTP (40 CFR, Part 86, Subpart B), as amended by the "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." Manufacturers may optionally determine an alternative CH_4 standard under subsection (a)(2)(C).

(B) Including N_2O and CH_4 in Fleet Averaging Program. Manufacturers may elect to not meet the emission standards in subsection (a)(2)(A). Manufacturers making this election shall measure N_2O and CH_4 emissions for each unique combination of model type and footprint value on both the FTP test cycle and the Highway Fuel Economy test cycle at full useful life, multiply the measured N_2O emissions value by 298 and the measured CH_4 emissions value by 25, and include both of these adjusted N_2O and CH_4 full useful life values in the fleet average calculations for passenger automobiles and light-duty trucks plus medium-duty passenger vehicles, as calculated in accordance with subsection (a)(2)(A)(D).

(C) Optional Use of Alternative N_2O and/or CH_4 Standards. Manufacturers may select an alternative standard applicable to a test group, for either N_2O or CH_4, or both. For example, a manufacturer may choose to meet the N_2O standard in subsection (a)(2)(A)1. and an alternative CH_4 standard in lieu of the standard in subsection (a)(2)(A)2. The alternative standard for each pollutant must be less stringent than the applicable exhaust emission standard specified in subsection (a)(2)(A). Alternative N_2O and CH_4 standards apply to emissions as measured on the FTP (40 CFR, Part 86, Subpart B), as amended by the "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," for the full useful life, and become the applicable certification and in-use emission standard(s) for the test group. Manufacturers using an alternative standard for N_2O and/or CH_4 must calculate emission debits according to the provisions of subsection (a)(2)(D) for each test group/alternative standard combination. Debits must be included in the calculation of total credits or debits generated in a model year as required under subsection (b)(1)(B). Flexible fuel vehicles (or other vehicles certified for multiple fuels) must meet these alternative standards when tested on all applicable test fuel type.

(D) CO_2-Equivalent Debits. CO_2-equivalent debits for test groups using an alternative N_2O and/or CH_4 standard as determined under (a)(2)(C) shall be calculated according to the following equation and rounded to the nearest whole gram per mile:

Debits = GWP x (Production) x (AltStd - Std)
Where:
Debits = N_2O or CH_4 CO_2-equivalent debits for a test group using an alternative N_2O or CH_4 standard;
GWP = 25 if calculating CH_4 debits and 298 if calculating N_2O debits;
Production = The number of vehicles of that test group produced and delivered for sale in California;
AltStd = The alternative standard (N_2O or CH_4) selected by the manufacturer under (a)(2)(C); and
Std = The exhaust emission standard for N_2O or CH_4 specified in (a)(2)(A).

(3) *Alternative Fleet Average Standards for Manufacturers with Limited U.S. Sales.* Manufacturers meeting the criteria in this subsection (a)(3) may request that the Executive Officer establish alternative fleet average CO_2 standards that would apply instead of the standards in subsection (a)(1).

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(A) Eligibility for Alternative Standards. Eligibility as determined in this subsection (a)(3) shall be based on the total sales of combined passenger cars, light-duty trucks, and medium-duty passenger vehicles. The terms "sales" and "sold" as used in this subsection (a)(3) shall mean vehicles produced and delivered for sale (or sold) in the states and territories of the United States. For the purpose of determining eligibility the sales of related companies shall be aggregated according to the provisions of section 1900. To be eligible for alternative standards established under this subsection (a)(3), the manufacturer's average sales for the three most recent consecutive model years must remain below 5,000. If a manufacturer's average sales for the three most recent consecutive model years exceeds 4,999, the manufacturer will no longer be eligible for exemption and must meet applicable emission standards as follows.

1. If a manufacturer's average sales for three consecutive model years exceeds 4,999, and if the increase in sales is the result of corporate acquisitions, mergers, or purchase by another manufacturer, the manufacturer shall comply with the emission standards described in subsections (a)(1) and (a)(2), as applicable, beginning with the first model year after the last year of the three consecutive model years.

2. If a manufacturer's average sales for three consecutive model years exceeds 4,999 and is less than 50,000, and if the increase in sales is solely the result of the manufacturer's expansion in vehicle production (not the result of corporate acquisitions, mergers, or purchase by another manufacturer), the manufacturer shall comply with the emission standards described in subsections (a)(1) and (a)(2), as applicable, beginning with the second model year after the last year of the three consecutive model years.

(B) *Requirements for New Entrants into the U.S. Market.* New entrants are those manufacturers without a prior record of automobile sales in the United States and without prior certification to (or exemption from, under 40 CFR § 86.1801-12(k)) greenhouse gas emission standards in 40 CFR § 86.1818-12 or greenhouse gas standards in section 1961.1. In addition to the eligibility requirements stated in subsection (a)(3)(A), new entrants must meet the following requirements:

1. In addition to the information required under subsection (a)(3)(D), new entrants must provide documentation that shows a clear intent by the company to actually enter the U.S. market in the years for which alternative standards are requested. Demonstrating such intent could include providing documentation that shows the establishment of a U.S. dealer network, documentation of work underway to meet other U.S. requirements (e.g., safety standards), or other information that reasonably establishes intent to the satisfaction of the Executive Officer.

2. Sales of vehicles in the U.S. by new entrants must remain below 5,000 vehicles for the first two model years in the U.S. market and the average sales for any three consecutive years within the first five years of entering the U.S. market must remain below 5,000 vehicles. Vehicles sold in violation of these limits will be considered not covered by the certificate of conformity and the manufacturer will be subject to penalties on an individual-vehicle basis for sale of vehicles not covered by a certificate. In addition, violation of these limits will result in loss of eligibility for alternative standards until such point as the manufacturer demonstrates two consecutive model years of sales below 5,000 automobiles.

3. A manufacturer with sales in the most recent model year of less than 5,000 automobiles, but where prior model year sales were not less than 5,000 automobiles, is eligible to request alternative standards under subsection (a)(3). However, such a manufacturer will be considered a new entrant and subject to the provisions regarding new entrants in this subsection (a)(3), except that the requirement to demonstrate an intent to enter the U.S. market in subsection (a)(3)(B)(1) shall not apply.

(C) How to Request Alternative Fleet Average Standards. Eligible manufacturers may petition for alternative standards for up to five consecutive model years if sufficient information is available on which to base such standards.

1. To request alternative standards starting with the 2017 model year, eligible manufacturers must submit a completed application no later than July 30, 2013.

2. To request alternative standards starting with a model after 2017, eligible manufacturers must submit a completed application no later than 36 months prior to the start of the first model year to which the alternative standards would apply.

3. The application must contain all the information required in subsection (a)(3)(D), and must be signed by a chief officer of the company. If the Executive Officer determines that the content of the request is incomplete or insufficient, the manufacturer will be notified and given an additional 30 days to amend the request.

(D) Data and Information Submittal Requirements. Eligible manufacturers requesting alternative standards under subsection (a)(3) must submit the following information to the California Air Resources Board. The Executive Officer may request additional information as s/he deems appropriate. The completed request must be sent to the California Air Resources Board at the following address: Chief, Emissions Certification and Compliance Division, California Air Resources Board, 4001 Iowa Avenue, Riverside, CA 92507.

1. Vehicle Model and Fleet Information.

   a. The model years to which the requested alternative standards would apply, limited to five consecutive model years.

   b. Vehicle models and projections of production volumes for each model year.

   c. Detailed description of each model, including the vehicle type, vehicle mass, power, footprint, and expected pricing.

   d. The expected production cycle for each model, including new model introductions and redesign or refresh cycles.

2. Technology Evaluation Information.

a. The CO_2 reduction technologies employed by the manufacturer on each vehicle model, including information regarding the cost and CO_2 -reducing effectiveness. Include technologies that improve air conditioning efficiency and reduce air conditioning system leakage, and any "off-cycle" technologies that potentially provide benefits outside the operation represented by the FTP and the HWFET.

b. An evaluation of comparable models from other manufacturers, including CO_2 results and air conditioning credits generated by the models. Comparable vehicles should be similar, but not necessarily identical, in the following respects: vehicle type, horsepower, mass, power-to-weight ratio, footprint, retail price, and any other relevant factors. For manufacturers requesting alternative standards starting with the 2017 model year, the analysis of comparable vehicles should include vehicles from the 2012 and 2013 model years, otherwise the analysis should at a minimum include vehicles from the most recent two model years.

c. A discussion of the CO_2-reducing technologies employed on vehicles offered outside of the U.S. market but not available in the U.S., including a discussion as to why those vehicles and/or technologies are not being used to achieve CO_2 reductions for vehicles in the U.S. market.

d. An evaluation, at a minimum, of the technologies projected by the California Air Resources Board in the "Staff Report: Initial Statement of Reasons for Proposed Rulemaking, Public Hearing to Consider the "LEV III" Amendments to The California Greenhouse Gas and Criteria Pollutant Exhaust and Evaporative Emission Standards and Test Procedures and to the On-Board Diagnostic System Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and to the Evaporative Emission Requirements for Heavy-Duty Vehicles" and the appendices to this report, released on December 7, 2011, as those technologies likely to be used to meet greenhouse gas emission standards and the extent to which those technologies are employed or projected to be employed by the manufacturer. For any technology that is not projected to be fully employed, the manufacturer must explain why this is the case.

3. Information Supporting Eligibility.

a. U.S. sales for the three previous model years and projected sales for the model years for which the manufacturer is seeking alternative standards.

b. Information regarding ownership relationships with other manufacturers, including details regarding the application of the provisions of 40 CFR § 86.1838-01(b)(3) and section 1900 regarding the aggregation of sales of related companies.

(E) Alternative Standards. Upon receiving a complete application, the Executive Officer will review the application and determine whether an alternative standard is warranted. If the Executive Officer judges that an alternative standard is warranted, the following standards shall apply. For the purposes of this subsection (a)(3)(E), an "ultra-small volume manufacturer" shall mean a manufacturer that meets the requirements of subsection (a)(3).

1. At the beginning of the model year that is three model years prior to the model year for which an alternative standard is requested, each ultra-small volume manufacturer shall identify all vehicle models from the model year that is four model years prior to the model year for which an alternative standard is requested, certified by a large volume manufacturer that are comparable to that small volume manufacturer's vehicle models for the model year for which an alternative standard is requested, based on model type and footprint value. The ultra-small volume manufacturer shall demonstrate to the Executive Officer the appropriateness of each comparable vehicle model selected. Upon approval of the Executive Officer, s/he shall provide to the ultra-small volume manufacturer the target grams CO_2 per mile for each vehicle model type and footprint value that is approved. The ultra-small volume manufacturer shall calculate its fleet average CO_2 standard in accordance with subsection (a)(1)(C) based on these target grams CO_2 per mile values provided by the Executive Officer.

2. In the 2017 and subsequent model years, an ultra-small volume manufacturer shall either:

a. not exceed its fleet average CO_2 standard calculated in accordance with subsection (a)(1)(C) based on the target grams CO_2 per mile values provided by the Executive Officer; or
b. upon approval of the Executive Officer, if an ultra-small volume manufacturer demonstrates a vehicle model uses an engine, transmission, and emission control system and has a footprint value that are identical to a configuration certified for sale in California by a large volume manufacturer, those ultra-small volume manufacturer vehicle models are exempt from meeting the requirements in paragraph 2.a.of this subsection.

(F) Restrictions on Credit Trading. Manufacturers subject to alternative standards approved by the Executive Officer under this subsection (a)(3) may not trade credits to another manufacturer. Transfers of credits between a manufacturer's car and truck fleets are allowed.

(4) Greenhouse Gas Emissions Values for Electric Vehicles, "Plug-In" Hybrid Electric Vehicles, and Fuel Cell Vehicles.

(A) Electric Vehicle Calculations.

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1. For each unique combination of model type and footprint value, a manufacturer shall calculate the City CO_2 Value using the following formula:

City CO_2 *Value* = *(270* gCO_2e/kWh*)* * E_{EV} - 0.25 * $CO_{2\ target}$
Where E_{EV} is measured directly from each cycle for each test vehicle of battery electric vehicle technology in units of kilowatt-hours per mile (per SAE J1634, incorporated herein by reference).

2. For each unique combination of model type and footprint value, a manufacturer shall calculate the Highway CO_2 Value using the following formula:

Highway CO_2 Value = *(270* gCO_2e/kWh*)* * E_{EV} - 0.25 * $CO_{2\ target}$
Where E_{EV} is measured directly from each cycle for each test vehicle of battery electric vehicle technology in units of kilowatt-hours per mile (per SAE J1634, incorporated herein by reference).

(B) "Plug-In" Hybrid Electric Vehicle Calculations. For each unique combination of model type and footprint value, a manufacturer shall calculate the City CO_2 Value and the Highway CO_2 Value using the following formulas:

City CO_2 Value = GHG_{urban}
and
Highway CO_2 Value = $GHG_{highway}$
Where GHG_{urban} and $GHG_{highway}$ are measured in accordance with section G.12 of the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes" or the "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 applicable.

(C) Fuel Cell Vehicle Calculations. For each unique combination of model type and footprint value, a manufacturer shall calculate the City CO_2 Value and the Highway CO_2 Value using the following formulas:

City CO_2 = GHG_{FCV} = (9132 $gCO_2e/kg\ H_2$) * H_{FCV} - $G_{upstream}$
and
Highway CO_2 = GHG_{FCV} = (9132 $gCO_2e/kg\ H_2$) * H_{FCV} - $G_{upstream}$ Where H_{FCV} means hydrogen consumption in kilograms of hydrogen per mile, measured for the applicable test cycle, in accordance with SAE J2572 (published October 2008), incorporated herein by reference.

(5) Calculation of Fleet Average Carbon Dioxide Value.

(A) For each unique combination of model type and footprint value, a manufacturer shall calculate a combined city/highway CO_2 exhaust emission value as follows:

0.55 x City CO_2 Value + 0.45 x Highway CO_2 Value

"City" CO_2 exhaust emissions shall be measured using the FTP test cycle (40 CFR, Part 86, Subpart B), as amended by the "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." "Highway" CO_2 exhaust emission shall be measured using the using the Highway Fuel Economy Test (HWFET; 40 CFR 600 Subpart B).

(B) Each combined city/highway CO_2 exhaust emission, determined for each unique combination of model type and footprint value, shall be multiplied by the total production of that model type/footprint combination for the applicable model year.

(C) The resulting products shall be summed, and that sum shall be divided by the total production of passenger cars or total combined production of light-duty trucks and medium-duty passenger vehicles, as applicable, in that model year. The result shall be rounded to the nearest whole gram per mile. This result shall be the manufacturer's actual sales-weighted fleet average CO_2 value for the manufacturer's passenger car fleet or its combined light-duty truck and medium-duty passenger vehicle fleet, as applicable.

(D) For each model year, a manufacturer must demonstrate compliance with the fleet average requirements in section (a)(1) based on one of two options applicable throughout the model year, either:

Option 1: the total number of passenger cars, light-duty trucks, and medium-duty passenger vehicles that are certified to the California exhaust emission standards in section 1961.3.1, and are produced and delivered for sale in California; or

Option 2: the total number of passenger cars, light-duty trucks, and medium-duty passenger vehicles that are certified to the California exhaust emission standards in this section, and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's greenhouse gas emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

1. A manufacturer that selects compliance Option 2 must notify the Executive Officer of that selection, in writing, prior to the start of the applicable model year or must comply with Option 1. Once a manufacturer has selected compliance Option 2, that selection applies unless the manufacturer selects Option 1 and notifies the Executive Officer of that selection in writing before the start of the applicable model year.

2. When a manufacturer is demonstrating compliance using Option 2 for a given model year, the term "in California" as used in section means California, the District of Columbia, and all states that have adopted California's greenhouse gas emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

3. A manufacturer that selects compliance Option 2 must provide to the Executive Officer separate values for the number of vehicles in each model type and footprint value produced and delivered for sale in the District of Columbia and for each individual state within the average and the City CO_2 Value and Highway CO_2 exhaust emission values that apply to each model type and footprint value.

(6) Credits for Reduction of Air Conditioning Direct Emissions. Manufacturers may generate A/C Direct Emissions Credits by implementing specific air conditioning system technologies designed to reduce air conditioning direct emissions over the useful life of their vehicles. A manufacturer may only use an A/C Direct Emissions Credit for vehicles within a model type upon approval of the A/C Direct Emissions Credit for that model type by the Executive Officer. The conditions and requirements for obtaining approval of an A/C Direct Emissions Credit are described in (A) through (F), below.

(A) Applications for approval of an A/C Direct Emissions Credit must be organized by model type. The applications must also include:

- vehicle make and
- number of vehicles within the model type that will be equipped with the air conditioning system to which the leakage credit shall apply.

Separate applications must be submitted for any two configurations of an A/C system with differences other than dimensional variation.

(B) To obtain approval of the A/C Direct Emissions Credit, the manufacturer must demonstrate through an engineering evaluation that the A/C system under consideration reduces A/C direct emissions. The demonstration must include all of the following elements:

- the amount of A/C Direct Emissions Credit requested, in grams of CO_2-equivalent per mile (gCO_2e/mi);
- the calculations identified in section (a)(6)(C) justifying that credit amount;
- schematic of the A/C system;
- specifications of the system components with sufficient detail to allow reproduction of the calculation; and
- an explanation describing what efforts have been made to minimize the number of fittings and joints and to optimize the components in order to minimize leakage.

Calculated values must be carried to at least three significant figures throughout the calculations, and the final credit value must be rounded to one tenth of a gram of CO_2-equivalent per mile (gCO_2e/mi).

(C) The calculation of A/C Direct Emissions Credit depends on the refrigerant or type of system, and is specified in paragraphs 1, 2, and 3 of this subsection.

1. HFC-134a vapor compression systems

For A/C systems that use HFC-134a refrigerant, the A/C Direct Emissions Credit is calculated using the following formula:

$$Direct\ Credit = Direct\ Credit\ Baseline \times \left(1 - \frac{LR}{Avg\ LR}\right)$$

Where:
Direct Credit Baseline = 12.6 gCO_2e/mi for passenger cars;
Direct Credit Baseline = 15.6 gCO_2e/mi for light-duty trucks and medium-duty passenger vehicles;
Avg LR = 16.6 grams/year for passenger cars;
Avg LR = 20.7 grams/year for light-duty trucks and medium-duty passenger vehicles;
LR = the larger of *SAE LR* or *Min LR;*
Where:
SAE LR = initial leak rate evaluated using SAE International's Surface Vehicle Standard SAE J2727 (Revised February 2012), incorporated by reference, herein;

Min LR = 8.3 grams/year for passenger car A/C systems with belt-driven compressors;
Min LR = 10.4 grams/year for light-duty truck and medium-duty passenger vehicle A/C systems with belt-driven compressors;
Min LR = 4.1 grams/year for passenger car A/C systems with electric compressors;
Min LR = 5.2 grams/year for light-duty truck and medium-duty passenger vehicle A/C systems with electric compressors.
Note: Initial leak rate is the rate of refrigerant leakage from a newly manufactured A/C system in grams of refrigerant per year. The Executive Officer may allow a manufacturer to use an updated version of SAE J2727 or an alternate method if s/he determines that the updated SAE J2727 or the alternate method provides more accurate estimates of the initial leak rate of A/C systems than the February 2012 version of SAE J2727 does.

2. Low-GWP vapor compression systems

For A/C systems that use a refrigerant having a GWP of 150 or less, the A/C Direct Emissions Credit shall be calculated using the following formula:
A/C Direct Credit = Low GWP Credit - High Leak Penalty
Where:

$$Low\ GWP\ Credit = Max\ Low\ GWP\ Credit \times (1 - \frac{GWP}{1{,}430})$$

and

$$High\ Leak\ Penalty$$

$$= \begin{cases} Max\ High\ Leak\ Penalty, & if\ SAE\ LR > Avg\ LR; \\ Max\ High\ Leak\ Penalty \times \dfrac{SAE\ LR - Min\ LR}{Avg\ LR - Min\ LR}, & if\ Min\ LR < SAE\ LR \leq Avg\ LR; \\ 0, & if\ SAE\ LR \leq Min\ LR. \end{cases}$$

Where:
Max Low GWP Credit = 13.8 gCO_2e/mi for passenger cars;
Max Low GWP Credit = 17.2 gCO_2e/mi for light-duty trucks and medium-duty passenger vehicles;
GWP = the global warming potential of the refrigerant over a 100-year horizon, as specified in section (a)(6)(F);
Max High Leak Penalty = 1.8 gCO_2e/mi for passenger cars;
Max High Leak Penalty = 2.1 gCO_2e/mi for light-duty trucks and medium-duty passenger vehicles;
Avg LR = 13.1 g/yr for passenger cars;

Avg LR = 16.6 g/yr for light-duty trucks and medium-duty passenger vehicles;
and where:
SAE LR = initial leak rate evaluated using SAE International's Surface Vehicle Standard SAE J2727 (Revised February 2012);
Min LR = 8.3 g/yr for passenger cars;
Min LR = 10.4 g/yr for light-duty trucks and medium-duty passenger vehicles.
Note: Initial leak rate is the rate of refrigerant leakage from a newly manufactured A/C system in grams of refrigerant per year. The Executive Officer may allow a manufacturer to use an updated version of SAE J2727 or an alternate applicable test method if s/he finds the update or the alternate method provides more accurate estimates of the initial leak rate of A/C systems than the February 2012 version of SAE J2727 does.

3. Other A/C systems

For an A/C system that uses a technology other than vapor compression cycles, an A/C Direct Emissions Credit may be approved by the Executive Officer. The amount of credit requested must be based on demonstration of the reduction of A/C direct emissions of the technology using an engineering evaluation that includes verifiable laboratory test data, and cannot exceed 13.8 gCO_2e/mi for passenger cars and 17.2 gCO_2e/mi for light-duty trucks and medium-duty passenger vehicles.

(D) The total leakage reduction credits generated by the air conditioning system shall be calculated separately for passenger cars, and for light-duty trucks and medium-duty passenger vehicles, according to the following formula:

Total Credits (g/mi) = A/C Direct Credit x Production
Where:
A/C Direct Credit is calculated as specified in subsection (a)(6)(C).
Production = The total number of passenger cars or light-duty trucks plus medium-duty passenger vehicles, whichever is applicable, produced and delivered for sale in California, with the air conditioning system to which the *A/D Direct Credit* value from subsection (a)(6)(C) applies.

(E) The results of subsection (a)(6)(D), rounded to the nearest whole gram per mile, shall be included in the manufacturer's credit/debit totals calculated in subsection (b)(1)(B).

(F) The following values for refrigerant global warming potential (GWP), or alternative values as determined by the Executive Officer, shall be used in the calculations of this subsection (a)(6). The Executive Officer shall determine values for refrigerants not included in this subsection (a)(6)(F) upon request by a manufacturer, based on findings by the Intergovernmental Panel on Climate Change (IPCC) or from other applicable research studies.

Refrigerant	*GWP*
HFC-134a	1,430
HFC-152a	124
HFO-1234yf	4
CO_2	1

(7) Credits for Improving Air Conditioning System Efficiency. Manufacturers may generate CO_2 credits by implementing specific air conditioning system technologies designed to reduce air conditioning-related CO_2 emissions over the useful life of their passenger cars, light-duty trucks, and/or medium-duty passenger vehicles. Credits shall be calculated according to this subsection (a)(7) for each air conditioning system that the manufacturer is using to generate CO_2 credits. The eligibility requirements specified in subsection (a)(7)(E) must be met before an air conditioning system is allowed to generate credits.

(A) Air conditioning efficiency credits are available for the following technologies in the gram per mile amounts indicated for each vehicle category in the following table:

Air Conditioning Technology	*Passenger Cars (g/mi)*	*Light-Duty Trucks and Medium-Duty Passenger Vehicles (g/mi)*
Reduced reheat, with externally-controlled, variable-displacement compressor (*e.g.* a compressor that controls displacement based on temperature setpoint and/or cooling demand of the air conditioning system control settings inside the passenger compartment).	1.5	2.2
Reduced reheat, with externally-controlled, fixed-displacement or pneumatic variable displacement compressor (*e.g.* a compressor that controls displacement based on conditions within, or internal to, the air conditioning system, such as head pressure, suction pressure, or evaporator outlet temperature).	1.0	1.4
Default to recirculated air with closed-loop control of the air supply (sensor feedback to control interior air quality) whenever the ambient temperature is 75 °F or higher: Air conditioning systems that operated with closed-loop control of the air supply at different temperatures may receive credits by submitting an engineering analysis to the Administrator for approval.	1.5	2.2
Default to recirculated air with open-loop control air supply (no sensor feedback) whenever the ambient temperature is 75 °F or higher. Air conditioning systems that operate with open-loop control of the air supply at different temperatures may receive credits by submitting an engineering analysis to the Administrator for approval.	1.0	1.4
Blower motor controls which limit wasted electrical energy (*e.g.* pulse width modulated power controller).	0.8	1.1
Internal heat exchanger (*e.g.* a device that transfers heat from the high-pressure, liquid-phase refrigerant entering the evaporator to the low-pressure, gas-phase refrigerant exiting the evaporator).	1.0	1.4
Improved condensers and/or evaporators with system analysis on the component(s) indicating a coefficient of performance improvement for the system of greater than 10% when compared to previous industry standard designs).	1.0	1.4
Oil separator. The manufacturer must submit an engineering analysis demonstrating the increased improvement of the system relative to the baseline design, where the baseline component for comparison is the version which a manufacturer most recently had in production on the same vehicle design or in a similar or related vehicle model. The characteristics of the baseline component shall be compared to the new component to demonstrate the improvement.	0.5	0.7

(B) Air conditioning efficiency credits are determined on an air conditioning system basis. For each air conditioning system that is eligible for a credit based on the use of one or more of the items listed in subsection (a)(7)(A), the total credit value is the sum of the gram per mile values listed in subsection (a)(7)(A) for each item that applies to the air conditioning system. However, the total credit value for an air conditioning system may not be greater than 5.0 grams per mile for any passenger car or 7.2 grams per mile for any light-duty truck or medium-duty passenger vehicle.

(C) The total efficiency credits generated by an air conditioning system shall be calculated separately for passenger cars and for light-duty trucks plus medium-duty passenger vehicles according to the following formula:

Total Credits (g/mi) = Credit x Production
Where:
Credit = the CO_2 efficiency credit value in grams per mile determined in subsection (a)(7)(B) or (a)(7)(E), whichever is applicable.
Production = The total number of passenger cars or light-duty trucks plus medium-duty passenger vehicles, whichever is applicable, produced and delivered for sale in California, with the air conditioning system to which to the efficiency credit value from subsection (a)(7)(B) applies.

(D) The results of subsection (a)(7)(C), rounded to the nearest whole gram per mile, shall be included in the manufacturer's credit/debit totals calculated in subsection (b)(1)(B).

(E) For the purposes of this subsection (a)(7)(E), the AC17 Test Procedure shall mean the AC17 Air Conditioning Efficiency Test Procedure set forth in the "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."

1. For each air conditioning system selected by the manufacturer to generate air conditioning efficiency credits, the manufacturer shall perform the AC17 Test Procedure.

2. Using good engineering judgment, the manufacturer must select the vehicle configuration to be tested that is expected to result in the greatest increased CO_2 emissions as a result of the operation of the air conditioning system for which efficiency credits are being sought. If the air conditioning system is being installed in passenger cars, light-duty trucks, and medium-duty passenger vehicles, a separate determination of the quantity of credits for passenger cars and for light-duty trucks and medium-duty passenger vehicles must be made, but only one test vehicle is required to represent the air conditioning system, provided it represents the worst-case impact of the system on CO_2 emissions.

3. For each air conditioning system selected by the manufacturer to generate air conditioning efficiency credits, the manufacturer shall perform the AC17 Test Procedure according to the following requirements. Each air conditioning system shall be tested as follows:

   a. Perform the AC17 test on a vehicle that incorporates the air conditioning system with the credit-generating technologies.

   b. Perform the AC17 test on a vehicle which does not incorporate the credit-generating technologies. The tested vehicle must be similar to the vehicle tested under subsection (a)(7)(E)(3)a.

c. Subtract the CO_2 emissions determined from testing under subsection (a)(7)(E)(3)a from the CO_2 emissions determined from testing under subsection (a)(7)(E)(3)b and round to the nearest 0.1 grams/mile. If the result is less than or equal to zero, the air conditioning system is not eligible to generate credits. If the result is greater than or equal to the total of the gram per mile credits determined under subsection (a)(7)(B), then the air conditioning system is eligible to generate the maximum allowable value determined under subsection (a)(7)(B). If the result is greater than zero but less than the total of the gram per mile credits determined under subsection (a)(7)(B), then the air conditioning system is eligible to generate credits in the amount determined by subtracting the CO_2 emissions determined from testing under subsection (a)(7)(E)(3)a from the CO_2 emissions determined from testing under subsection (a)(7)(E)(3)b and rounding to the nearest 0.1 grams/mile.

4. For the first model year for which an air conditioning system is expected to generate credits, the manufacturer must select for testing the highest-selling subconfiguration within each vehicle platform that uses the air conditioning system. Credits may continue to be generated by the air conditioning system installed in a vehicle platform provided that:

   a. The air conditioning system components and/or control strategies do not change in any way that could be expected to cause a change in its efficiency;

   b. The vehicle platform does not change in design such that the changes could be expected to cause a change in the efficiency of the air conditioning system; and

   c. The manufacturer continues to test at least one sub-configuration within each platform using the air conditioning system, in each model year, until all sub-configurations within each platform have been tested.

5. Each air conditioning system must be tested and must meet the testing criteria in order to be allowed to generate credits. Using good engineering judgment, in the first model year for which an air conditioning system is expected to generate credits, the manufacturer must select for testing the highest-selling subconfiguration within each vehicle platform using the air conditioning system. Credits may continue to be generated by an air conditioning system in subsequent model years if the manufacturer continues to test at least one sub-configuration within each platform on annually, as long as the air conditioning system and vehicle platform do not change substantially.

(8) Off-Cycle Credits. Manufacturers may generate credits for CO_2-reducing technologies where the CO_2 reduction benefit of the technology is not adequately captured on the FTP and/or the HWFET. These technologies must have a measurable, demonstrable, and verifiable real-world CO_2 reduction that occurs outside the conditions of the FTP and the HWFET. These optional credits are referred to as "off-cycle" credits. Off-cycle technologies used to generate emission credits are considered emission-related components subject to applicable requirements, and must be demonstrated to be effective for the full useful life of the vehicle. Unless the manufacturer demonstrates that the technology is not subject to in-use deterioration, the manufacturer must account for the deterioration in their analysis. The manufacturer must use one of the three options specified in this subsection (a)(8) to determine the CO_2 gram per mile credit applicable to an off-cycle technology. The manufacturer should notify the Executive Officer in its pre-model year report of its intention to generate any credits under this subsection (a)(8).

(A) Credit available for certain off-cycle technologies.

1. The manufacturer may generate a CO_2 gram/mile credit for certain technologies as specified in the following table, provided that each technology is applied to the minimum percentage of the manufacturer's total U.S. production of passenger cars, light-duty trucks, and medium-duty passenger vehicles specified in the table in each model year for which credit is claimed. Technology definitions are in subsection (e).

Off-Cycle Technology	*Passenger Cars (g/mi)*	*Light-Duty Trucks and Medium-Duty Passenger Vehicles (g/mi)*	*Minimum Total Percent of U.S. Production*
Active aerodynamics	0.6	1.0	10
High efficiency exterior lighting	1.1	1.1	10
Engine heat recovery	0.7 per 100W of capacity	0.7 per 100W of capacity	10
Engine start-stop (idle-off)	2.9	4.5	10
Active transmission warm-up	1.8	1.8	10
Active engine warm-up	1.8	1.8	10
Electric heater circulation pump	1.0	1.5	n/a
Solar roof panels	3.0	3.0	n/a
Thermal control	≤3.0	≤4.3	n/a

a. Credits may also be accrued for thermal control technologies as defined in subsection (e) in the amounts shown in the following table:

Thermal Control Technology	*Credit Value: Passenger Cars (g/mi)*	*Credit Value: Light-Duty Trucks and Medium- Duty Passenger Vehicles (g/mi)*
Glass or glazing	≤2.9	≤3.9
Active seat ventilation	1.0	1.3
Solar reflective paint	0.4	0.5
Passive cabin ventilation	1.7	2.3
Active cabin ventilation	2.1	2.8

b. The maximum credit allowed for thermal control technologies is limited to 3.0 g/mi for passenger cars and to 4.3 g/mi for light-duty trucks and medium-duty passenger vehicles. The maximum credit allowed for glass or glazing is limited to 2.9 g/mi for passenger cars and to 3.9 g/mi for light-duty trucks and medium-duty passenger vehicles.

c. Glass or glazing credits are calculated using the following equation:

$$Credit = \left[Z \times \sum_{i=1}^{n} \frac{T_i \times G_i}{G} \right]$$

Where:
Credit = the total glass or glazing credits, in grams per mile, for a vehicle, which may not exceed 3.0 g/mi for passenger cars or 4.3 g/mi for light-duty trucks and medium-duty passenger vehicles;
Z = 0.3 for passenger cars and 0.4 for light-duty trucks and medium-duty passenger vehicles;
G_i = the measured glass area of window i, in square meters and rounded to the nearest tenth;
G = the total glass area of the vehicle, in square meters and rounded to the nearest tenth;
T_i = the estimated temperature reduction for the glass area of window i, determined using the following formula:
$T_i = 0.3987 \times (Tts_{base} - Tts_{new})$
Where:
Tts_{new} = the total solar transmittance of the glass, measured according to ISO 13837:2008, "Safety glazing materials -- Method for determination of solar transmittance" (incorporated by reference, herein).
Tts_{base} = 62 for the windshield, side-front, side-rear, rear-quarter, and backlite locations, and 40 for rooflite locations.

2. The maximum allowable decrease in the manufacturer's combined passenger car and light-duty truck plus medium-duty passenger vehicle fleet average CO_2 emissions attributable to use of the default credit values in subsection (a)(8)(A)1. is 10 grams per mile. If the total of the CO_2 g/mi credit values from the table in subsection (a)(8)(A)1. does not exceed 10 g/mi for any passenger automobile or light truck in a manufacturer's fleet, then the total off-cycle credits may be calculated according to subsection (a)(8)(D). If the total of the CO_2 g/mi credit values from the table in subsection (a)(8)(A)1. exceeds 10 g/mi for any passenger car, light-duty truck, or medium-duty passenger vehicle in a manufacturer's fleet, then the gram per mile decrease for the combined passenger car and light-duty truck plus medium-duty passenger vehicle fleet must be determined according to subsection (a)(8)(A)2.a. to determine whether the 10 g/mi limitation has been exceeded.

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a. Determine the gram per mile decrease for the combined passenger car and light-duty truck plus medium-duty passenger vehicle fleet using the following formula:

$$Decrease = \frac{Credits \times 1{,}000{,}000}{[(Prod_c \times 195{,}264) + (Prod_T \times 225{,}865)\,]}$$

Where:
Credits = The total of passenger car and light-duty truck plus medium-duty passenger vehicles credits, in Megagrams, determined according to subsection (a)(8)(D) and limited to those credits accrued by using the default gram per mile values in subsection (a)(8)(A)1.
Prodc = The number of passenger cars produced by the manufacturer and delivered for sale in the U.S.
$Prod_T$ = The number of light-duty trucks and medium-duty passenger vehicles produced by the manufacturer and delivered for sale in the U.S.

b. If the value determined in subsection (a)(8)(A)2.a.is greater than 10 grams per mile, the total credits, in Megagrams, that may be accrued by a manufacturer using the default gram per mile values in subsection (a)(8)(A)1.shall be determined using the following formula:

$$Credit\ (Megagrams) = \frac{[10 \times ((Prod_c \times 195{,}264) + (Prod_T \times 225{,}865)\,)]}{1{,}000{,}000}$$

Where:
Prodc = The number of passenger cars produced by the manufacturer and delivered for sale in the U.S.
$Prod_T$ = The number of light-duty trucks and medium-duty passenger vehicles produced by the manufacturer and delivered for sale in the U.S.

c. If the value determined in subsection (a)(8)(A)2.a.is not greater than 10 grams per mile, then the credits that may be accrued by a manufacturer using the default gram per mile values in subsection (a)(8)(A)1.do not exceed the allowable limit, and total credits may be determined for each category of vehicles according to subsection (a)(8)(D).

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d. If the value determined in subsection (a)(8)(A)2.a is greater than 10 grams per mile, then the combined passenger car and light-duty truck plus medium-duty passenger vehicle credits, in Megagrams, that may be accrued using the calculations in subsection (a)(8)(D) must not exceed the value determined in subsection (a)(8)(A)2.b. This limitation should generally be done by reducing the amount of credits attributable to the vehicle category that caused the limit to be exceeded such that the total value does not exceed the value determined in subsection (a)(8)(A)2.b.

3. In lieu of using the default gram per mile values specified in subsection (a)(8)(A)1.for specific technologies, a manufacturer may determine an alternative value for any of the specified technologies. An alternative value must be determined using one of the methods specified in subsection (a)(8)(B) or subsection (a)(8)(C).

(B) Technology demonstration using EPA 5-cycle methodology. To demonstrate an off-cycle technology and to determine a CO_2 credit using the EPA 5-cycle methodology, the manufacturer shall determine the off-cycle city/highway combined carbon-related exhaust emissions benefit by using the EPA 5-cycle methodology described in 40 CFR Part 600. Testing shall be performed on a representative vehicle, selected using good engineering judgment, for each model type for which the credit is being demonstrated. The emission benefit of a technology is determined by testing both with and without the off-cycle technology operating. Multiple off-cycle technologies may be demonstrated on a test vehicle. The manufacturer shall conduct the following steps and submit all test data to the Executive Officer.

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1. Testing without the off-cycle technology installed and/or operating. Determine carbon-related exhaust emissions over the FTP, the HWFET, the US06, the SC03, and the cold temperature FTP test procedures according to the test procedure provisions specified in 40 CFR part 600 subpart B and using the calculation procedures specified in § 600.113-08 of this chapter. Run each of these tests a minimum of three times without the off-cycle technology installed and operating and average the per phase (bag) results for each test procedure. Calculate the 5-cycle weighted city/highway combined carbon-related exhaust emissions from the averaged per phase results, where the 5-cycle city value is weighted 55% and the 5-cycle highway value is weighted 45%. The resulting combined city/highway value is the baseline 5-cycle carbon-related exhaust emission value for the vehicle.

2. Testing with the off-cycle technology installed and/or operating. Determine carbon-related exhaust emissions over the US06, the SC03, and the cold temperature FTP test procedures according to the test procedure provisions specified in 40 CFR part 600 subpart B and using the calculation procedures specified in 40 CFR § 600.113-08. Run each of these tests a minimum of three times with the off-cycle technology installed and operating and average the per phase (bag) results for each test procedure. Calculate the 5-cycle weighted city/highway combined carbon-related exhaust emissions from the averaged per phase results, where the 5-cycle city value is weighted 55% and the 5-cycle highway value is weighted 45%. Use the averaged per phase results for the FTP and HWFET determined in subsection (a)(8)(B)1.for operation without the off-cycle technology in this calculation. The resulting combined city/highway value is the 5-cycle carbon-related exhaust emission value showing the off-cycle benefit of the technology but excluding any benefit of the technology on the FTP and HWFET.

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3. Subtract the combined city/highway value determined in subsection (a)(8)(B)1. from the value determined in subsection (a)(8)(B)2. The result is the off-cycle benefit of the technology or technologies being evaluated. If this benefit is greater than or equal to three percent of the value determined in subsection (a)(8)(B)1. then the manufacturer may use this value, rounded to the nearest tenth of a gram per mile, to determine credits under subsection (a)(8)(C).

4. If the value calculated in subsection (a)(8)(B)3. is less than two percent of the value determined in subsection (a)(8)(B)1., then the manufacturer must repeat the testing required under subsections (a)(8)(B)1. and (a)(8)(B)2., except instead of running each test three times they shall run each test two additional times. The off-cycle benefit of the technology or technologies being evaluated shall be calculated as in subsection (a)(8)(B)3. using all the tests conducted under subsections (a)(8)(B)1., (a)(8)(B)2., and (a)(8)(B)4. If the value calculated in subsection (a)(8)(B)3. is less than two percent of the value determined in subsection (a)(8)(B)1., then the manufacturer must verify the emission reduction potential of the off-cycle technology or technologies using the EPA Vehicle Simulation Tool, and if the results support a credit value that is less than two percent of the value determined in subsection (a)(8)(B)1. then the manufacturer may use the off-cycle benefit of the technology or technologies calculated as in subsection (a)(8)(B)3. using all the tests conducted under subsections (a)(8)(B)1., (a)(8)(B)2., and (a)(8)(B)4., rounded to the nearest tenth of a gram per mile, to determine credits under subsection (a)(8)(C).

(C) Review and approval process for off-cycle credits.

1. Initial steps required.

   a. A manufacturer requesting off-cycle credits under the provisions of subsection (a)(8)(B) must conduct the testing and/or simulation described in that paragraph.

   b. A manufacturer requesting off-cycle credits under subsection (a)(8)(B) must conduct testing and/or prepare engineering analyses that demonstrate the in-use durability of the technology for the full useful life of the vehicle.

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2. Data and information requirements. The manufacturer seeking off-cycle credits must submit an application for off-cycle credits determined under subsection (a)(8)(B). The application must contain the following:

   a. A detailed description of the off-cycle technology and how it functions to reduce CO_2 emissions under conditions not represented on the FTP and HWFET.

   b. A list of the vehicle model(s) which will be equipped with the technology.

   c. A detailed description of the test vehicles selected and an engineering analysis that supports the selection of those vehicles for testing.

   d. All testing and/or simulation data required under subsection (a)(8)(B), as applicable, plus any other data the manufacturer has considered in the analysis.

   e. An estimate of the off-cycle benefit by vehicle model and the fleet-wide benefit based on projected sales of vehicle models equipped with the technology.

   f. An engineering analysis and/or component durability testing data or whole vehicle testing data demonstrating the in-use durability of the off-cycle technology components.

3. Review of the off-cycle credit application. Upon receipt of an application from a manufacturer, the Executive Officer will do the following:

   a. Review the application for completeness and notify the manufacturer within 30 days if additional information is required.

   b. Review the data and information provided in the application to determine if the application supports the level of credits estimated by the manufacturer.

4. Decision on off-cycle application.

The Executive Officer will notify the manufacturer in writing of its decision to approve or deny the application within 60 days of receiving a complete application, and if denied, the Executive Officer will provide the reasons for the denial.

(D) Calculation of total off-cycle credits. Total off-cycle credits in grams per mile of CO_2 (rounded to the nearest tenth of a gram per mile) shall be calculated separately for passenger cars and light-duty trucks plus medium-duty passenger vehicles according to the following formula:

Total Credits (g/mi) = Credit x Production
Where:
Credit = the credit value in grams per mile determined in subsection (a)(8)(A) or subsection (a)(8)(B).
Production = The total number of passenger cars or light-duty trucks plus medium-duty passenger vehicles, whichever is applicable, produced and delivered for sale in California, produced with the off-cycle technology to which to the credit value determined in subsection (a)(8)(A) or subsection (a)(8)(B) applies.

(9) Credits for certain full-size pickup trucks.

Full-size pickup trucks may be eligible for additional credits based on the implementation of hybrid technologies or on exhaust emission performance, as described in this subsection (a)(9). Credits may be generated under either subsection (a)(9)(A) or subsection (a)(9)(B) for a qualifying pickup truck, but not both.

(A) Credits for implementation of gasoline-electric hybrid technology. Full-size pickup trucks that implement hybrid gasoline-electric technologies may be eligible for an additional credit under this subsection (a)(9)(A). Pickup trucks using the credits under this subsection (a)(9)(A) may not use the credits described in subsection (a)(9)(B).

1. Full-size pickup trucks that are mild hybrid gasoline-electric vehicles and that are produced in the 2017 through 2021 model years are eligible for a credit of 10 grams/mile. To receive this credit, the manufacturer must produce a quantity of mild hybrid full-size pickup trucks such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than the amount specified in the table below for each model year.

Model year	*Required minimum percent of full-size pickup trucks*
2017	30%
2018	40%
2019	55%
2020	70%
2021	80%

2. Full-size pickup trucks that are strong hybrid gasoline-electric vehicles and that are produced in the 2017 through 2025 model years are eligible for a credit of 20 grams/mile. To receive this credit, the manufacturer must produce a quantity of strong hybrid full-size pickup trucks such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than 10 percent for each model year.

(B) Credits for emission reduction performance. 2017 through 2021 model year full-size pickup trucks that achieve carbon-related exhaust emission values below the applicable target value determined in subsection (a)(1)(B) may be eligible for an additional credit. Pickup trucks using the credits under this subsection (a)(9)(B) may not use the credits described in subsection (a)(9)(A).

1. Full-size pickup trucks that achieve carbon-related exhaust emissions less than or equal to the applicable target value determined in subsection (a)(1)(B) multiplied by 0.85 (rounded to the nearest gram per mile) and greater than the applicable target value determined in subsection (a)(1)(B) multiplied by 0.80 (rounded to the nearest gram per mile) in a model year are eligible for a credit of 10 grams/mile. A pickup truck that qualifies for this credit in a model year may claim this credit for subsequent model years through the 2021 model year if the carbon-related exhaust emissions of that pickup truck do not increase relative to the emissions in the model year in which the pickup truck qualified for the credit. To qualify for this credit in each model year, the manufacturer must produce a quantity of full-size pickup trucks that meet the emission requirements of this subsection (a)(9)(B)1 such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than the amount specified in the table below for each model year.

Model year	*Required minimum percent of full-size pickup trucks*
2017	15%
2018	20%
2019	28%
2020	35%
2021	40%

2. Full-size pickup trucks that achieve carbon-related exhaust emissions less than or equal to the applicable target value determined in subsection (a)(1)(B) multiplied by 0.80 (rounded to the nearest gram per mile) in a model year are eligible for a credit of 20 grams/mile. A pickup truck that qualifies for this credit in a model year may claim this credit for a maximum of five subsequent model years if the carbon-related exhaust emissions of that pickup truck do not increase relative to the emissions in the model year in which the pickup truck first qualified for the credit. This credit may not be claimed in any model year after 2025. To qualify for this credit, the manufacturer must produce a quantity of full-size pickup trucks that meet the emission requirements of subsection (a)(9)(B)1.such that the proportion of production of such vehicles, when compared to the manufacturer's total production of full-size pickup trucks, is not less than 10 percent in each model year.

(C) Calculation of total full-size pickup truck credits. Total credits in grams per mile of CO_2 (rounded to the nearest whole gram per mile) shall be calculated for qualifying full-size pickup trucks according to the following formula:

Total Credits (g/mi) = (10 x $Production_{10}$) + (20 x $Production_{20}$)
Where:
$Production_{10}$ = The total number of full-size pickup trucks produced and delivered for sale in California with a credit value of 10 grams per mile from subsection (a)(9)(A) and subsection (a)(9)(B).
$Production_{20}$ = The total number of full-size pickup trucks produced and delivered for sale in California with a credit value of 20 grams per mile from subsection (a)(9)(A) and subsection (a)(9)(B).

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(10) Greenhouse Gas In-Use Compliance Standards. The in-use exhaust CO_2 emission standard shall be the combined city/highway exhaust emission value calculated according to the provisions of subsection (a)(5)(A) for the vehicle model type and footprint value multiplied by 1.1 and rounded to the nearest whole gram per mile. For vehicles that are capable of operating on multiple fuels, a separate value shall be determined for each fuel that the vehicle is capable of operating on. These standards apply to in-use testing performed by the manufacturer pursuant to the "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."

(b) Calculation of Greenhouse Gas Credits/Debits. Credits that are earned as part of the 2012 through 2016 MY National greenhouse gas program shall not be applicable to California's greenhouse gas program. Debits that are earned as part of the 2012 through 2016 MY National greenhouse gas program shall not be applicable to California's greenhouse gas program.

(1) Calculation of Greenhouse Gas Credits for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

(A) A manufacturer that achieves fleet average CO_2 values lower than the fleet average CO_2 requirement for the corresponding model year shall receive credits for each model year in units of g/mi. A manufacturer that achieves fleet average CO_2 values higher than the fleet average CO_2 requirement for the corresponding model year shall receive debits for each model year in units of g/mi. Manufacturers must calculate greenhouse gas credits and greenhouse gas debits separately for passenger cars and for combined light-duty trucks and medium-duty passenger vehicles as follows:

CO_2 Credits or Debits = (CO_2 Standard - Manufacturer's Fleet Average CO_2 Value) x (Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs).
Where:
CO_2 Standard = the applicable standard for the model year as determined in subsection (a)(1)(C);
Manufacturer's Fleet Average CO_2 Value = average calculated according to subsection (a)(5);

(B) A manufacturer's total Greenhouse Gas credits or debits generated in a model year shall be the sum of its CO_2 credits or debits and any of the following credits or debits, if applicable. The manufacturer shall calculate, maintain, and report Greenhouse Gas credits or debits separately for its passenger car fleet and for its light-duty truck plus medium-duty passenger vehicle fleet.

1. Air conditioning leakage credits earned according to the provisions of subsection (a)(6);

2. Air conditioning efficiency credits earned according to the provisions of subsection (a)(7);

3. Off-cycle technology credits earned according to the provisions of subsection (a)(8).

4. CO_2-equivalent debits earned according to the provisions of subsection (a)(2)(D).

(2) A manufacturer with 2017 and subsequent model year fleet average Greenhouse Gas values greater than the fleet average CO_2 standard applicable for the corresponding model year shall receive debits in units of g/mi Greenhouse Gas equal to the amount of negative credits determined by the aforementioned equation. For the 2017 and subsequent model years, the total g/mi Greenhouse Gas credits or debits earned for passenger cars and for light-duty trucks and medium-duty passenger vehicles shall be summed together. The resulting amount shall constitute the g/mi Greenhouse Gas credits or debits accrued by the manufacturer for the model year.

(3) Procedure for Offsetting Greenhouse Gas Debits.

(A) A manufacturer shall equalize Greenhouse Gas emission debits by earning g/mi Greenhouse Gas emission credits in an amount equal to the g/mi Greenhouse Gas debits, or by submitting a commensurate amount of g/mi Greenhouse Gas credits to the Executive Officer that were earned previously or acquired from another manufacturer. A manufacturer shall equalize combined Greenhouse Gas debits for passenger cars, light-duty trucks, and medium-duty passenger vehicles within five model years after they are earned. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the emission debits are not equalized by the end of the specified time period. For a manufacturer demonstrating compliance under Option 2 in subsection (a)(5)(D), the emission debits that are subject to a civil penalty under Health and Safety Code section 43211 shall be calculated separately for California, the District of Columbia, and each individual state that is included in the fleet average greenhouse gas requirements in subsection (a)(1). These emission debits shall be calculated for each individual state using the formula in subsections (b)(1) and (b)(2), except that the "Total No. of Vehicles Produced and Delivered for Sale in California, including ZEVs and HEVs" shall be calculated separately for the District of Columbia and each individual state.

For the purposes of Health and Safety Code section 43211, the number of passenger cars not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year calculated for California by the g/mi Greenhouse Gas fleet average requirement for passenger car applicable for the model year in which the debits were first incurred. For the purposes of Health and Safety Code section 43211, the number of light-duty trucks and medium-duty passenger vehicles not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year calculated for California by the g/mi Greenhouse Gas fleet average requirement for light-duty trucks and medium-duty passenger vehicles, applicable for the model year in which the debits were first incurred.

(B) Greenhouse Gas emission credits earned in the 2017 and subsequent model years shall retain full value through the fifth model year after they are earned, and will have no value if not used by the beginning of the sixth model year after being earned.

(4) Use of Greenhouse Gas Emission Credits to Offset a Manufacturer's ZEV Obligations.

(A) For a given model year, a manufacturer that has Greenhouse Gas credits remaining after equalizing all of its Greenhouse Gas debits may use those Greenhouse Gas credits to comply with its ZEV obligations for that model year, in accordance with the provisions set forth in the "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," incorporated by reference in section 1962.2.

(B) Any Greenhouse Gas credits used by a manufacturer to comply with its ZEV obligations shall retain no value for the purposes of complying with this section 1961.3.1.

(5) Credits and debits that are earned as part of the 2012 through 2016 MY National Greenhouse Gas Program, shall have no value for the purpose of complying with this section 1961.3.1.

(c) Optional Compliance with the 2017 through 2025 MY National Greenhouse Gas Program.

For the 2017 through 2025 model years, a manufacturer may elect to demonstrate compliance with this section 1961.3.1 by demonstrating compliance with the 2017 through 2025 MY National greenhouse gas program as follows:

(1) A manufacturer that selects compliance with this option must notify the Executive Officer of that selection, in writing, prior to the start of the applicable model year or must comply with 1961.3.1 (a) and (b);

(2) The manufacturer must submit to ARB all data that it submits to EPA in accordance with the reporting requirements as required under 40 CFR § 86.1865-12, incorporated by reference in and amended by the "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," for demonstrating compliance with the 2017 through 2025 MY National greenhouse gas program and the EPA determination of compliance. All such data must be submitted within 30 days of receipt of the EPA determination of compliance for each model year that a manufacturer selects compliance with this option;

(3) The manufacturer must provide to the Executive Officer separate values for the number of vehicles in each model type and footprint value produced and delivered for sale in California, the District of Columbia, and each individual state that has adopted California's greenhouse gas emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507), the applicable fleet average CO_2 standards for each of these model types and footprint values, the calculated fleet average CO_2 value for each of these model types and footprint values, and all values used in calculating the fleet average CO_2 values.

(d) Test Procedures. The certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "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,", incorporated by reference in section 1961.2. In the case of hybrid electric vehicles, the certification requirements and test procedures for determining compliance with the emission standards in this section are set forth in the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962.1, or the "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,", incorporated by reference in section 1962.2, as applicable.

(e) Abbreviations. The following abbreviations are used in this section:

"CFR" means Code of Federal Regulations.
"CH_4" means methane.
"CO_2" means carbon dioxide.
"FTP" means Federal Test Procedure.
"GHG" means greenhouse gas.
"g/mi" means grams per mile.
"GVW" means gross vehicle weight.
"GVWR" means gross vehicle weight rating.
"GWP" means the global warming potential.
"HEV" means hybrid-electric vehicle.
"HWFET" means Highway Fuel Economy Test (HWFET; 40 CFR 600 Subpart B).
"LDT" means light-duty truck.
"LVW" means loaded vehicle weight.
"MDPV" means medium-duty passenger vehicle.
"mg/mi" means milligrams per mile.
"MY" means model year.
"NHTSA" means National Highway Traffic Safety Administration.

"N_2O" means nitrous oxide.
"ZEV" means zero-emission vehicle.

(f) Definitions Specific to this Section. The following definitions apply to this section 1961.3.1:

(1) "A/C Direct Emissions" means any refrigerant released from a motor vehicle's air conditioning system.

(2) "Active Aerodynamic Improvements" means technologies that are activated only at certain speeds to improve aerodynamic efficiency by a minimum of three percent, while preserving other vehicle attributes or functions.

(3) "Active Cabin Ventilation" means devices that mechanically move heated air from the cabin interior to the exterior of the vehicle.

(4) "Active Transmission Warmup" means a system that uses waste heat from the exhaust system to warm the transmission fluid to an operating temperature range quickly using a heat exchanger in the exhaust system, increasing the overall transmission efficiency by reducing parasitic losses associated with the transmission fluid, such as losses related to friction and fluid viscosity.

(5) "Active Engine Warmup" means a system using waste heat from the exhaust system to warm up targeted parts of the engine so that it reduces engine friction losses and enables the closed-loop fuel control to activate more quickly. It allows a faster transition from cold operation to warm operation, decreasing CO_2 emissions.

(6) "Active Seat Ventilation" means a device that draws air from the seating surface which is in contact with the occupant and exhausts it to a location away from the seat.

(7) "Blower motor controls which limit waste energy" means a method of controlling fan and blower speeds that does not use resistive elements to decrease the voltage supplied to the motor.

(8) "Default to recirculated air mode" means that the default position of the mechanism which controls the source of air supplied to the air conditioning system shall change from outside air to recirculated air when the operator or the automatic climate control system has engaged the air conditioning system (i.e., evaporator is removing heat), except under those conditions where dehumidification is required for visibility (i.e., defogger mode). In vehicles equipped with interior air quality sensors (e.g., humidity sensor, or carbon dioxide sensor), the controls may determine proper blend of air supply sources to maintain freshness of the cabin air and prevent fogging of windows while continuing to maximize the use of recirculated air. At any time, the vehicle operator may manually select the non-recirculated air setting during vehicle operation but the system must default to recirculated air mode on subsequent vehicle operations (i.e., next vehicle start). The climate control system may delay switching to recirculation mode until the interior air temperature is less than the outside air temperature, at which time the system must switch to recirculated air mode.

(9) "Electric Heater Circulation Pump" means a pump system installed in a stop-start equipped vehicle or in a hybrid electric vehicle or plug-in hybrid electric vehicle that continues to circulate hot coolant through the heater core when the engine is stopped during a stop-start event. This system must be calibrated to keep the engine off for 1 minute or more when the external ambient temperature is 30 deg F.

(10) "Emergency Vehicle" means a motor vehicle manufactured primarily for use as an ambulance or combination ambulance-hearse or for use by the United States Government or a State or local government for law enforcement.

(11) "Engine Heat Recovery" means a system that captures heat that would otherwise be lost through the exhaust system or through the radiator and converting that heat to electrical energy that is used to meet the electrical requirements of the vehicle. Such a system must have a capacity of at least 100W to achieve 0.7 g/mi of credit. Every additional 100W of capacity will result in an additional 0.7 g/mi of credit.

(12) "Engine Start-Stop" means a technology which enables a vehicle to automatically turn off the engine when the vehicle comes to a rest and restart the engine when the driver applies pressure to the accelerator or releases the brake.

(13) "EPA Vehicle Simulation Tool" means the "EPA Vehicle Simulation Tool" as incorporated by reference in 40 CFR § 86.1 in the Notice of Proposed Rulemaking for EPA's 2017 and subsequent MY National Greenhouse Gas Program, as proposed at 76 Fed. Reg. 74854, 75357 (December 1, 2011).

(14) "Executive Officer" means the Executive Officer of the California Air Resources Board.

(15) "Footprint" means the product of average track width (rounded to the nearest tenth of an inch) and wheelbase (measured in inches and rounded to the nearest tenth of an inch), divided by 144 and then rounded to the nearest tenth of a square foot, where the average track width is the average of the front and rear track widths, where each is measured in inches and rounded to the nearest tenth of an inch.

(16) "Federal Test Procedure" or "FTP" means 40 CFR, Part 86, Subpart B, as amended by the "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."

(17) "Full-size pickup truck" means a light-duty truck that has a passenger compartment and an open cargo box and which meets the following specifications:

1. A minimum cargo bed width between the wheelhouses of 48 inches, measured as the minimum lateral distance between the limiting interferences (pass-through) of the wheelhouses. The measurement shall exclude the transitional arc, local protrusions, and depressions or pockets, if present. An open cargo box means a vehicle where the cargo box does not have a permanent roof or cover. Vehicles produced with detachable covers are considered "open" for the purposes of these criteria.
2. A minimum open cargo box length of 60 inches, where the length is defined by the lesser of the pickup bed length at the top of the body and the pickup bed length at the floor, where the length at the top of the body is defined as the longitudinal distance from the inside front of the pickup bed to the inside of the closed endgate as measured at the height of the top of the open pickup bed along vehicle centerline, and the length at the floor is defined as the longitudinal distance from the inside front of the pickup bed to the inside of the closed endgate as measured at the cargo floor surface along vehicle centerline.
3. A minimum towing capability of 5,000 pounds, where minimum towing capability is determined by subtracting the gross vehicle weight rating from the gross combined weight rating, or a minimum payload capability of 1,700 pounds, where minimum payload capability is determined by subtracting the curb weight from the gross vehicle weight rating.

(18) "Greenhouse Gas" means the following gases: carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons.

(19) "GWP" means the global warming potential of the refrigerant over a 100-year horizon, as specified in Intergovernmental Panel on Climate Change (IPCC) 2007: Climate Change 2007 -- The Physical Science Basis. S. Solomon et al. (editors), Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Cambridge University Press, Cambridge, UK and New York, NY, USA, ISBN 0-521-70596-7, or determined by ARB if such information is not available in the IPCC Fourth Assessment Report.

(20) "High Efficiency Exterior Lighting" means a lighting technology that, when installed on the vehicle, is expected to reduce the total electrical demand of the exterior lighting system by a minimum of 60 watts when compared to conventional lighting systems. To be eligible for this credit the high efficiency lighting must be installed in the following components: parking/position, front and rear turn signals, front and rear side markers, stop/brake lights (including the center-mounted location), taillights, backup/reverse lights, and license plate lighting.

(21) "Improved condensers and/or evaporators" means that the coefficient of performance (COP) of air conditioning system using improved evaporator and condenser designs is 10 percent higher, as determined using the bench test procedures described in SAE J2765 "Procedure for Measuring System COP of a Mobile Air Conditioning System on a Test Bench," when compared to a system using standard, or prior model year, component designs. SAE J2765 is incorporated by reference herein. The manufacturer must submit an engineering analysis demonstrating the increased improvement of the system relative to the baseline design, where the baseline component(s) for comparison is the version which a manufacturer most recently had in production on the same vehicle design or in a similar or related vehicle model. The dimensional characteristics (e.g., tube configuration/thickness/spacing, and fin density) of the baseline component(s) shall be compared to the new component(s) to demonstrate the improvement in coefficient of performance.

(22) "Mild hybrid gasoline-electric vehicle" means a vehicle that has start/stop capability and regenerative braking capability, where the recaptured braking energy over the FTP is at least 15 percent but less than 75 percent of the total braking energy, where the percent of recaptured braking energy is measured and calculated according to 40 CFR § 600.108(g).

(23) "Model Type" means a unique combination of car line, basic engine, and transmission class.

(24) "2012 through 2016 MY National Greenhouse Gas Program" means the national program that applies to new 2012 through 2016 model year passenger cars, light-duty-trucks, and medium-duty passenger vehicles as adopted by the U.S. Environmental Protection Agency on April 1, 2010 (75 Fed. Reg. 25324, 25677 (May 7, 2010)).

(25) "2017 through 2025 MY National Greenhouse Gas Program" means the national program that applies to new 2017 through 2025 model year passenger cars, light-duty-trucks, and medium-duty passenger vehicles as adopted by the U.S. Environmental Protection Agency as codified in 40 CFR Part 86, Subpart S, except as follows: For model years 2021 through 2025, the "2017 through 2025 MY National Greenhouse Gas Program" means the national program that applies to new 2021 through 2025 model year passenger cars, light-duty-trucks, and medium-duty passenger vehicles as adopted by the U.S. Environmental Protection Agency as codified in 40 CFR Part 86, Subpart S, as last amended on October 25, 2016 that incorporates CFR sections 86.1818-12 (October 25, 2016), 86.1865-12 (October 25, 2016), 86.1866-12 (October 25, 2016), 86.1867-12 (October 25, 2016), 86.1868-12 (October 25, 2016), 86.1869-12 (October 25, 2016), 86.1870-12 (October 25, 2016), and 86.1871-12 (October 25, 2016).

(26) "Oil separator" means a mechanism that removes at least 50 percent of the oil entrained in the oil/refrigerant mixture exiting the compressor and returns it to the compressor housing or compressor inlet, or a compressor design that does not rely on the circulation of an oil/refrigerant mixture for lubrication.

(27) "Passive Cabin Ventilation" means ducts or devices which utilize convective airflow to move heated air from the cabin interior to the exterior of the vehicle.

(28) "Plug-in Hybrid Electric Vehicle" means "off-vehicle charge capable hybrid electric vehicle" as defined in the "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."

(29) "Reduced reheat, with externally controlled, fixed-displacement or pneumatic variable displacement compressor" means a system in which the output of either compressor is controlled by cycling the compressor clutch off-and-on via an electronic signal, based on input from sensors (e.g., position or setpoint of interior temperature control, interior temperature, evaporator outlet air temperature, or refrigerant temperature) and air temperature at the outlet of the evaporator can be controlled to a level at 41°F, or higher.

(30) "Reduced reheat, with externally-controlled, variable displacement compressor" means a system in which compressor displacement is controlled via an electronic signal, based on input from sensors (e.g., position or setpoint of interior temperature control, interior temperature, evaporator outlet air temperature, or refrigerant temperature) and air temperature at the outlet of the evaporator can be controlled to a level at 41°F, or higher.

(31) "SC03" means the SC03 test cycle as set forth in the "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."

(32) "Solar Reflective Paint" means a vehicle paint or surface coating which reflects at least 65 percent of the impinging infrared solar energy, as determined using ASTM standards E903-96 (Standard Test Method for Solar Absorptance, Reflectance, and Transmittance of Materials Using Integrating Spheres, DOI: 10.1520/E0903-96 (Withdrawn 2005)), E1918-06 (Standard Test Method for Measuring Solar Reflectance of Horizontal and Low-Sloped Surfaces in the Field, DOI: 10.1520/E1918-06), or C1549-09 (Standard Test Method for Determination of Solar Reflectance Near Ambient Temperature Using a Portable Solar Reflectometer, DOI: 10.1520/C1549-09). These ASTM standards are incorporated by reference, herein.

(33) "Solar Roof Panels" means the installation of solar panels on an electric vehicle or a plug-in hybrid electric vehicle such that the solar energy is used to provide energy to the electric drive system of the vehicle by charging the battery or directly providing power to the electric motor with the equivalent of at least 50 Watts of rated electricity output.

(34) "Strong hybrid gasoline-electric vehicle" means a vehicle that has start/stop capability and regenerative braking capability, where the recaptured braking energy over the Federal Test Procedure is at least 75 percent of the total braking energy, where the percent of recaptured braking energy is measured and calculated according to 40 CFR § 600.108(g).

(35) "Subconfiguration" means a unique combination within a vehicle configuration of equivalent test weight, road load horsepower, and any other operational characteristics or parameters which is accepted by USEPA.

(36) "US06" means the US06 test cycle as set forth in the "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."

(37) "Worst-Case" means the vehicle configuration within each test group that is expected to have the highest CO_2-equivalent value, as calculated in section (a)(5).

(g) Severability.

Each provision of this section is severable, and in the event that any provision of this section is held to be invalid, the remainder of both this section and this article remains in full force and effect.

NOTE: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43018.5, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106 and 43211, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 1962.2.1 of title 13, California Code of Regulations, to read as follows:

§ 1962.2.1 Zero-Emission Vehicle Standards for 2018 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles Electric Vehicle Charging Requirements. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *ZEV Emission Standard.* The Executive Officer shall certify new 2018 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles as ZEVs, vehicles that produce zero exhaust emissions of any criteria pollutant (or precursor pollutant) or greenhouse gas, excluding emissions from air conditioning systems, under any possible operational modes or conditions.

(b) *[Reserved.]*

(c) *[Reserved.]*

(d) *[Reserved.]*

(e) *[Reserved.]*

(f) [Reserved.]

(g) *[Reserved.]*

(h) *Test Procedures.*

(1) Determining Compliance. The certification requirements and test procedures for determining compliance with this section 1962.2 are set forth in "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," amended September 3, 2015, which is incorporated herein by reference. ↓ adopted March 22, 2012,

(2) NEV Compliance. The test procedures for determining compliance with subdivision 1962.1(d)(5)(F)1. are set forth in ETA-NTP002 (revision 3) "Implementation of SAE Standard J1666 May 93: Electric Vehicle Acceleration, Gradeability, and Deceleration Test Procedure" (December 1, 2004), and ETA-NTP004 (revision 3) "Electric Vehicle Constant Speed Range Tests" (February 1, 2008), both of which are incorporated by reference herein.

(i) [Reserved.]
(j) [Reserved.]
(k) [Reserved.]
(l) [Reserved.]

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NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 38562, 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204 and 43205.5, Health and Safety Code.

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Title 13, California Code of Regulations

Adopt Section 1962.3.1 of title 13, California Code of Regulations, to read as follows:

§ 1962.3.1 Electric Vehicle Charging Requirements. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Applicability. This section applies to:

(1) all battery electric vehicles, range extended battery electric vehicles, except for model year 2006 through 2013 neighborhood electric vehicles, that qualify for ZEV credit under section 1962.1 and 1962.2; and

(2) all hybrid electric vehicles that are capable of being recharged by a battery charger that transfers energy from the electricity grid to the vehicle for purposes of recharging the vehicle traction battery.

(b) Definitions.

(1) The definitions in section 1962.1 and 1962.2 apply to this section.

(c) Requirements.

(1) Beginning with the 2006 model year, all vehicles identified in subdivision (a) must be equipped with a conductive charger inlet and charging system which meets all the specifications applicable to AC Level 1 and Level 2 charging contained in Society of Automotive Engineers (SAE) Surface Vehicle Recommended Practice SAE J1772 REV JAN 2010, SAE Electric Vehicle and Plug in Hybrid Electric Vehicle Conductive Charger Coupler, which is incorporated herein by reference. All such vehicles must also be equipped with an on-board charger with a minimum output of 3.3 kilowatts, or, sufficient power to enable a complete charge in less than 4 hours.

(2) A manufacturer may apply to the Executive Officer for approval to use an alternative to the AC inlet described in subdivision (c)(1), provided that the following conditions are met:

(A) each vehicle is supplied with a rigid adaptor that would enable the vehicle to meet all of the remaining system and on-board charger requirements described in subdivision (c)(1); and

(B) the rigid adaptor and alternative inlet must be tested and approved by a Nationally Recognized Testing Laboratory (NRTL).

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 38562, 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204 and 43205.5, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 1965.0.1 of title 13, California Code of Regulations, to read as follows:

§ 1965.0.1 Emission Control, Smog Index, and Environmental Performance Labels--1979 and Subsequent Model-Year Motor Vehicles. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

In addition to all other requirements, emission control labels are required by the California certification procedures contained in the "California Motor Vehicle Emission Control and Smog Index Label Specifications for 1978 through 2003 Model Year Motorcycles, Light-, Medium- And Heavy-Duty Engines And Vehicles," adopted March 1, 1978, as last amended September 5, 2003, which is incorporated herein by reference, the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," incorporated by reference in § 1961(d), the "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," incorporated by reference in § 1961.2(d), the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles," incorporated by reference in § 1956.8(b). the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," incorporated by reference in § 1956.8(b) and (d), and the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines," incorporated by reference in § 1956.8(d). Smog index labels for passenger cars and light-duty trucks shall conform to the "California Smog Index Label Specifications for 2004 Through 2009 Model Year Passenger Cars and Light-Duty Trucks," adopted September 5, 2003, as last amended May 2, 2008, which is incorporated herein by reference. Environmental Performance labels for passenger cars, light-duty trucks, and medium-duty passenger vehicles shall conform to the "California Environmental Performance Label Specifications for 2009 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles," adopted May 2, 2008, as last amended September 2, 2015, which is incorporated herein by reference. Motorcycles shall meet the requirements of Title 40, Code of Federal Regulations, section 86.413-78, as last amended October 28, 1977, which is incorporated herein by reference.

Note: Authority cited: Sections 39600, 39601, 43200 and 43200.1, Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43013, 43018.5, 43100, 43101, 43102, 43104, 43107, 43200 and 43200.1, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 1969.0.1 of title 13, California Code of Regulations, to read as follows:

§ 1969.0.1 Motor Vehicle Service Information - 1994 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Engines and Vehicles, and 2007 and Subsequent Model Heavy-Duty Engines. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Applicability

(1) This section shall apply to: (1) all California-certified 1994 and subsequent model-year passenger cars, light-duty trucks and medium-duty engines and vehicles equipped with on-board diagnostic (OBD) systems pursuant to title 13, California Code of Regulations, sections 1968.1 or 1968.2: and (2) all 2007 and subsequent model year California-certified heavy-duty engines equipped with OBD systems pursuant to title 13, California Code of Regulations, sections 1971 or 1971.1. This section shall supersede the provisions of section 1968.1(k)(2.1) at all times that this section is effective and operative. This regulation shall also apply to any passenger cars, light-duty trucks, medium-duty vehicles, and medium- and heavy-duty engines certified to future on-board diagnostic requirements adopted by the Air Resources Board.

(2) Motor vehicle and engine manufacturers shall comply with amendments made to this section no later than 90 days after such amendments are made effective by the Secretary of State. Copies of any amendments to this section may be obtained upon request to the Chief of the Emissions Certification and Compliance Division at 4001 Iowa Avenue, Riverside, California 92507.

(b) Optional Regulatory Compliance.

(1) Motor vehicle manufacturers that produce engines for use on heavy-duty vehicles may, for those engines, alternatively comply with all service information and tool provisions of this regulation that are applicable to 1994 and subsequent model year passenger cars, light-duty trucks, and medium-duty engines and vehicles, subject to Executive Officer approval. Implementation dates must comply with the service information provision dates applicable to engine manufacturers.

(2) Engine manufacturers of diesel-derived engines for use in medium-duty vehicles may, for those engines, alternatively comply with all service information and tool provisions of this regulation that are applicable to 2010 and subsequent model year heavy-duty engines, subject to Executive Officer approval. Implementation dates must comply with the service information provision dates applicable to motor vehicle manufacturers.

(c) Severability of Provisions. If any provision of this section or its application is held invalid, the remainder of the section and the application of such provision to other persons or circumstances shall not be affected.

(d) Definitions. The definitions in section 1900(b), Division 3, Chapter 9, Title 13 of the California Code of Regulations, apply with the following additions:

(1) "Access codes, recognition codes and encryption" mean any type, strategy, or means of encoding software, information, devices, or equipment that would prevent the access to, use of, or proper function of any emission-related part.

(2) "Authorized service network" means a group of independent service and repair facilities that are recognized by motor vehicle manufacturers or engine manufacturers as being capable of performing repairs to factory specifications, including warranty repair work.

(3) "Bi-directional control" means the capability of a diagnostic tool to send messages on the data bus (if applicable) that temporarily override a module's control over a sensor or actuator and give control to the diagnostic tool operator. Bi-directional controls do not create permanent changes to engine or component calibrations.

(4) "Covered person" means: (1) any person or entity engaged in the business of service or repair of passenger cars, light-duty trucks, or medium-duty motor vehicles, engines, or transmissions who is licensed or registered with the Bureau of Automotive Repair, pursuant to section 9884.6 of the Business and Professions Code, to conduct that business in California; (2) any person or entity engaged in the business of service or repair of heavy-duty motor vehicles, engines, or transmissions; (3) any commercial business or government entity that repairs or services its own California motor vehicle fleet(s); (4) tool and equipment companies; or (5) any person or entity engaged in the manufacture or remanufacture of emission-related motor vehicle or engine parts for California motor vehicles and motor vehicle engines.

(5) "Data stream information" means information that originates within a vehicle or engine by a module or intelligent sensor (including, but not limited to, a sensor that contains and is controlled by its own module) and is transmitted between a network of modules and intelligent sensors connected in parallel with either one or two communications wires. The information is broadcast over communication wires for use by other modules such as chassis or transmission modules to conduct normal vehicle operation or for use by diagnostic tools. Data stream information does not include engine calibration-related information.

(6) "Days" means calendar days (unless otherwise specified in this section); in computing the time within which a right may be exercised or an act is to be performed, the day of the event from which the designated period runs shall not be included and the last day shall be included, unless the last day falls on a Saturday, Sunday, or a California-recognized holiday observed by the subject motor vehicle manufacturer or engine manufacturer, in which case the last day shall be the following day.

(7) "Diesel-derived engine" means an engine using a compression ignition thermodynamic cycle and powered by either diesel fuel or alternative fuels such as liquefied petroleum gas or compressed natural gas.

(8) "Emission-related motor vehicle information" means 1994 and subsequent model year passenger car, light-duty truck, and medium-duty engine and vehicle information regarding any of the following:

(A) Any original equipment system, component, or part that controls emissions.

(B) Any original equipment system, component, or part associated with the powertrain system including, but not limited to, the fuel system and ignition system.

(C) Any original equipment system or component that is likely to impact emissions, including, but not limited to, the transmission system.

(9) "Emission-related engine information" means 2007 and subsequent model year heavy-duty engine information regarding any of the following:

(A) Any original equipment system, component, or part that controls emissions.

(B) Any original equipment system, component, or part associated with the engine system including, but not limited to, the fuel system and ignition system. For the purposes of this regulation, if an engine manufacturer elects to have its OBD system monitor inputs received from the transmission, the engine manufacturer is responsible for making relevant transmission system information available pursuant to subsection (e)(2); it shall also make available, beginning with the 2010 model year, and pursuant to subsection (e)(1), all corresponding repair information needed to repair the malfunction and turn off the malfunction indicator light.

(10) "Emission-related motor vehicle or engine part" means any direct replacement automotive part or any automotive part certified by Executive Order that may affect emissions from a motor vehicle or engine, including replacement parts, consolidated parts, rebuilt parts, remanufactured parts, add-on parts, modified parts and specialty parts.

(11) "Engine manufacturer," for the purposes of this regulation and unless otherwise noted, means any manufacturer of 2007 and subsequent model year heavy-duty engines equipped with on-board diagnostic systems pursuant to title 13, California Code of Regulations, sections 1971 or 1971.1.

(12) "Enhanced data stream information" means data stream information that is specific for a motor vehicle manufacturer's or an engine manufacturer's brand of tools and equipment.

(13) "Enhanced diagnostic, recalibration, and reconfiguration tool" means a proprietary tool developed by or for an engine manufacturer for its engines that can perform emission-related functions including, but not limited to, generic and enhanced tool diagnostic capability, recalibration, and reconfiguration.

(14) "Enhanced diagnostic tool" means a diagnostic tool that is specific to a motor vehicle manufacturer's vehicles or an engine manufacturer's engines and which can be used for emission-related repair purposes.

(15) "Fair, reasonable, and nondiscriminatory price", for the purposes of section 1969, means a price that allows a motor vehicle or engine manufacturer to be compensated for the cost of providing required emission-related motor vehicle or engine information and diagnostic tools considering the following:

(A) The net cost to the motor vehicle or engine manufacturer's franchised dealerships or authorized service networks, as applicable, for similar information obtained from motor vehicle manufacturers or engine manufacturers, less any discounts, rebates or other incentive programs;

(B) The cost to the motor vehicle manufacturer or engine manufacturer, as applicable, for preparing and distributing the information, excluding any research and development costs incurred in designing and implementing, upgrading or altering the onboard computer and its software or any other vehicle part or component. Amortized capital costs for the preparation and distribution of the information may be included;

(C) The price charged by other motor vehicle manufacturers or engine manufacturers, as applicable, for similar information;

(D) The price charged by the motor vehicle manufacturer or engine manufacturer, as applicable, for similar information immediately prior to the applicability of this section;

(E) The ability of an average covered person to afford the information.

(F) The means by which the information is distributed;

(G) The extent to which the information is used, which includes the number of users, and frequency, duration, and volume of use; and

(H) Inflation.

(16) "Generic scan tool" is a tool that can read standardized information pursuant to title 13, California Code of Regulations, sections 1968.1, 1968.2, and/or 1971.1 and that can be used on a number of different engines manufactured by different manufacturers.

(17) "Initialization" or "reinitialization" means the process of resetting a vehicle or engine security system by means of an ignition key or access code(s).

(18) "Intermediary information repository" means any individual or entity, other than a motor vehicle manufacturer or engine manufacturer, which collects and makes available to covered persons service information and/or information related to the development of emission-related diagnostic tools.

(19) "Motor vehicle manufacturer," for the purposes of this section, means any manufacturer of 1994 and subsequent model year engines or vehicles in the following classes: passenger cars, light-duty trucks, and medium-duty vehicles equipped with on-board diagnostic systems pursuant to title 13, California Code of Regulations, sections 1968.1 or 1968.2.

(20) "Nondiscriminatory" as used in the phrase "fair, reasonable, and nondiscriminatory price" means that motor vehicle manufacturers and engine manufacturers shall not set a price for emission-related motor vehicle or engine information or tools that provides franchised dealerships or authorized service networks with an unfair economic advantage over covered persons.

(21) "On-board diagnostic system" or "OBD system" for purposes of this section means any system certified to meet the requirements of title 13, California Code of Regulations, sections 1968.1, 1968.2, 1971, 1971.1, or future OBD requirements adopted by the Air Resources Board.

(22) A "Reasonable business means" is a method or mode of distribution or delivery of information that is commonly used by businesses or government to distribute or deliver and receive information at a fair, reasonable, and nondiscriminatory price. A reasonable business mean includes, but is not limited to, the Internet, first-class mail, courier services, intermediary information repositories, and fax services.

(23) "Recalibration" means the process of downloading to an engine's on-board computer emission-related, heavy-duty revisions of on-board computer application software and calibration parameters with default configurations. Recalibration is not dependent on the use of the vehicle identification number (VIN) in determining vehicle configuration.

(24) "Reconfiguration" means the process of enabling or adjusting engine features or engine parameters associated with such features to adapt a heavy-duty engine to a particular vehicle and/or application.

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(e)(1) Service Information. Except as expressly specified below, motor vehicle manufacturers and engine manufacturers shall respectively make available for purchase to all covered persons all emission-related motor vehicle information and emission-related engine information, as applicable, that is provided to the motor vehicle manufacturer's or engine manufacturer's franchised dealerships or authorized service networks for the engine or vehicle models they have certified in California. Motor vehicle manufacturers and engine manufacturers electing to comply with one of the options of subsection (b) shall make available the emission-related information for the vehicle class for which they opt to comply. The information shall include, but is not limited to, diagnosis, service, and repair information and procedures, technical service bulletins, troubleshooting guides, wiring diagrams, and training materials useful for self-study outside a motor vehicle manufacturer's or engine manufacturer's training classroom. Any motor vehicle manufacturer or engine manufacturer choosing to withhold training materials because it has determined they are not useful for self-study as indicated above shall identify and describe the materials on its website. The motor vehicle manufacturer's or engine manufacturer's determination is subject to Executive Officer review and approval.

(2) On-Board Diagnostic System (OBD) Information. Motor vehicle manufacturers and engine manufacturers shall make available for purchase to all covered persons, a general description of each OBD system used in 1996 and subsequent model year passenger cars, light-duty trucks, and medium-duty engines and vehicles, and 2007 and subsequent model year heavy-duty engines, which shall include the following:

(A) A general description of the operation of each monitor, including a description of the parameter that is being monitored.

(B) A listing of all typical OBD diagnostic trouble codes associated with each monitor.

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(C) A description of the typical enabling conditions for each monitor to execute during vehicle or engine operation, including, but not limited to, minimum and maximum intake air and engine coolant temperature, vehicle speed range, and time after engine startup. Motor vehicle manufacturers and engine manufacturers must also make available all existing monitor-specific OBD drive cycle information for all major OBD monitors as equipped including, but not limited to, catalyst, catalyst heater, oxygen sensor, oxygen sensor heater, evaporative system, exhaust gas recirculation, secondary air, and air conditioning system. As applicable, manufacturers of diesel vehicles or engines must also make available all existing monitor-specific drive cycle information for those engines and vehicles that perform misfire, fuel system, and comprehensive monitoring under specific driving conditions (i.e., non-continuous monitoring).

(D) A listing of each monitor sequence, execution frequency and typical duration.

(E) A listing of typical malfunction thresholds for each monitor.

(F) For OBD parameters for specific vehicles and engines that deviate from the typical parameters, the OBD description shall indicate the deviation and provide a separate listing of the typical values for those vehicles and engines. Subject to Executive Officer approval, manufacturers may consolidate typical value listings into a range of values or another acceptable format if the number of typical parameters is unduly burdensome to list.

(G) Identification and Scaling Information.

1. For 1994 and subsequent model year passenger cars, light-duty trucks, and medium-duty engines and vehicles, identification and scaling information necessary to interpret and understand data available to a generic scan tool through Service/Mode 6, pursuant to Society of Automotive Engineers (SAE) J1979, "E/E Diagnostic Test Modes - Equivalent to ISO/DIS 15031-5: April 30, 2002," April 2002, which is incorporated by reference in title 13, California Code of Regulations, sections 1968.1 and 1968.2.

2. For 2013 and subsequent model year heavy-duty engines, identification and scaling information necessary to interpret and understand data available through Diagnostic Message 8 pursuant to SAE Recommended Practice J1939-73 or through Service/Mode $06 pursuant to Society of Automotive Engineers (SAE) J1979, "E/E Diagnostic Test Modes - Equivalent to ISO/DIS 15031-5: April 30, 2002," April 2002, both of which are incorporated by reference in title 13, California Code of Regulations, section 1971.1.

(H) Except as provided below, the information required by this subsection does not include specific algorithms, specific software code or specific calibration data beyond those required to be made available through the generic scan tool pursuant to the requirements of title 13, California Code of Regulations, sections 1968.1, 1968.2, 1971.1, as applicable, and all future adopted OBD regulations for passenger cars, light-duty trucks, medium-duty engines and vehicles, and heavy-duty engines. Algorithms, software codes, or calibration data that are made available to franchised dealerships or authorized service networks shall be made available for purchase to covered persons. To the extent possible, motor vehicle manufacturers and engine manufacturers shall organize and format the information so that it will not be necessary to divulge specific algorithms, codes, or calibration data considered to be a trade secret by the motor vehicle manufacturer or engine manufacturer.

(3) On-Board Computer Initialization Procedures.

(A) Consistent with the requirements of subsection (i) below, motor vehicle manufacturers and engine manufacturers shall make available for purchase to all covered persons computer or anti-theft system initialization information for vehicles or engines so equipped necessary for:

1. The proper installation of on-board computers on motor vehicles or engines that employ integral vehicle security systems; or

2. The repair or replacement of any other emission-related part.

(B) Motor vehicle manufacturers and engine manufacturers must make this information available for purchase in a manner that will not require a covered person to purchase enhanced diagnostic tools to perform the initialization. Motor vehicle manufacturers and engine manufacturers may make such information available through, for example, generic aftermarket tools, a pass-through device, or inexpensive manufacturer-specific cables.

(C) A motor vehicle manufacturer or engine manufacturer may request Executive Officer approval to be excused from the requirements above for some or all model year vehicles or engines, as applicable, through the 2009 model year. The Executive Officer shall approve the request upon finding that the motor vehicle manufacturer or engine manufacturer has demonstrated that:

1. The availability of such information to covered persons would significantly increase the risk of vehicle theft;

2. A technical and economic need for such a request exists; and

3. It will make available to covered persons reasonable alternative means to install computers, or to otherwise repair or replace an emission-related part, at a fair, reasonable, and nondiscriminatory price and that such alternative means do not place covered persons, as a class, at a competitive disadvantage to either franchised dealerships or authorized service networks in their ability to service and repair vehicles or engines.

    a. Any alternative means shall be available to covered persons within 24 hours of the initial request and shall not require the purchase of enhanced diagnostic tools to perform an initialization. Alternatives may include lease of such tools, but only at a fair, reasonable and nondiscriminatory price.

    b. In lieu of leasing its enhanced diagnostic tools, a motor vehicle manufacturer or engine manufacturer may alternatively make available for purchase to independent equipment and tool companies all data stream information needed to make their diagnostic tools fully functional for initialization purposes. Any motor vehicle manufacturer or engine manufacturer choosing this option must release the information to equipment and tool companies within 60 days of Executive Officer approval.

(D) All approvals are conditional and subject to audit under subsection (l) below and possible rescission if the conditions set forth in subsection (e)(3)(C) fail to be satisfied.

(4) The information required by this subsection shall be made available for purchase no later than 180 days after the start of engine or vehicle introduction into commerce or concurrently with its availability to franchised dealerships or authorized service networks, whichever occurs first.

(f) Internet Availability for Service Information.

(1) Information required to be made available for purchase under subsection (e), excluding subsection (e)(3), shall be directly accessible via the Internet. As an exception, motor vehicle manufacturers or engine manufacturers with annual California sales of less than 300 engines or vehicles (based on the average number of California-certified engines or vehicles sold by the motor vehicle manufacturer or engine manufacturer in the three previous consecutive model years) have the option not to provide required materials directly over the Internet. Such motor vehicle manufacturers and engine manufacturers may instead propose an alternative reasonable business means for providing the information required by this section to the Executive Officer for review and approval. The alternate method shall include an Internet website that adequately specifies that the required service information is readily available through other reasonable business means at fair, reasonable, and nondiscriminatory prices. If a motor vehicle manufacturer or engine manufacturer later exceeds the three-year sales average, it would be required to begin complying with all Internet availability requirements the next model year. In such cases, the requirements would apply only to those engine and vehicle models certified in that and subsequent model years and would not apply to any models that were within carry-over test groups that were initially certified before the sales average was exceeded.

(2) For purposes of making the information available for purchase via the Internet, motor vehicle manufacturers and engine manufacturers, or their designees, shall establish and maintain an Internet website(s) that:

(A) Is accessible at all times, except during times required for routine and emergency maintenance. Routine maintenance shall be scheduled after normal business hours. If the motor vehicle manufacturer's or engine manufacturer's service information website(s) is not available for more than 24 hours for other than routine maintenance, the motor vehicle manufacturer or engine manufacturer, as applicable, shall notify the Executive Officer by either phone or email within one business day.

(B) Houses all of the required information such that it is available for direct online access (i.e., for online viewing and/or file downloading), except as provided in subsections (e)(3), (f)(2)(G) and (f)(2)(J). In addition to direct online access, motor vehicle manufacturers and engine manufacturers may concurrently offer the information by means of electronic mail, fax transmission, or other reasonable business means.

(C) Is written in English with all text using readable font sizes.

(D) Has clearly labeled and descriptive headings or sections, has an online index connected to a search engine and/or hyperlinks that directly take the user to the information, and has a comprehensive search engine that permits users to obtain information by various query terms including, but not limited to, engine, transmission, or vehicle model (as applicable), model year, bulletin number, diagnostic procedure, and trouble code.

(E) Provides, at a minimum, e-mail access for communication with a designated contact person(s). The contact person(s) shall respond to any inquiries within 2 days of receipt, Monday through Friday. The website shall also provide a business address for the purposes of receiving mail, including overnight or certified mail.

(F) Lists the most recent updates to the website. Updates must occur concurrently with the availability of new or revised information to franchised dealerships or authorized service networks, whichever occurs first.

(G) Provides all training materials offered by the motor vehicle manufacturer or engine manufacturer, as applicable, as required under subsection (e)(1). For obtaining any training materials that are not in a format that can be readily downloaded directly from the Internet (e.g., instructional tapes, full-text information associated with bundled software, CD-ROMs, or other media), the website must include information on the type of materials that are available, and how such materials can be purchased.

(H) Offers media files (if any) and other service information documents in formats that can be viewed with commonly available software programs (e.g., Adobe Acrobat, Microsoft Word, RealPlayer, etc.).

(I) Provides secure Internet connections (i.e., certificate-based) for transfer of payment and personal information.

(J) Provides ordering information and instructions for the purchase of tools and information that are required to be made available pursuant to subsections (g) and (h).

(K) Complies with the following requirements for term, definitions, abbreviations, and acronyms:

1. For 2003 and subsequent model-year passenger cars, light duty trucks, and medium-duty engines and vehicles, complies with the SAE Recommended Practice J1930, "Electrical/Electronic Systems, Diagnostic Terms, Definitions, Abbreviations, and Acronyms - Equivalent to ISO/TR 15031-2: April 30, 2002," April 2002, incorporated by reference herein, for all emission-related motor vehicle information.

2. For 2010 and later model year heavy-duty engines, emission-related nomenclature shall comply with SAE J2403, "Medium/Heavy-Duty E/E Systems Diagnosis Nomenclature," August 2004, incorporated by reference herein.

(L) Complies with the following website performance criteria:

1. Possesses sufficient server capacity to allow ready access by all users and has sufficient downloading capacity to assure that all users may obtain needed information without undue delay.

2. Broken weblinks shall be corrected or deleted weekly.

3. Website navigation does not require a user to return to the motor vehicle manufacturer's or engine manufacturer's home page or a search engine in order to access a different portion of the site. The use of "one-up" links (i.e., links that connect to related webpages that preceded the one being viewed) is recommended at the bottom of subordinate webpages in order to allow a user to stay within the desired subject matter.

4. Any manufacturer-specific acronym or abbreviation shall be defined in a glossary webpage which, at a minimum, is hyperlinked by each webpage that uses such acronyms and abbreviations. Motor vehicle manufacturers and engine manufacturers may request Executive Officer approval to use alternate methods to define such acronyms and abbreviations. The Executive Officer shall approve such methods if the motor vehicle manufacturer or engine manufacturer adequately demonstrates that the method provides equivalent or better ease-of-use to the website user.

(M) Indicates the minimum hardware and software specifications required for satisfactory access to the website(s).

(3) All information must be maintained by motor vehicle manufacturers and engine manufacturers for a minimum of fifteen years. After such time, the information may be retained in an off-line electronic format (e.g., CD-ROM) and made available for purchase in that format at fair, reasonable, and nondiscriminatory prices upon request. Motor vehicle manufacturers and engine manufacturers shall index their available archived information with a title that adequately describes the contents of the document to which it refers. Motor vehicle manufacturers and engine manufacturers may allow for the ordering of information directly from the website, or from a website hyperlinked to the motor vehicle manufacturer's or engine manufacturer's website. In the alternative, motor vehicle manufacturers and engine manufacturers shall list a phone number and address where covered persons can call or write to obtain requested information through reasonable business means.

(4) Motor vehicle manufacturers and engine manufacturers must implement fair, reasonable, and nondiscriminatory pricing structures relative to a range of time periods for online access (e.g., in cases where information can be viewed online) and/or the amount of information purchased (e.g., in cases where information becomes viewable after downloading). These pricing structures shall be submitted to the Executive Officer for review concurrently with being posted on the motor vehicle manufacturer's or engine manufacturer's service information website(s).

(5) Motor vehicle manufacturers and engine manufacturers must provide the Executive Officer with free, unrestricted access to their Internet websites. Access shall include the ability to directly view and download posted service information. The information necessary to access the websites (e.g., user name, password, contact person(s)) must be submitted to the Executive Officer once the websites are operational.

(6) Reporting Requirements. Motor vehicle manufacturers and engine manufacturers shall provide the Executive Officer with reports that adequately demonstrate that their individual Internet websites meet the requirements of subsection (f)(2). The reports shall also indicate the performance and effectiveness of the websites by using commonly used Internet statistics (e.g., successful requests, frequency of use, number of subscriptions purchased, etc.). Motor vehicle manufacturers and engine manufacturers shall submit such reports annually within 30 days of the end of the calendar year. The Executive Officer may also require motor vehicle manufacturers and engine manufacturers to submit additional reports upon request, including any information required by the United States Environmental Protection Agency under the federal service information regulation. These reports shall be submitted in a format prescribed by the Executive Officer.

(g) Light-Duty and Medium-Duty Vehicle Diagnostic and Reprogramming Tools and Information.

(1) Diagnostic and Reprogramming Tools. Motor vehicle manufacturers shall make available for purchase through reasonable business means to all covered persons, all emission-related enhanced diagnostic tools and reprogramming tools available to franchised dealers, including software and data files used in such equipment. The motor vehicle manufacturer shall ship purchased tools to a requesting covered person as expeditiously as possible after a request has been made.

(2) Data Stream and Bi-Directional Control Information. Motor vehicle manufacturers shall make available for purchase through reasonable business means, to all equipment and tool companies, all information necessary to read and format all emission-related data stream information, including enhanced data stream information, that is used in diagnostic tools available to franchised dealerships or authorized service networks, and all information that is needed to activate all emission-related bi-directional controls that can be activated by franchised dealership or authorized service network tools. Motor vehicle manufacturers may require, as a condition of sale, that the business agreement contain indemnity or "hold harmless" clauses that relieve the motor vehicle manufacturer from any liability resulting from damage caused by tools produced by the tool and equipment company that is otherwise not attributable to the data provided by the motor vehicle manufacturer. Motor vehicle manufacturers shall make all required information available through the Internet or other reasonable business means to the requesting equipment and tool company within 14 days after the request to purchase has been made, unless the motor vehicle manufacturer petitions the Executive Officer for approval to refuse to disclose such information ("petition for non-disclosure") to the requesting company or petitions the Executive Officer for additional time to comply ("petition for additional time"). After receipt of a petition and consultation with the affected parties, the Executive Officer shall either grant or refuse the petition based on the evidence submitted during the consultation process:

(A) If the evidence demonstrates that the motor vehicle manufacturer has a reasonably based belief that the requesting equipment and tool company could not produce safe and functionally accurate tools that would not cause damage to the vehicle, a petition for non-disclosure will be granted.

(B) If the evidence demonstrates that the motor vehicle manufacturer does not have a reasonably-based belief that the requesting equipment and tool company could not produce safe and functionally accurate tools that would not cause damage to the vehicle, a petition for non-disclosure will be denied and the motor vehicle manufacturer shall make the requested information available to the requesting equipment and tool company within 2 days of the denial.

(C) If the motor vehicle manufacturer submits a petition for additional time, and satisfactorily demonstrates to the Executive Officer that the motor vehicle manufacturer is able to comply but requires additional time within which to do so, the Executive Officer shall grant the petition and provide additional time that is necessary to fully and expeditiously comply. Petitions for additional time shall be considered by the Executive Officer on a case-by-case basis.

(3) Reprogramming Information.

(A) Beginning with the 2004 model year, reprogramming methods used for passenger cars, light-duty trucks, and medium-duty engines and vehicles shall be compatible with SAE J2534-1 Paper, "Recommended Practice for Pass-Thru Vehicle Programming, December 2004, which is incorporated by reference herein, for all vehicle models that can be reprogrammed by franchised dealerships or authorized service networks.

(B) Motor vehicle manufacturers shall make available for purchase through reasonable business means to covered persons for vehicle models meeting the requirements of subsection (g)(3)(A) all vehicle reprogramming information and materials necessary to install motor vehicle manufacturers' software and calibration data to the extent that it is provided to franchised dealerships. The motor vehicle manufacturer shall, within 2 days of receipt of a covered person's request, provide purchased reprogramming information via an Internet download or, if available in a different electronic format, via postal mail or package delivery service.

(4) The information and tools required by this subsection shall be made available for purchase no later than 180 days after the start of vehicle introduction into commerce or concurrently with its availability to franchised dealerships or authorized service networks, whichever occurs first.

(h) Heavy-Duty Engine Enhanced Diagnostic, Recalibration, and Reconfiguration Tools and Information.

16/2/15
PER AGENCY
REQUEST
LSM

(1)(A) Engine manufacturers shall continue to make available for purchase through reasonable business means all emission-related diagnostic tools currently available to covered persons, including installation software and data files used in such equipment. Beginning with the 2013 model year, engine manufacturers shall also make available for purchase all emission-related enhanced diagnostic tools, recalibration tools, and reconfiguration tools available to franchised dealerships and authorized service networks, including installation software and data files used in such equipment. The engine manufacturer shall ship purchased tools to a requesting covered person as expeditiously as possible after a request has been made. As a condition for sale and shipment, however, an engine manufacturer may request that the requesting covered persons to take all necessary training offered by the engine manufacturer. Any required training materials and classes must comply with the following conditions:

1. similar training must be required by the engine manufacturer for the use of the same tool by its franchised dealerships and authorized service networks, and the training required for covered persons must be substantially similar to such training in terms of material covered and length of training classes;

2. the training must be available within six months after a tool request has been made;

3. the training must be available at a minimum of one California location; and

4. the training must be made available to the covered person at a fair, reasonable and nondiscriminatory price.

(B) Recalibration and reconfiguration software, methods, and parameters shall be made available for purchase through reasonable business means to covered persons. Recalibration information and methods shall be compatible with either SAE J2534-1, December 2004, or the Technology and Maintenance Council's (TMC) Recommended Practice RP1210A, "WindowsECommunication API," July 1999, which are incorporated by reference herein.

(2) Data Stream and Bi-Directional Control Information.

10/2/15
PER AGENCY
REQUEST
LSM

(A) Beginning with the 2013 model year, engine manufacturers shall make available for purchase through reasonable business means, to all equipment and tool companies, all information necessary to read and format all emission-related data stream information, including enhanced data stream information, that is used in diagnostic tools available to franchised dealerships or authorized service networks, and all information that is needed to activate all emission-related bi-directional controls that can be activated by franchised dealership or authorized service network tools. Engine manufacturers shall make all required information available through the Internet or other reasonable business means to the requesting equipment and tool company within 14 days after the request to purchase has been made, unless the engine manufacturer petitions the Executive Officer for approval to refuse to disclose such information ("petition for non-disclosure") to the requesting company or petitions the Executive Officer for additional time to comply ("petition for additional time"). After receipt of a petition and consultation with the affected parties, the Executive Officer shall either grant or refuse the petition based on the evidence submitted during the consultation process:

1. If the evidence demonstrates that the engine manufacturer has a reasonably based belief that the requesting equipment and tool company could not produce safe and functionally accurate tools that would not cause damage to the engine, the petition for non-disclosure will be granted. Engine manufacturers are not required to provide data stream and bi-directional control information that would permit an equipment and tool company's products to modify a California-certified engine or transmission configuration.

2. If the evidence does not demonstrate that the engine manufacturer has a reasonably-based belief that the requesting equipment and tool company could not produce safe and functionally accurate tools that would not cause damage to the engine, the petition for non-disclosure will be denied and the engine manufacturer, as applicable, shall make the requested information available to the requesting equipment and tool company within 2 days of the denial.

3. If the engine manufacturer submits a petition for additional time, and satisfactorily demonstrates to the Executive Officer that the motor vehicle manufacturer is able to comply but requires additional time within which to do so, the Executive Officer shall grant the petition and provide additional time to fully and expeditiously comply. Petitions for additional time shall be considered by the Executive Officer on a case-by-case basis.

(B) Engine manufacturers may require that tools using information covered under subsection (h)(2)(A) comply with the Component Identifier message specified in SAE J1939-71, dated December 2003, as Parameter Group Number (PGN) 65249 (including the message parameter's make, model, and serial number) and the SAE J1939-81, dated May 2003, Address Claim PGN.

(C) An engine manufacturer may require, as a condition of sale of its tools, that the business agreement contain indemnity or "hold harmless" clauses that relieve the engine manufacturer from any liability resulting from damage caused by tools produced by the tool and equipment company that is otherwise not attributable to the data provided by the engine manufacturer.

(3) The information and tools required by this subsection shall be made available for purchase no later than 180 days after the start of engine introduction into commerce or concurrently with its availability to franchised dealerships or authorized service networks, whichever occurs first.

(i) Costs: All information and tools required to be provided to covered persons by this regulation shall be made available for purchase at a fair, reasonable, and nondiscriminatory prices.

(j) Motor vehicle manufacturers and engine manufacturers shall not utilize any access code, recognition code or encryption for the purpose of preventing a vehicle or engine owner from using an emission-related motor vehicle or engine part (with the exception of the powertrain control module, engine control modules and transmission control modules, as applicable), that has not been manufactured by that motor vehicle manufacturer or engine manufacturer or any of its original equipment suppliers.

(k) Trade Secrets: Motor vehicle manufacturers and engine manufacturers may withhold trade secret information (as defined in the Uniform Trade Secret Act contained in Title 5 of the California Civil Code) which otherwise must be made available for purchase, subject to the following:

(1) At the time of initial posting of all information required to be provided under subsections (e) through (h) above, a motor vehicle manufacturer or engine manufacturer shall identify, by brief description on its Internet website, any information that it believes to be a trade secret and not subject to disclosure.

(2) A covered person, believing that a motor vehicle manufacturer or engine manufacturer has not fully provided all information that is required to be provided under subsections (e) through (h) above shall submit a request in writing by certified mail to the motor vehicle manufacturer for release of the information.

(3) Upon receipt of the request for information, a motor vehicle manufacturer or engine manufacturer shall do the following:

(A) If it had not previously made the information available for purchase because of an oversight, it shall make the information available within 2 days from receipt of the request directly to the requesting covered person at a fair, reasonable, and nondiscriminatory price and by reasonable business means. Additionally, the motor vehicle manufacturer or engine manufacturer shall, within 7 days, make such information available for purchase to other covered persons consistent with the requirements of this regulation.

(B) If it has not made the requested information available for purchase because it believes the information to be a trade secret, it shall within 14 days, notify the requesting covered person that it considers the information to be a trade secret, provide justification in support of its position, and make reasonable efforts to see if the matter can be resolved informally.

(C) If during this 14 day period set forth in subsection (k)(3)(B), the motor vehicle manufacturer or engine manufacturer determines that the information is, in fact, not a trade secret, it shall immediately notify the requesting covered person of its determination and make the information available within the timeframes and means set forth in subsection (k)(3)(A)

(D) If the parties can informally resolve the matter, the motor vehicle manufacturer or engine manufacturer shall within 2 days provide the requesting covered person with all of the information that is subject to disclosure consistent with that agreement. The motor vehicle manufacturer or engine manufacturer shall also, within 7 days, make such information available for purchase to other covered persons consistent with the requirements of this regulation.

(E) If the matter cannot be informally resolved, the motor vehicle manufacturer or engine manufacturer shall, within 30 days from the date that it notified the requesting covered person that it considers the information to be a trade secret, or such longer period the parties may mutually agree upon, petition the California superior court for declaratory relief to make a finding that the information is exempt from disclosure because it is a trade secret. The petition shall be filed in accordance with the California Code of Civil Procedure section 395 et seq. The petition shall be accompanied with a declaration stating facts that show that the motor vehicle manufacturer or engine manufacturer has made a reasonable and good faith attempt to informally resolve the matter.

(l) Executive Officer Review of Compliance.

(A) The Executive Officer shall monitor compliance with the requirements of Health and Safety Code section 43105.5 and this regulation.

(2) The Executive Officer, through the Chief of the Mobile Source Operations Division (Division Chief), shall periodically audit a motor vehicle manufacturer's or engine manufacturer's Internet website(s) and other distribution sources to determine whether the information requirements of Health and Safety Code section 43105.5 and this regulation are being fulfilled. Motor vehicle manufacturers and engine manufacturers must provide the Executive Officer with free unrestricted access to the sites and other sources for the purposes of an audit.

(3) The Division Chief shall also commence an audit upon receipt of a request from a covered person that provides reasonable cause to believe that a motor vehicle manufacturer or engine manufacturer is not in compliance.

(A) Such a request shall be in the form of a written declaration setting forth specific details of the alleged noncompliance of the motor vehicle manufacturer or engine manufacturer. The declaration shall also set forth facts that demonstrate that the requesting covered person has undertaken efforts to resolve the matter informally with the named motor vehicle manufacturer or engine manufacturer.

(B) The covered person shall concurrently provide a copy of the audit request on the motor vehicle manufacturer or engine manufacturer against whom the request has been filed.

(C) The Division Chief shall determine if the request, on its face, sets forth facts establishing reasonable cause to believe that that motor vehicle manufacturer or engine manufacturer is in noncompliance with Health and Safety Code section 43105.5 or this regulation and that the covered person has undertaken reasonable efforts to informally resolve the alleged noncompliance with the motor vehicle manufacturer or engine manufacturer directly. If the Division Chief determines that the request satisfies these conditions, he or she shall conduct an audit of the designated motor vehicle manufacturer's or engine manufacturer's Internet website. Otherwise, the Division Chief shall dismiss the request and notify the requesting covered person and the affected motor vehicle manufacturer or engine manufacturer of his or her determination.

(4) In conducting any audit, the Division Chief may require the motor vehicle manufacturer or engine manufacturer to provide the ARB with all information and materials related to compliance with the requirements of Health and Safety Code section 43105.5 and this regulation, including but not limited to:

(A) Copies of all books, records, correspondence or documents in its possession or under its control that the motor vehicle manufacturer or engine manufacturer is required to provide to persons engaged in the service and repair industries and to equipment and tool companies under subsections (d) through (h) of this regulation, and

(B) Any and all reports or records developed or compiled either for or by the motor vehicle manufacturer or engine manufacturer to monitor performance of its Internet site(s).

(5) In conducting the audit, the Division Chief may order or subpoena the motor vehicle manufacturer or engine manufacturer, the party filing the request for inspection, or any other person with possible knowledge of the issue of noncompliance to appear in person and testify under oath. The Division Chief may also request or subpoena such persons to provide any additional information that the Division Chief deems necessary to determine any issue of noncompliance.

(6) Except for good cause, the audit shall be completed within 60 days from the date that the Division Chief notifies the motor vehicle manufacturer or engine manufacturer about the audit. At the conclusion of the audit, the Division Chief shall issue a written determination, with supporting findings, regarding compliance by the motor vehicle manufacturer or engine manufacturer.

(7) If the Division Chief finds sufficient credible evidence that the motor vehicle manufacturer or engine manufacturer is not in compliance with any requirements of Health and Safety Code section 43105.5 or this regulation, the determination shall be in the form of a notice to comply against the motor vehicle manufacturer or engine manufacturer.

(8) The Division Chief's determination not to issue a notice to comply against a motor vehicle manufacturer or engine manufacturer is subject to limited review by the Executive Officer.

(A) A covered person may only request that the Executive Officer review a determination that it specifically requested pursuant to subsection (l)(3) above.

(B) The covered person shall file the request for Executive Officer review within 10 days from the date of issuance of the Division Chief's determination.

1. The request shall be filed to the attention of the Executive Officer c/o Clerk of the Board, Air Resources Board, P.O. Box 2815, Sacramento, CA 95812-2815. A copy of the request shall be concurrently served on the motor vehicle manufacturer that was the subject of the audit and determination.

2. The request shall set forth specific facts and reasons why the determination should be reviewed and supporting legal authority for why a notice to comply should have been issued.

(C) The motor vehicle manufacturer or engine manufacturer may file an opposition to the request for review within 10 days from the date of service of the request for review.

(D) The Executive Officer shall issue a determination within 30 days from the last day that the motor vehicle manufacturer or engine manufacturer had to file an opposition. The Executive Officer may affirm the decision of the Division Chief; remand the matter back to the Division Chief for further consideration or evidence; or issue a notice to comply against the motor vehicle manufacturer or engine manufacturer.

(9) Within 30 days from the date of issuance of a notice to comply, the motor vehicle manufacturer or engine manufacturer shall either:

(A) Submit to the Executive Officer a compliance plan that adequately demonstrates that the motor vehicle manufacturer or engine manufacturer will come into compliance with this section within 45 days from the date of submission of the plan, or such longer period that the Executive Officer deems appropriate to allow the motor vehicle manufacturer or engine manufacturer to properly remedy the noncompliance; or

(B) Request an administrative hearing to consider the basis or scope of the notice to comply.

(10) If the motor vehicle manufacturer or engine manufacturer elects to submit a compliance plan, the Executive Officer shall review the plan and issue a written determination, within 30 days, either accepting or rejecting the plan. The Executive Officer shall reject the compliance plan if the Executive Officer finds that it will not bring the motor vehicle manufacturer or engine manufacturer into compliance within 45 days from the date that the plan would have been approved, or such longer period that the Executive Officer deemed appropriate to allow the motor vehicle manufacturer or engine manufacturer to properly remedy the noncompliance. The Executive Officer shall notify the motor vehicle manufacturer or engine manufacturer in writing of his or her determination, and that the Executive Officer will be seeking administrative review pursuant to subsection (m) below.

(11) After approving a proposed compliance plan, if the Executive Officer determines that the motor vehicle manufacturer or engine manufacturer has failed to comply with the terms of the plan, the Executive Officer shall notify the motor vehicle manufacturer or engine manufacturer of his or her determination and that he or she will be seeking administrative review pursuant to subsection (m) below.

(m) Administrative Hearing Review.

(1) A motor vehicle manufacturer or engine manufacturer may request that a hearing officer review the basis and scope of the notice to comply. Failure by the motor vehicle manufacturer or engine manufacturer to request such a review and failing, in the alternative, to submit a compliance plan as required by subsection (l)(9)(A) shall result in the Executive Officer's determination becoming final and may subject the motor vehicle manufacturer or engine manufacturer to penalties pursuant to Health and Safety Code section 43105.5(f) and subsection (l).

(2) The Executive Officer shall forward the following matters to a hearing officer for appropriate administrative review, including, if warranted, consideration of penalties:

(A) A compliance plan that it has rejected pursuant to subsection (l)(10).

(B) A notice to comply that has been issued against a motor vehicle manufacturer or engine manufacturer who has failed to either request administrative review of the Executive Officer determination, or, in the alternative, to submit a compliance plan.

(C) An Executive Officer determination that a motor vehicle manufacturer or engine manufacturer has failed to satisfy the terms of a compliance plan it has submitted in response to a notice to comply.

(3) Administrative hearings under this regulation shall be conducted pursuant to the procedures set forth in title 17, California Code of Regulations, section 60060.1 et seq.

(n) Penalties.

(1) If after an administrative hearing, the hearing officer finds that the motor vehicle manufacturer or engine manufacturer has failed to comply with any of the requirements of this section, and the motor vehicle manufacturer or engine manufacturer fails to correct the violation within 30 days from the date of his finding, the hearing officer may impose a civil penalty upon the motor vehicle manufacturer or engine manufacturer in an amount not to exceed $25,000 per day (including Saturdays, Sundays, and observed holidays) per violation until the violation is corrected. The hearing officer may immediately impose a civil penalty in cases where a motor vehicle manufacturer or engine manufacturer has failed to act in accordance with a compliance plan it has previously submitted.

(2) For purposes of this section, a finding by a hearing officer that a motor vehicle manufacturer or engine manufacturer has failed to comply with the requirements of Health and Safety Code section 43105.5 and title 13, California Code of Regulations, section 1969 et seq., including the failure to submit a timely compliance plan, shall be considered a single violation.

Note: Authority cited: Sections 39600, 39601, 43000.5, 43018, 43105.5 and 43700, Health and Safety Code. Reference: Sections 39027.3, 43104 and 43105.5, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 1976.0.1 of title 13, California Code of Regulations, to read as follows:

§ 1976.0.1 Standards and Test Procedures for Motor Vehicle Fuel Evaporative Emissions. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Fuel evaporative emissions from 1970 through 1977 model passenger cars and light-duty trucks are set forth in Title 40, Code of Federal Regulations, Part 86, Subparts A and C, as it existed on June 20, 1973. These standards are enforced in California pursuant to section 43008 of the Health and Safety Code.

(b) (1) Evaporative emissions for 1978 and subsequent model gasoline fueled, 1983 and subsequent model liquefied petroleum gas fueled, and 1993 and subsequent model alcohol fueled motor vehicles and hybrid electric vehicles subject to exhaust emission standards under this article, except petroleum fueled diesel vehicles, compressed natural gas fueled vehicles, hybrid electric vehicles that have sealed fuel systems which can be demonstrated to have no evaporative emissions, and motorcycles, shall not exceed the following standards:

(A) For vehicles identified below, tested in accordance with the test procedure based on the Sealed Housing for Evaporative Determination as set forth in Title 40, Code of Federal Regulations, sections 86.130-78 through 86.143-90 as they existed July 1, 1989, the evaporative emission standards are:

Vehicle Type	*Model Year*	*Hydrocarbons[1] Diurnal + Hot Soak (grams/test) 50K miles*
Passenger cars	1978 and 1979	6.0
Light-duty trucks		6.0
Medium-duty vehicles		6.0
Heavy-duty vehicles		6.0
Passenger cars	1980-1994[2]	2.0
Light-duty trucks		2.0
Medium-duty vehicles		2.0
Heavy-duty vehicles		2.0

[1] Organic Material Hydrocarbon Equivalent, for alcohol-fueled vehicles.

[2] Other than hybrid electric vehicles.

(B) For the vehicles identified below, tested in accordance with the test procedure which includes the running loss test, the hot soak test, and the 72 hour diurnal test, the evaporative emission standards are:

Vehicle Type	*Model Year*	*Hydrocarbons*[1]	
		Three-Day Diurnal +Hot Soak (grams/test) Useful Life[2]	*Running Loss (grams/mile) Useful Life* [2]
Passenger cars	1995 through 2005[3]	2.0	0.05
Light-duty trucks		2.0	0.05
Medium-duty vehicles (6,001-8,500 lbs. GVWR)			
with fuel tanks < 30 gallons		2.0	0.05
with fuel tanks ≥ 30 gallons		2.5	0.05
(8,501-14,000 lbs. GVWR)[4]		3.0	0.05
Heavy-duty vehicles (over 14,000 lbs. GVWR)		2.0	0.05
Hybrid electric passenger cars	1993 through 2005[5]	2.0	0.05
Hybrid electric light-duty trucks		2.0	0.05
Hybrid electric medium-duty vehicles		2.0	0.05

[1] Organic Material Hydrocarbon Equivalent, for alcohol-fueled vehicles.

[2] For purposes of this paragraph, "useful life" shall have the same meaning as provided in section 2112, Title 13, California Code of Regulations. Approval of vehicles which are not exhaust emission tested using a chassis dynamometer pursuant to section 1960.1 or 1961, Title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

[3] The running loss and useful life three-day diurnal plus hot soak evaporative emission standards (hereinafter "running loss and useful life standards") shall be phased in beginning with the 1995 model year. Each manufacturer, except ultra-small volume and small volume manufacturers, shall certify the specified percent (a) of passenger cars and (b) of light-duty trucks, medium-duty vehicles and heavy-duty vehicles to the running loss and useful life standards according to the following schedule:

Model Year	***Minimum Percentage of Vehicles Certified to Running Loss and Useful Life Standards****

1995	10 percent
1996	30 percent
1997	50 percent

* The minimum percentage of motor vehicles of each vehicle type required to be certified to the running loss and useful life standards shall be based on the manufacturer's projected California model-year sales (a) of passenger cars and (b) of light-duty trucks, medium-duty vehicles and heavy-duty vehicles. Optionally, the percentage of motor vehicles can also be based on the manufacturer's projected California model-year sales (a) of passenger cars and light-duty trucks and (b) of medium-duty vehicles and heavy-duty vehicles.

Beginning with the 1998 model year, all motor vehicles subject to the running loss and useful life standards, except those produced by ultra-small volume manufacturers, shall be certified to the specified standards. In the 1999 through 2005 model years, all motor vehicles subject to the running loss and useful life standards, including those produced by ultra-small volume manufacturers, shall be certified to the specified standards.

All 1995 through 1998 model-year motor vehicles which are not subject to running loss and useful life standards pursuant to the phase-in schedule shall comply with the 50,000-mile standards in effect for 1980 through 1994 model-year vehicles.

[4] For the 1995 model year only, the evaporative emission standards for complete vehicles in this weight range shall be 2.0 grams/test and compliance with the evaporative emission standards shall be based on the SHED conducted in accordance with the procedures set forth in Title 40, Code of Federal Regulations, sections 86.130-78 through 86.143-90 as they existed July 1, 1989. For the 1995 through 2005 model years, the evaporative emission standards for incomplete vehicles in this weight range shall be 2.0 grams/test and compliance with the evaporative emission standards shall be based on the test procedures specified in paragraph 4.g. of the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles."

[5] The running loss and useful life standards for all hybrid electric vehicles shall be effective beginning in the 1993 model year.

(C) For vehicles identified below, tested in accordance with the test procedure which includes the hot soak test and the 48 hour diurnal test, the evaporative emission standards are:

Vehicle Type	***Model Year***	***Hydrocarbons[1] Two-Day Diurnal + Hot Soak (grams/test) Useful Life[2]***
Passenger cars	1996 through	2.5

Light-duty trucks	2005[3]	2.5
Medium-duty vehicles		
(6.001-8,500 lbs. GVWR)		
with fuel tanks < 30 gallons		2.5
with fuel tanks ≥ 30 gallons		3.0
(8,501-14,000 lbs. GVWR)		3.5
Heavy-duty vehicles (over 14,000 lbs. GVWR)		4.5
Hybrid electric passenger cars	1996 through	2.5
Hybrid electric light-duty trucks	2005[3]	2.5
Hybrid electric medium-duty vehicles		2.5

[1] Organic Material Hydrocarbon Equivalent for alcohol-fueled vehicles.

[2] For purposes of this paragraph, "useful life" shall have the same meaning as provided in section 2112, Title 13, California Code of Regulations. Approval of vehicles which are not exhaust emission tested using a chassis dynamometer pursuant to section 1960.1 or 1961, Title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

[3] The two-day diurnal plus hot soak evaporative emission standards (hereinafter "supplemental standards") shall be phased-in beginning with the 1996 model year. Those vehicles certified under the running loss and useful life standards for the 1996 through 2005 model years must also be certified under the supplemental standards.

(D) Zero-emission vehicles shall produce zero fuel evaporative emissions under any and all possible operational modes and conditions.

(E) For 2001 through 2014 model year vehicles, the optional zero-fuel evaporative emission standards for the three-day and two-day diurnal-plus-hot-soak tests are 0.35 grams per test for passenger cars, 0.50 grams per test for light-duty trucks 6,000 lbs. GVWR and under, and 0.75 grams per test for light-duty trucks from 6,001 to 8,500 lbs. GVWR, to account for vehicle non-fuel evaporative emissions (resulting from paints, upholstery, tires, and other vehicle sources). Vehicles demonstrating compliance with these evaporative emission standards shall also have zero (0.0) grams of fuel evaporative emissions per test for the three-day and two-day diurnal-plus-hot-soak tests. The "useful life" shall be 15 years or 150,000 miles, whichever occurs first. In lieu of demonstrating compliance with the zero (0.0) grams of fuel evaporative emissions per test over the three-day and two-day diurnal-plus-hot-soak tests, the manufacturer may submit for advance Executive Officer approval a test plan to demonstrate that the vehicle has zero (0.0) grams of fuel evaporative emissions throughout its useful life.

Additionally, in the case of a SULEV vehicle for which a manufacturer is seeking a partial ZEV credit, the manufacturer may prior to certification elect to have measured fuel evaporative emissions reduced by a specified value in all certification and in-use testing of the vehicle as long as measured mass exhaust emissions of NMOG for the vehicle are increased in all certification and in-use testing. The measured fuel evaporative emissions shall be reduced in increments of 0.1 gram per test, and the measured mass exhaust emissions of NMOG from the vehicle shall be increased by a gram per mile factor, to be determined by the Executive Officer, for every 0.1 gram per test by which the measured fuel evaporative emissions are reduced. For the purpose of this calculation, the evaporative emissions shall be measured, in grams per test, to a minimum of three significant figures.

(F) For the 2004 through 2014 model motor vehicles identified below, tested in accordance with the test procedures described in Title 40, Code of Federal Regulations, sections 86.130-78 through 86.143-90 as they existed July 1, 1989 and as modified by the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles" incorporated by reference in section 1976(c), the evaporative emission standards are:

Vehicle Type	***Hydrocarbon[1] Standards[2 3 4]***		
	Running Loss (grams per mile)	***Three Day Diurnal + Hot Soak (grams per test)***	***Two-Day Diurnal + Hot Soak (grams per test)***
Passenger cars	0.05	0.50	0.65
Light-duty trucks (under 8,501 lbs. GVWR)			
6,000 lbs. GVWR and under	0.05	0.65	0.85
6,001-8,500 lbs. GVWR	0.05	0.90	1.15
Medium-duty vehicles (8,501-14,000 lbs. GVWR)	0.05	1.00	1.25
Heavy-duty vehicles (over 14,000 lbs. GVWR)	0.05	1.00	1.25

[1] Organic Material Hydrocarbon Equivalent for alcohol-fueled vehicles.

[2] For all vehicles certified to these standards, the "useful life" shall be 15 years or 150,000 miles, whichever first occurs. Approval of vehicles which are not exhaust emission tested using a chassis dynamometer pursuant to section 1960.1 or 1961, title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

[3] (a) These evaporative emission standards shall be phased-in beginning with the 2004 model year. Each manufacturer, except small volume manufacturers, shall certify at a minimum the specified percentage of its vehicle fleet to the evaporative emission standards in this table or the optional zero-evaporative emission standards in section 1976(b)(1)(E) according to the schedule set forth below. For purposes of this paragraph (a), each manufacturer's vehicle fleet consists of the total projected California sales of the manufacturer's gasoline-fueled, liquefied petroleum-fueled and alcohol-fueled passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty vehicles.

Model Year	***Minimum Percentage of Vehicles Certified to the Standards in §§ 1976(b)(1)(F) and (b)(1)(E)***
2004	40
2005	80
2006 and subsequent	100

A small volume manufacturer shall certify 100 percent of its 2006 and subsequent model vehicle fleet to the evaporative emission standards in the table or the optional zero-evaporative emission standards in section 1976(b)(1)(E).

All 2004 through 2005 model-year motor vehicles which are not subject to these standards or the standards in section 1976(b)(1)(E) pursuant to the phase-in schedule shall comply with the requirements of sections 1976(b)(1)(B) and (C).

(b) A manufacturer may use an "Alternative or Equivalent Phase-in Schedule" to comply with the phase-in requirements. An "Alternative Phase-in" is one that achieves at least equivalent emission reductions by the end of the last model year of the scheduled phase-in. Model-year emission reductions shall be calculated by multiplying the percent of vehicles (based on the manufacturer's projected California sales volume of the applicable vehicle fleet) meeting the new requirements per model year by the number of model years implemented prior to and including the last model year of the scheduled phase-in. The "cumulative total" is the summation of the model-year emission reductions (e.g., the three model-year 40/80/100 percent phase-in schedule would be calculated as: (40%*3 years) + (80%*2 years) + (100%*1 year) =380). The required cumulative total for the phase-in of these standards is 380 emission reductions. Any alternative phase-in that results in an equal or larger cumulative total than the required cumulative total by the end of the last model year of the scheduled phase-in shall be considered acceptable by the Executive Officer only if all vehicles subject to the phase-in comply with the respective requirements in the last model year of the required phase-in schedule. A manufacturer shall be allowed to include vehicles introduced before the first model year of the scheduled phase-in (e.g., in the previous example, 10 percent introduced one year before the scheduled phase-in begins would be calculated as: (10%*4 years)=40) and added to the cumulative total.

(c) These evaporative emission standards do not apply to zero-emission vehicles.

[4] In-use compliance whole vehicle testing shall not begin until the motor vehicle is at least one year from the production date and has accumulated a minimum of 10,000 miles. For vehicles introduced prior to the 2007 model year, in-use compliance standards of 1.75 times the "Three-Day Diurnal + Hot-Soak" and "Two-Day Diurnal + Hot-Soak" gram per test standards shall apply for only the first three model years of an evaporative family certified to a new standard.

(G) For 2015 and subsequent model motor vehicles, the following evaporative emission requirements apply:

1. A manufacturer must certify all vehicles subject to this section to the emission standards specified in either Option 1 or Option 2 below.

a. *Option 1.* The evaporative emissions from 2015 and subsequent model motor vehicles, tested in accordance with the test procedure sequence described in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," incorporated by reference in section 1976(c), shall not exceed:

Vehicle Type	***Hydrocarbon[1] Emission Standards[2]***		
	Running Loss (grams per mile)	***Three-Day Diurnal + Hot Soak and Two-Day Diurnal + Hot Soak***	
		Whole Vehicle (grams per test)	***Fuel Only[3] (grams per test)***
Passenger cars	0.05	0.350	0.0
Light-duty trucks 6,000 lbs. GVWR and under	0.05	0.500	0.0
Light-duty trucks 6,001-8,500 lbs. GVWR	0.05	0.750	0.0
Medium-duty passenger vehicles	0.05	0.750	0.0
Medium-duty vehicles (8,501-14,000 lbs. GVWR)	0.05	0.750	0.0
Heavy-duty vehicles (over 14,000 lbs. GVWR)	0.05	0.750	0.0

[1] Organic Material Hydrocarbon Equivalent for alcohol-fueled vehicles.

[2] For all vehicles certified to these standards, the "useful life" shall be 15 years or 150,000 miles, whichever occurs first. Approval of vehicles that are not exhaust emission tested using a chassis dynamometer pursuant to section 1961, title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

[3] In lieu of demonstrating compliance with the fuel-only emission standard (0.0 grams per test) over the three-day and two-day diurnal plus hot soak tests, a manufacturer may, with advance Executive Officer approval, demonstrate compliance through an alternate test plan.

b. *Option 2.* The evaporative emissions from 2015 and subsequent model motor vehicles, tested in accordance with the test procedure sequence described in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," incorporated by reference in section 1976(c), shall not exceed:

Vehicle Type	***Hydrocarbon[1] Emission Standards[2]***		
	Running Loss (grams per mile)	***Highest Whole Vehicle Diurnal + Hot Soak[3][4][5] (grams per test)***	***Canister Bleed[6] (grams per test)***
Passenger cars; and Light-duty trucks 6,000 lbs. GVWR and under, and 0-3,750 lbs. LVW	0.05	0.300	0.020
Light-duty trucks 6,000 lbs. GVWR and under, and 3,751-5,750 lbs. LVW	0.05	0.400	0.020
Light-duty trucks 6,001-8,500 lbs. GVWR; and Medium-duty passenger vehicles	0.05	0.500	0.020
Medium-duty vehicles (8,501-14,000 lbs. GVWR); and Heavy-duty vehicles (over 14,000 lbs. GVWR)	0.05	0.600	0.030

[1] Organic Material Hydrocarbon Equivalent for alcohol-fueled vehicles.

[2] Except as provided below, for all vehicles certified to these standards, the "useful life" shall be 15 years or 150,000 miles, whichever occurs first. For 2016 and previous model vehicles, 2017 and previous model vehicles >6,000 lbs. GVWR, and 2021 and previous model vehicles certified by a small volume manufacturer, the canister bleed standards are certification standards only. Manufacturers are not required to establish deterioration factors for canister bleed emissions. Approval of vehicles that are not exhaust emission tested using a chassis dynamometer pursuant to section 1961, title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant.

[3] The manufacturer shall determine compliance by selecting the highest whole vehicle diurnal plus hot soak emission value of the Three-Day Diurnal Plus Hot Soak Test and of the Two-Day Diurnal Plus Hot Soak Test.

[4] *Fleet-Average Option for the Highest Whole Vehicle Diurnal Plus Hot Soak Emission Standard Within Each Emission Standard Category.* A manufacturer may optionally comply with the highest whole vehicle diurnal plus hot soak emission standards by using fleet-average hydrocarbon emission values. To participate, a manufacturer must utilize the fleet-average option for all of its emission standard categories and calculate a separate fleet-average hydrocarbon emission value for each emission standard category. The emission standard categories are as follows: (1) passenger cars and light-duty trucks 6,000 pounds GVWR and under, and 0-3,750 pounds LVW; (2) light-duty trucks 6,000 pounds GVWR and under, and 3,751-5,750 pounds LVW; (3) light-duty trucks 6,001-8,500 pounds GVWR and medium-duty passenger vehicles; and (4) medium-duty and heavy-duty vehicles. The fleet-average hydrocarbon emission value for each emission standard category shall be calculated as follows:

$$\frac{\sum_{i=1}^{n}[(\text{number of vehicles in the evaporative family})_i \times (\text{family emission limit})_i]}{\sum_{i=1}^{n}(\text{number of vehicles in the evaporative family})_i}$$

where "n" = a manufacturer's total number of Option 2 certification evaporative families within an emission standard category for a given model year;

"number of vehicles in the evaporative family" = the number of vehicles produced and delivered for sale in California in the evaporative family;

"family emission limit" = the numerical value selected by the manufacturer for the evaporative family that serves as the emission standard for the evaporative family with respect to all testing, instead of the emission standard specified in this section 1976.0.1 (b)(1)(G)1.b. The family emission limit shall not exceed 0.500 grams per test for passenger cars; 0.650 grams per test for light duty trucks 6,000 pounds GVWR and under; 0.900 grams per test for light-duty trucks 6,001-8,500 pounds GVWR; and 1.000 grams for medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles. In addition, the family emission limit shall be set in increments of 0.025 grams per test.

[5] *Calculation of Hydrocarbon Credits or Debits for the Fleet-Average Option.*

(1) *Calculation of Hydrocarbon Credits or Debits.* For each emission standard category in the model year, a manufacturer shall calculate the hydrocarbon credits or debits, as follows:

[(Applicable Hydrocarbon Emission Standard for the Emission Standard Category) -- (Manufacturer's Fleet-Average Hydrocarbon Emission Value for the Emission Standard Category)] X (Total Number of Affected Vehicles)

where "Total Number of Affected Vehicles" = the total number of vehicles in the evaporative families participating in the fleet-average option, which are produced and delivered for sale in California, for the emission standard category of the given model year.

A negative number constitutes hydrocarbon debits, and a positive number constitutes hydrocarbon credits accrued by the manufacturer for the given model year. Hydrocarbon credits earned in a given model year shall retain full value through the fifth model year after they are earned. At the beginning of the sixth model year, the hydrocarbon credits will have no value.

(2) *Procedure for Offsetting Hydrocarbon Debits.* A manufacturer shall offset hydrocarbon debits with hydrocarbon credits for each emission standard category within three model years after the debits have been incurred. If total hydrocarbon debits are not equalized within three model years after they have been incurred, the manufacturer shall be subject to the Health and Safety Code section 43211 civil penalties applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the hydrocarbon debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code section 43211, the number of vehicles not meeting the state board's emission standards shall be determined by dividing the total amount of hydrocarbon debits for the model year in the emission standard category by the applicable hydrocarbon emission standard for the model year in which the debits were first incurred.

Additionally, to equalize the hydrocarbon debits that remain at the end of the three model year offset period: (1) hydrocarbon credits may be exchanged between passenger cars and light-duty trucks 6,000 pounds GVWR and under and 0-3,750 pounds LVW, and light-duty trucks 6,000 pounds GVWR and under and 3,751-5,750 pounds LVW and (2) hydrocarbon credits may be exchanged between light-duty trucks 6,001-8,500 pounds GVWR and medium-duty passenger vehicles, and medium-duty vehicles and heavy-duty vehicles.

[6] *Vehicle Canister Bleed Emission.* Compliance with the canister bleed emission standard shall be determined based on the Bleed Emission Test Procedure described in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," incorporated by reference in section 1976(c), and demonstrated on a stabilized canister system. Vehicles with a non-integrated refueling canister-only system are exempt from the canister bleed emission standard.

2. *Phase-In Schedule.* For each model year, a manufacturer shall certify, at a minimum, the specified percentage of its vehicle fleet to the evaporative emission standards set forth in section 1976(b)(1)(G)1.a. or section 1976(b)(1)(G)1.b., according to the schedule set forth below. For the purpose of this section 1976(b)(1)(G)2., the manufacturer's vehicle fleet consists of the vehicles produced and delivered for sale by the manufacturer in California that are subject to the emission standards in section 1976(b)(1)(G)1. All 2015 through 2022 model motor vehicles that are not subject to these standards pursuant to the phase-in schedule shall comply with the requirements for 2004 through 2014 model motor vehicles, as described in section 1976(b)(1)(F), or the optional zero-fuel evaporative emission standards for 2001 through 2014 model motor vehicles, as described in section 1976(b)(1)(E).

Model Years 2015, 2016, and 2017	***Minimum Percentage of Vehicle Fleet[1][2] Average of vehicles certified to section 1976(b)(1)(E) in model years 2012, 2013, and 2014[3][4]***
2018 and 2019	60
2020 and 2021	80
2022 and subsequent	100

[1] For the 2018 through 2022 model years only, a manufacturer may use an alternate phase-in schedule to comply with the phase-in requirements. An alternate phase-in schedule must achieve equivalent compliance volume by the end of the last model year of the scheduled phase-in (2022). The compliance volume is the number calculated by multiplying the percent of vehicles (based on the vehicles produced and delivered for sale by the manufacturer in California) meeting the new requirements in each model year by the number of years implemented prior to and including the last model year of the scheduled phase-in, then summing these yearly results to determine a cumulative total. The cumulative total of the five year (60/60/80/80/100) scheduled phase-in set forth above is calculated as follows: (60*5 years) + (60*4 years) + (80*3 years) + (80*2 years) + (100*1 year) = 1040. Accordingly, the required cumulative total for any alternate phase-in schedule of these emission standards is 1040. The Executive Officer shall consider acceptable any alternate phase-in schedule that results in an equal or larger cumulative total by the end of the last model year of the scheduled phase-in (2022).

[2] Small volume manufacturers are not required to comply with the phase-in schedule set forth in this table. Instead, they shall certify 100 percent of their 2022 and subsequent model year vehicle fleet to the evaporative emission standards set forth in section 1976(b)(1)(G)1.a. or section 1976(b)(1)(G)1.b.

[3] The percentage of vehicle fleet averaged across the 2015, 2016, and 2017 model years shall be used to determine compliance with this requirement.

[4] The minimum percentage required in the 2015, 2016, and 2017 model years is determined by averaging the percentage of vehicles certified to the emission standards in section 1976(b)(1)(E) in each of the manufacturer's 2012, 2013, and 2014 model year vehicle fleets. For the purpose of calculating this average, a manufacturer shall use the percentage of vehicles produced and delivered for sale in California for the 2012, 2013, and 2014 model years. A manufacturer may calculate this average percentage using the projected sales for these model years in lieu of actual sales.

3. *Carry-Over of 2014 Model-Year Evaporative Families Certified to the Zero-Fuel Evaporative Emission Standards.* A manufacturer may carry over 2014 model motor vehicles certified to the zero-fuel (0.0 grams per test) evaporative emission standards set forth in section 1976(b)(1)(E) through the 2019 model year and be considered compliant with the requirements of section 1976(b)(1)(G)1. For all motor vehicles that are certified via this carry-over provision, the emission standards set forth in section 1976(b)(1)(E) shall apply when determining in-use compliance throughout the vehicle's useful life. If the manufacturer chooses to participate in the fleet-average option for the highest whole vehicle diurnal plus hot soak emission standard, the following family emission limits are assigned to these evaporative families for the calculation of the manufacturer's fleet-average hydrocarbon emission value.

Vehicle Type	***Highest Whole Vehicle Diurnal + Hot Soak (grams per test)***
Passenger cars	0.300
Light-duty trucks 6,000 lbs. GVWR and under, and 0-3,750 lbs. LVW	0.300
Light-duty trucks 6,000 lbs. GVWR and under, and 3,751-5,750 lbs. LVW	0.400
Light-duty trucks 6,001-8,500 lbs. GVWR	0.500

4. *Pooling Provision.* The following pooling provision applies to the fleet-average option for the Highest Whole Vehicle Diurnal Plus Hot Soak Emission Standard in section 1976(b)(1)(G)1.b. and to the phase-in requirements in section 1976(b)(1)(G)2.

   a. For the fleet-average option set forth in section 1976(b)(1)(G)1.b., a manufacturer must demonstrate compliance, for each model year, based on one of two options applicable throughout the model year, either: Pooling Option 1: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section 1976(b)(1)(G)1.b., and are produced and delivered for sale in California; or

Pooling Option 2: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section 1976(b)(1)(G)1.b., and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's evaporative emission standards set forth in section 1976(b)(1)(G)1. for that model year pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

b. For the phase-in requirements in section 1976(b)(1)(G)2., a manufacturer must demonstrate compliance, for each model year, based on one of two options applicable throughout the model year, either:

Pooling Option 1: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section 1976(b)(1)(G)1., and are produced and delivered for sale in California; or

Pooling Option 2: the total number of passenger cars, light-duty trucks, medium-duty passenger vehicles, medium-duty vehicles, and heavy-duty vehicles that are certified to the California evaporative emission standards in section 1976(b)(1)(G)1., and are produced and delivered for sale in California, the District of Columbia, and all states that have adopted California's evaporative emission standards set forth in section 1976(b)(1)(G)1. for that model year pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

c. A manufacturer that selects Pooling Option 2 must notify the Executive Officer of that selection in writing before the start of the applicable model year or must comply with Pooling Option 1. Once a manufacturer has selected Pooling Option 2, that selection applies unless the manufacturer selects Option 1 and notifies the Executive Officer of that selection in writing before the start of the applicable model year.

d. When a manufacturer is demonstrating compliance using Pooling Option 2 for a given model year, the term "in California" as used in section 1976(b)(1)(G) means California, the District of Columbia, and all states that have adopted California's evaporative emission standards for that model year pursuant to Section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

e. A manufacturer that selects Pooling Option 2 must provide to the Executive Officer separate values for the number of vehicles in each evaporative family produced and delivered for sale in the District of Columbia and for each individual state within the average.

5. Optional Certification for 2014 Model Motor Vehicles. A manufacturer may optionally certify its 2014 model motor vehicles to the evaporative emission standards set forth in section 1976(b)(1)(G)1.

6. *Effective leak diameter standard and procedure.* Manufacturers shall demonstrate that for 2018 and subsequent model vehicles ≤ 14,000 lbs. GVWR certifying to the evaporative emission standards set forth in 1976(b)(1)(G), fuel systems do not exceed an effective leak diameter of 0.02 inches when tested in accordance with the test procedure sequence described in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," incorporated by reference in section 1976(c). This requirement does not apply to 2021 and previous model vehicles certified by a small volume manufacturer. For vehicles with fuel tanks exceeding 25 gallons nominal fuel tank capacity, manufacturers may request approval from the Executive Officer for a leak standard greater than 0.020 inches, up to a maximum value of 0.040 inches.

7. *Auxiliary engines and fuel systems. Auxiliary engines and fuel systems.* For 2017 and subsequent model vehicles ≤6,000 lbs. GVWR equipped with an auxiliary engine and 2018 and subsequent model vehicles >6,000 lbs. GVWR equipped with an auxiliary engine, manufacturers shall demonstrate compliance in accordance with the provisions set forth in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," incorporated by reference in section 1976(c). These requirements do not apply to 2021 and previous model vehicles certified by a small volume manufacturer.

(b) (2) Evaporative emissions for gasoline-fueled motorcycles subject to exhaust emission standards under this article shall not exceed:

Motorcycle Class	***Model Year***	***Hydrocarbons (grams per test)***
Class I and II (50-279cc)	1983 and 1984	6.0
	1985 and subsequent	2.0
Class III (280cc and larger)	1984 and 1985	6.0
	1986 and subsequent	2.0
Class III (280cc and larger) (Optional Standard for Small-Volume Motorcycle Manufacturers)	1986-1988	6.0

(c) The test procedures for determining compliance with the standards in subsection (b) above applicable to 1978 through 2000 model year vehicles are set forth in "California Evaporative Emission Standards and Test Procedures for 1978-2000 Model Motor Vehicles," adopted by the state board on April 16, 1975, as last amended August 5, 1999, which is incorporated herein by reference. The test procedures for determining compliance with standards applicable to 2001 and subsequent model year vehicles are set forth in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," adopted by the state board on August 5, 1999, and as last amended December 6, 2012, which is incorporated herein by reference.

(d) Motorcycle engine families certified to 0.2 grams per test or more below the applicable standards shall be exempted from the state board's "Specifications for Fill Pipes and Openings of Motor Vehicle Fuel Tanks" pursuant to section 2235, Title 13, California Code of Regulations.

(e) Small volume motorcycle manufacturers electing to certify 1986, 1987, or 1988 model-year Class III motorcycles in accordance with the optional 6.0 grams per test evaporative emission standard shall submit, with the certification application, a list of the motorcycle models for which it intends to seek California certification and estimated sales data for such models. In addition, each such manufacturer shall, on or before July 1 of each year in which it certifies motorcycles under the optional standard, submit a report describing its efforts and progress toward meeting the more stringent evaporative emission standards. The report shall also contain a description of the manufacturer's current hydrocarbon evaporative emission control development status, along with supporting test data, and shall summarize future planned development work.

(f) Definitions Specific to this Section.

(1) For purposes of this section, "small volume motorcycle manufacturer" means a manufacturer which sells less than 5,000 new motorcycles per year in California.

(2) For the purposes of this section, "ultra-small volume manufacturer" means any vehicle manufacturer with California sales less than or equal to 300 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive model years, and "small volume manufacturer" means, for 1978 through 2000 model years, any vehicle manufacturer with California sales less than or equal to 3000 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive model years. For 2001 and subsequent model motor vehicles, "small volume manufacturer" has the meaning set forth in section 1900(a).

(3) "Non-integrated refueling emission control system" is defined in 40 Code of Federal Regulations § 86.1803-01.

(4) "Non-integrated refueling canister-only system" means a subclass of a non-integrated refueling emission control system, where other non-refueling related evaporative emissions from the vehicle are stored in the fuel tank, instead of in a vapor storage unit(s).

NOTE: Authority cited: Sections 39500, 39600, 39601, 39667, 43013, 43018, 43101, 43104, 43105, 43106 and 43107, Health and Safety Code. Reference: Sections 39002, 39003, 39500, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204 and 43205, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 1978.0.1 of title 13, California Code of Regulations, to read as follows:

§ 1978.0.1 Standards and Test Procedures for Vehicle Refueling Emissions. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) (1) Vehicle refueling emissions for 1998 and subsequent model gasoline-fueled, alcohol-fueled, diesel-fueled, liquefied petroleum gas-fueled, fuel-flexible, and hybrid electric passenger cars, light-duty trucks, and medium-duty vehicles with a gross vehicle weight rating less than 8501 pounds, 2015 and subsequent model gasoline-fueled, alcohol-fueled, diesel-fueled, liquefied petroleum gas-fueled, fuel-flexible, and hybrid electric medium-duty vehicles with a gross vehicle weight rating between 8,501 and 14,000 pounds, and 2022 and subsequent model gasoline-fueled, alcohol-fueled, diesel-fueled, liquefied petroleum gas-fueled, fuel-flexible, and hybrid electric heavy-duty vehicles with a gross vehicle weight rating greater than 14,000 pounds shall not exceed the following standards. Natural gas-fueled vehicles are exempt from meeting these refueling standards, but the refueling receptacles on natural gas-fueled vehicles must comply with the receptacle provisions of the American National Standards Institute Standard for Compressed Natural Gas Vehicle Fueling Connection Devices, ANSI NGV1-2006, which is incorporated herein by reference. The standards apply equally to certification and in-use vehicles.

Hydrocarbons (for gasoline-fueled, diesel-fueled, and hybrid electric vehicles): 0.20 grams per gallon of fuel dispensed.

Organic Material Hydrocarbon Equivalent (for alcohol-fueled, fuel-flexible, and hybrid electric vehicles): 0.20 grams per gallon of fuel dispensed. Hydrocarbons (for liquefied petroleum gas-fueled vehicles): 0.15 gram per gallon of fuel dispensed.

(2) Vehicles powered by diesel fuel are not required to conduct testing to demonstrate compliance with the refueling emission standards set forth above, provided that:

(A) The manufacturer can attest that the vehicle meets the 0.20 grams/gallon refueling emission standard; and

(B) The certification requirement described in paragraph (A) is provided in writing and applies for the full useful life of the vehicle, as defined in section 2112.

In addition to the above provisions, the ARB reserves the authority to require testing to enforce compliance and to prevent noncompliance with the refueling emission standard.

Vehicles certified to the refueling emission standard under this provision shall not be counted in the phase-in sales percentage compliance determinations.

(3) Through model year 2014, the manufacturer shall adhere to the following phase-in schedule, as determined by projected vehicle sales throughout the United States, with the exception of small volume manufacturers.

ORVR Model Year Phase-in Schedule			
Class of Vehicle	***40% Fleet***	80% Fleet	100% Fleet
Passenger Cars	1998	1999	2000
Light-Duty Trucks 0-6,000 lbs. GVWR	2001	2002	2003
Light-Duty Trucks/ Medium-Duty Vehicles (6,001-8,500 lbs. GVWR)	2004	2005	2006

(A) Prior to the 2001 model year, small volume manufacturers are defined for purposes of this section as any vehicle manufacturer with California actual sales less than or equal to 3000 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive years.

(B) Small volume manufacturers of passenger cars, as defined in subsection (a)(3)(A), are exempt from the implementation schedule in subsection (a)(3) for model year 1998 and 1999. For small volume manufacturers of passenger cars, the standards of subsection (a)(1), and the associated test procedures, shall not apply until model year 2000, when 100 percent compliance with the standards of this section is required. Small volume manufacturers of light-duty trucks and medium-duty vehicles are not exempt from the implementation schedule in subsection (a)(3).

(4) All vehicles subject to the refueling emission standards in section 1978(a)(1) shall demonstrate compliance except incomplete vehicles that are certified as incomplete vehicles for the purposes of evaporative emissions testing as set forth in the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," incorporated by reference in section 1976.

(5) *Carry-Over of 2014 Model Year Families:* 2014 model year motor vehicles certified to the refueling emission standards of section 1978(a)(1) may carry over to the 2015 through 2018 model years and be considered compliant.

(b) The test procedures for determining compliance with standards applicable to 1998 through 2000 gasoline, alcohol, diesel, and hybrid electric passenger cars, light-duty trucks, and medium-duty vehicles are set forth in the "California Refueling Emission Standards and Test Procedures for 1998-2000 Model Year Motor Vehicles," as amended August 5, 1999, which is incorporated herein by reference. The test procedures for determining compliance with standards applicable to 2001 and subsequent gasoline, alcohol, diesel, and hybrid electric passenger cars, light-duty trucks, and medium-duty vehicles are set forth in the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles," adopted August 5, 1999, and last amended March 22, 2012, which is incorporated herein by reference.

NOTE: Authority cited: Sections 39500, 39600, 39601, 39667, 43013, 43018, 43101, 43104, 43105 and 43106, Health and Safety Code. Reference: Sections 39002, 39003, 39500, 39667, 43000, 43009.5, 43013, 43018, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204 and 43205 Health and Safety Code.

10/2/25
PER AGENCY
REQUEST
LSM

Title 13, California Code of Regulations

Adopt Section 2037.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2037.0.1 Defects Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Applicability.

This section shall apply to 1990 and subsequent model passenger cars, light-duty trucks, medium-duty vehicles, and motor vehicle engines used in such vehicles. This section shall apply to medium-duty vehicles certified to the GHG emission standards of section 95663, title 17, for GHG emission control components, as set forth in 40 CFR 1037.120, as adopted November 14, 2011. The warranty period shall begin on the date the vehicle is delivered to an ultimate purchaser, or if the vehicle is first placed in service as a "demonstrator" or "company" car prior to delivery, on the date it is first placed in service.

(b) General Emissions Warranty Coverage.

The manufacturer of each motor vehicle or motor vehicle engine shall warrant to the ultimate purchaser and each subsequent purchaser that the vehicle or engine is:

(1) Designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board pursuant to its authority in chapters 1 and 2, part 5, division 26 of the Health and Safety Code; and

(2) Free from defects in materials and workmanship which cause the failure of a warranted part to be identical in all material respects to the part as described in the vehicle or engine manufacturer's application for certification, including any defect in materials or workmanship which would cause the vehicle's on-board diagnostic malfunction indicator light to illuminate, for a period of three years or 50,000 miles, whichever first occurs; and

(3) Free from defects in materials and workmanship which cause the failure of a warranted part described in section (c) below for seven years or 70,000 miles, whichever first occurs.

(c) "High-Priced" Warranted Parts.

(1) Each manufacturer shall identify in its application for certification the "high-priced" warranted parts which are:

(A) For 1990 through 2007 model year vehicles: [i] included on the Board's "Emissions Warranty Parts List" as last amended February 22, 1985, incorporated herein by reference, and; [ii] have an individual replacement cost at the time of certification exceeding the cost limit defined in section (c)(3);

(B) For 2008 and subsequent model year vehicles: [i] subject to coverage as a warranted part in section (b)(2) above, and; [ii] have an individual replacement cost at the time of certification exceeding the cost limit defined in section (c)(3).

(2) The replacement cost shall be the retail cost to a vehicle owner and include the cost of the part, labor, and standard diagnosis. The costs shall be those of the highest-cost metropolitan area of California.

(3) The cost limit shall be calculated using the following equation:

$\text{Cost limit}_n = \$300 \times (\text{CPI}_{n-2} / 118.3)$ where:

Cost limit_n is the cost limit for the applicable model year of the vehicle rounded to the nearest ten dollars.

n is the model year of the new vehicles.

n-2 is the calendar year two years prior to the model year of the new vehicles.

CPI is the annual average nationwide urban consumer price index published by the United States Bureau of Labor Statistics.

(4) The cost limit shall be revised annually by the Executive Officer. The highest-cost metropolitan area in California shall be identified by the Executive Officer for use in this section. If a manufacturer seeks certification of a vehicle before the applicable annual average CPI is available, the cost limit shall be calculated using the average of the monthly nationwide urban CPI figures for the most recent twelve month period for which figures have been published by the United States Bureau of Labor Statistics.

(5) Each manufacturer shall submit to the Executive Officer the documentation used to identify the "high-priced" warranted parts required in this section. The documentation shall include the estimated retail parts costs, labor rates in dollars per hour, and the labor hours necessary to diagnose and replace the parts. The documentation is not required for vehicles certified before January 24, 1991.

(6) The Executive Officer may reject or require modification of the manufacturer's list of "high-priced" warranted parts to ensure that such list includes all emission-related parts whose replacement cost exceeds the cost limit defined in section (c)(3).

(d) Subject to the conditions and exclusions of section (i), the warranty on emission-related parts shall be interpreted as follows:

(1) Any warranted part which is not scheduled for replacement as required maintenance in the written instructions required by section (e) shall be warranted for the applicable warranty period defined in section (b)(2) or (3). If any such part fails during the period of warranty coverage, it shall be repaired or replaced by the vehicle or engine manufacturer according to section (d)(4) below. Any such part repaired or replaced under the warranty shall be warranted for the remaining warranty period.

(2) Any warranted part which is scheduled only for regular inspection in the written instructions required by section (e) shall be warranted for the applicable warranty period defined in section (b)(2) or (3). A statement in such written instructions to the effect of "repair or replace as necessary" shall not reduce the period of warranty coverage. Any such part required or replaced under warranty shall be warranted for the remaining warranty period.

(3) Any warranted part which is scheduled for replacement as required maintenance in the written instructions required by section (e) shall be warranted for the period of time or mileage, whichever first occurs, prior to the first scheduled replacement point for that part. If the part fails prior to the first scheduled replacement, the part shall be repaired or replaced by the vehicle or engine manufacturer according to section (d)(4) below. Any such part required or replaced under warranty shall be warranted for the remainder of the period prior to the first scheduled replacement point for the part.

(4) Repair or replacement of any warranted part under the warranty provisions of this article shall be performed at no charge to the vehicle or engine owner at a warranty station, except in the case of an emergency when a warranted part or a warranty station is not reasonably available to the vehicle or engine owner. In an emergency, repairs may be performed at any available service establishment, or by the owner, using any replacement part. The manufacturer shall reimburse the owner for his or her expenses including diagnostic charges for such emergency repair or replacement, not to exceed the manufacturer's suggested retail price for all warranted parts replaced and labor charges based on the manufacturer's recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate. A vehicle or engine owner may reasonably be required to keep receipts and failed parts in order to receive compensation for warranted repairs reimbursable due to an emergency, provided the manufacturer's written instructions required by section (e) advise the owner of this obligation.

(5) Notwithstanding the provisions of subsection (d)(4) above, warranty services or repairs shall be provided at all of a manufacturer's dealerships which are franchised to service the subject vehicles or engines.

(6) The vehicle or engine owner shall not be charged for diagnostic labor which leads to the determination that a warranted part is defective, provided that such diagnostic work is performed at a warranty station.

(7) The vehicle or engine manufacturer shall be liable for damages to other vehicle components proximately caused by a failure under warranty of any warranted part.

(8) Throughout the vehicle or engine's warranty period defined in section (b)(2) and (b)(3), the vehicle or engine manufacturer shall maintain a supply of warranted parts sufficient to meet the expected demand for such parts. The lack of availability of such parts or the incompleteness of repairs within a reasonable time period, not to exceed 30 days from the time the vehicle or engine is initially presented to the warranty station for repair, shall constitute an emergency for purposes of section (d)(4) above.

(9) Any replacement part may be used in the performance of any maintenance or repairs. Any replacement part designated by a manufacturer may be used in warranty repairs provided without charge to the vehicle owner. Such use shall not reduce the warranty obligations of the vehicle or engine manufacturer, except that the vehicle or engine manufacturer shall not be liable under this article for repair or replacement of any replacement part which is not a warranted part (except as provided under section (d)(7) above).

(10) Any add-on or modified part exempted by the Air Resources Board from the prohibitions of Vehicle Code section 27156 may be used on a vehicle or engine. Such use, in and of itself, shall not be grounds for disallowing a warranty claim made in accordance with this article. The vehicle or engine manufacturer shall not be liable under this article to warrant failures of warranted parts caused by the use of such an add-on or modified part.

(11) The Executive Officer may request and, in such case, the vehicle or engine manufacture shall provide, any documents which describe the manufacturer's warranty procedures or policies.

(e) Each manufacturer shall furnish with each new vehicle or engine, written instructions for the maintenance and use of the vehicle or engine by the owner, and the instructions shall be consistent with this article and applicable regulations in article 2 of this subchapter.

(f) Each manufacturer shall furnish with each new vehicle or engine a list of the "high-priced" warranted parts established by section (c).

(g) Prior to the 2001 model year, each manufacturer shall submit the documents required by sections (c)(5), (e), and (f) with the manufacturer's preliminary application for new vehicle or engine certification for approval by the Executive Officer. For 2001 and subsequent model years, each manufacturer shall submit the documents required by section (c)(5), (e), and (f) with the Part 2 Application for Certification pursuant to the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," incorporated by reference in title 13, CCR section 1961(d), or the "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," incorporated by reference in title 13, CCR section 1961.2(d), as applicable. The Executive Officer may reject or require modification of any of the documents required by sections (c), (e), and (f) for, among other reasons, incompleteness and lack of clarity. Approval by the Executive Officer of the documents required by sections (c), (e), and (f) shall be a condition of certification. The Executive Officer shall approve or disapprove the documents required by sections (c), (e), and (f) within 90 days of the date such documents are received from the manufacturer. Any disapproval shall be accompanied by a statement of the reasons thereof. In the event of disapproval, the manufacturer may petition the Board to review the decision of the Executive Officer.

(h) *Vehicle Inspection Program.*

(1) This section applies to 1990 and subsequent model passenger cars, light-duty trucks, and medium-duty vehicles which fail to pass a smog check inspection pursuant to Health and Safety Code section 44012 after the warranty period of three years or 50,000 miles, whichever occurs first, has expired, but before the warranty period of seven years or 70,000 miles, whichever occurs first, has expired. The provisions of this section shall be contained in the warranty statement required pursuant to title 13, CCR section 2039.

(2) The owner of a vehicle which fails an inspection during the period described in section (h)(1) may choose to have the vehicle repaired at a warranty station.

(A) If the warranty station identifies that the inspection failure was caused by the failure or malfunction of a "high-priced" part defined in section (c), then the vehicle manufacturer shall be liable for expenses involved in detecting and correcting the part failure or malfunction, unless the warranty station demonstrates that the part failure or malfunction was caused by abuse, neglect, or improper maintenance as specified in section (i).

(B) If the warranty station demonstrates that the inspection failure was caused by one or more conditions excluded from warranty coverage pursuant to section (i), the vehicle owner shall be liable for all diagnostic and repair expenses. Such expenses shall not exceed the maximum repair costs permissible under the inspection program.

(C) If the warranty station determines that the inspection failure was caused by one or more defects covered under warranty pursuant to these regulations and in combination with one or more conditions excluded from warranty coverage pursuant to section (i), then the vehicle owner shall not be charged for the diagnostic and repair costs related to detecting and repairing the warrantable defects.

(3) In the alternative, the owner of a vehicle which fails the inspection may choose to have the vehicle repaired at other than a warranty station. If a warrantable defect is found, the vehicle owner may deliver the vehicle to a warranty station and have the defect corrected free of charge. The vehicle manufacturer shall not be liable for any expenses incurred at a service establishment not authorized to perform warranty repairs, except in the case of an emergency as defined in section (d)(4). If the vehicle owner chooses to have a warrantable defect repaired at other than a warranty station, the upper cost limit pursuant to Health and Safety Code section 44017 shall not apply to the repair.

(i) Exclusions.

The repair or replacement of any warranted part otherwise eligible for warranty coverage under sections (d) and (h) shall be excluded from such warranty coverage if the vehicle or engine manufacturer demonstrates that the vehicle or engine has been abused, neglected, or improperly maintained, and that such abuse, neglect, or improper maintenance was the direct cause of the need for the repair or replacement of the part.

Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600 and 39601, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 43106, 43204, 43205, 44004, 44010, 44011, 44012, 44015 and 44017, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 2038.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2038.0.1. Performance Warranty Requirements for 1990 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles, and Motor Vehicle Engines Used in Such Vehicles. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Applicability.

This section shall apply to 1990 and subsequent model passenger cars, light-duty trucks, and medium-duty vehicles, and motor vehicle engines used in such vehicles required to be inspected under any California statutorily authorized motor vehicle emissions inspection and maintenance program. The warranty period shall begin on the date the vehicle is delivered to an ultimate purchaser, or if the vehicle is first placed in service as a "demonstrator" or "company" car prior to delivery, on the date it is first placed in service.

(b) General Emissions Warranty Coverage.

The manufacturer of each passenger car, light-duty truck, and medium-duty vehicle shall warrant to the ultimate purchaser and each subsequent purchaser that the vehicle or engine:

(1) Is designed, built, and equipped so as to conform with all applicable regulations adopted by the Air Resources Board pursuant to its authority in chapters 1 and 2, part 5, division 26 of the Health and Safety Code; and

(2) Will, for a period of three years or 50,000 miles, whichever first occurs, pass an inspection established under section 44012 of the Health and Safety Code ("inspection").

(c) Written Instructions.

(1) Each vehicle or engine manufacturer shall furnish with each new vehicle or engine, written instructions for the required maintenance and use of this vehicle or engine by the vehicle owner (written instructions), and the written instructions shall be consistent with this article and applicable regulations in article 2 of this subchapter.

(2) Prior to the 2001 model year, each vehicle or engine manufacturer shall submit the documents required by section (c)(1) with the vehicle or engine manufacturer's preliminary application for new vehicle or engine certification for approval by the Executive Officer.

(3) For 2001 and subsequent model years, each vehicle or engine manufacturer shall submit the documents required by section (c)(1) with the Part 2 Application for Certification pursuant to the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2009 through 2016 Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," incorporated by reference in title 13, CCR section 1961(d), or the "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," incorporated by reference in title 13, CCR section 1961.2(d), as applicable.

(4) The Executive Officer may reject or require modification of written instructions for, among other reasons, incompleteness or lack of clarity. Approval by the Executive Officer of the written instructions shall be a condition of certification. The Executive Officer shall approve or disapprove the written instructions within 90 days of the date such documents are received from the vehicle or engine manufacturer. Any disapproval shall be accompanied by a statement of the reasons therefore. In the event of disapproval, the engine or vehicle manufacturer may petition the Board to review the decision of the Executive Officer.

(d) Proper Use and Maintenance.

(1) An emission performance warranty claim may be denied if the vehicle or engine manufacturer demonstrates that the vehicle or engine's failure of the inspection was directly caused by abuse, neglect, or improper maintenance as reflected by a failure to maintain or use the vehicle or engine in accordance with the written instructions.

(2) Except as provided in section (d)(5), a vehicle or engine manufacturer may deny an emission performance warranty claim on the basis of noncompliance with the written instructions only if:

(A) An owner is not able to comply with a request by a manufacturer for evidence pursuant to section (d)(4); or

(B) Notwithstanding the evidence presented pursuant to section (d)(4), the vehicle or engine manufacturer is able to prove that the vehicle failed an inspection because the vehicle was abused, the required maintenance and use was performed in a manner resulting in a component being improperly installed or a component or related parameter being adjusted substantially outside of the vehicle or engine manufacturer's specifications, or maintenance was performed on a vehicle which resulted in the removing or rendering inoperative of any component affecting the vehicle's emissions.

(3) When determining whether an owner has complied with the written instructions, a vehicle or engine manufacturer may require an owner to submit evidence of compliance only with those written instructions for which the vehicle or engine manufacturer has an objective reason for believing:

(A) Were not performed, and;

(B) If not performed, could be the cause of the particular vehicle's failed inspection.

(4) Evidence of compliance with a maintenance instruction may consist of:

(A) A maintenance log book which has been validated at the approximate time or mileage intervals specified in the written instructions by someone who regularly engages in the business of servicing automobiles for the relevant maintenance; or

(B) A repair order, sales receipt, or similar evidence showing that the vehicle has been submitted for scheduled maintenance at the approximate time or mileage intervals specified in the written instructions to someone who regularly engages in the business of servicing automobiles for the purpose of performing the relevant maintenance; or

(C) A statement by the vehicle owner that the maintenance was performed at the approximate time or mileage interval specified in the written instructions using proper replacement parts.

(5) In no case may a vehicle or engine manufacturer deny an emission performance warranty claim on the basis of:

(A) Warranty work or predelivery service performed by any facility authorized by the vehicle or engine manufacturer to perform such work or service; or

(B) Work performed in an emergency situation to rectify an unsafe condition, including an unsafe driveability condition, attributable to the vehicle or engine manufacturer, provided the vehicle owner has taken steps to put the vehicle back in a conforming condition in a timely manner; or

(C) Any cause attributable to the vehicle or engine manufacturer; or

(D) The use of any fuel which is commonly available in the geographical area in which the vehicle or engine is located, unless the written instructions specify that the use of that fuel would adversely affect the emission control devices and systems of the vehicle, and there is commonly available information for the vehicle owner to identify the proper fuel to be used.

(6) The vehicle owner may perform maintenance or have maintenance performed more frequently than required in the written instructions.

(7) Except as specified in section (d)(2)(B) above, failure of the vehicle or engine owner to ensure the performance of such scheduled maintenance or to keep maintenance records shall not, per se, be grounds for disallowing a warranty claim.

(e) Repair, adjustment, or replacement of any part under the warranty provisions of this article shall be performed at no charge to the vehicle or engine owner at a warranty station, except where a warranted part is not available to the vehicle or engine owner within a reasonable time (in no case more than 30 days) after the vehicle or engine is initially presented to the warranty station for repair. In case of such unavailability, repairs may be performed at any available service establishment, or by the owner, using any replacement part. The manufacturer shall reimburse the owner for his or her expenses including diagnostic charges for such repair or replacement, not to exceed the manufacturer's suggested retail price for all warranted parts replaced and labor charges based on the manufacturer's recommended time allowance for the warranty repair and the geographically appropriate hourly labor rate. A vehicle or engine owner may reasonably be required to keep receipts and failed parts in order to receive reimbursement due to such unavailability, provided the manufacturer's written instructions advise the owner of this obligation.

(f) The vehicle or engine manufacturer shall be liable for damages to other vehicle components proximately caused by a failure under warranty of any warranted part.

(g) Any replacement part may be used in the performance of any maintenance or repairs. Any replacement part designated by a vehicle or engine manufacturer may be used in warranty repairs provided without charge to the vehicle owner. Such use shall not reduce the warranty obligations of the vehicle or engine manufacturer, except that the vehicle or engine manufacturer shall not be liable under this article for repair or replacement of any replacement part which is not a warranted part (except as provided under section (d) above).

(h) Any add-on or modified part exempted by the Air Resources Board from the prohibitions of Vehicle Code section 27156 may be used on a vehicle or engine. Such use, in and of itself, shall not be grounds for disallowing a warranty claim made in accordance with this article. The vehicle or engine manufacturer shall not be liable under this article to warrant failures of warranted parts caused by the use of such an add-on or modified part.

(i) Warranty Claim Procedures.

(1) A warranty claim may be submitted by bringing a vehicle to any repair facility authorized by the vehicle or engine manufacturer to service that vehicle.

(2) The manufacturer of each vehicle or engine to which the warranty is applicable shall establish procedures as to the manner in which a claim under the emission performance warranty is to be processed. The procedures shall provide for a final decision and repair of a warrantable condition by the vehicle or engine manufacturer within a reasonable time, not to exceed 30 days from the time at which the vehicle is initially presented for repair, or unless a delay:

(A) is requested by the vehicle owner, or

(B) is caused by an event not attributable to the vehicle or engine manufacturer or the warranty station.

(3) Within the time period specified in section (i)(2), the manufacturer shall provide the owner, in writing, with an explanation as to why the claim is being denied.

(4) Failure to notify a vehicle owner that a warrantable condition does not exist within the required time period of section (i)(2), for reasons other than those provided for in sections (i)(2)(A) and (B), shall result in the vehicle or engine manufacturer being responsible for repairing the vehicle free of charge to the vehicle owner.

(5) The vehicle or engine manufacturer shall incur all costs associated with a determination that an emission performance warranty claim is valid.

(j) Warranty services or repairs shall be provided at all of a vehicle or engine manufacturer's dealerships which are franchised to service the subject vehicles or engines.

(k) The vehicle owner shall not be charged for diagnostic labor which leads to the determination of a warrantable condition provided that such diagnostic work is performed at a warranty station.

(l) Throughout the vehicle or engine's warranty period defined in section (b), the vehicle or engine manufacturer shall maintain a supply of warranted parts sufficient to meet the expected demand for such parts. The lack of availability of such parts or the incompleteness of the repairs within a reasonable time period, not to exceed 30 days from the time the vehicle or engine is initially presented to the warranty station for repair, shall constitute an unavailability of parts for purposes of section (e).

(m) The Executive Officer may request and, in such case, the vehicle or engine manufacturer shall provide, any documents which describe the vehicle or engine manufacturer's warranty procedures or policies.

Note: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 43106, 43204, 43205, 44004, 44010, 44011, 44012, 44014 and 44015, Health and Safety Code.

Title 13, California Code of Regulations

Adopt Section 2112.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2112.0.1 Definitions. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) "Capture rate" means the percentage of in-use vehicles subject to recall which must be corrected to bring the class or category of vehicles into compliance. The number of vehicles subject to recall shall be based on the actual number of vehicles in use as verified by the Department of Motor Vehicles registration records, or vehicle or engine registration records compiled and prepared by R. L. Polk and Company or a comparable source at the time a recall is initiated.

(b) "Correlation factor" means a pollutant-specific multiplicative factor calculated by a manufacturer for an engine family or test group which establishes a relationship between chassis exhaust emission data, as determined from the test procedures specified in section 1960.1, 1961, or 1961.2, Title 13, California Code of Regulations, and engine exhaust emission data, as determined from the test procedures specified in section 1956.8, Title 13, California Code of Regulations.

(c) "Days", when computing any period of time, means normal working days on which a manufacturer is open for business, unless otherwise noted.

(d) "Emission-Related Failure" means a failure of a device, system, or assembly described in the approved application for certification which affects any parameter, specification, or component enumerated in Appendix A to this subchapter 2.5 or listed in the Emission Warranty Parts List pursuant to section 2036, Title 13, California Code of Regulations, except for failures of devices, systems and assemblies which the Executive Officer has deleted from the manufacturer's list of warranted parts pursuant to section 2036(f), Title 13, California Code of Regulations.

(e) "Emission Warranty Claim" means an adjustment, inspection, repair or replacement of a specific emission-related component for which the vehicle or engine manufacturer is invoiced or solicited by a repairing agent for compensation pursuant to warranty provisions, regardless of whether compensation is actually provided.

(f) "Executive Officer" means the Executive Officer of the Air Resources Board or his or her authorized representative.

(g) "Influenced Emission Recall" means an inspection, repair, adjustment, or modification program initiated and conducted by a manufacturer or its agent or representative as a result of in-use enforcement testing or other evidence of noncompliance provided or required by the Board, to remedy any nonconformity for which direct notification of vehicle or engine owners is necessary.

(h) "Nonconformity" or "noncompliance" exists whenever:

(1) a substantial number of a class or category of vehicles or engines, although properly maintained and used, experience a failure of the same emission-related component within their useful lives which, if uncorrected, results in the vehicles' or engines' failure to meet the applicable standards; or

(2) a class or category of vehicles or engines within their useful lives, although properly maintained and used, on average does not comply with the emission standards prescribed under section 43101 or the Health and Safety Code which are applicable to the model-year of such vehicles or engines.

(i) "Ordered Emission Recall" means an inspection, repair, adjustment, or modification program required by the Board and conducted by the manufacturer or its agent or representative to remedy any nonconformity for which direct notification of vehicle or engine owners is necessary.

(j) "Quarterly reports" refer to the following calendar periods: January 1-March 31, April 1-June 30, July 1-September 30, October 1-December 31.

(k) "Ultimate purchaser" has the same meaning as defined in section 39055.5 of the Health and Safety Code.

(l) "Useful life" means, for the purposes of this article:

(1) For Class I motorcycles and motorcycle engines (50 to 169 cc or 3.1 to 10.4 cu. in.), a period of use of five years or 12,000 kilometers (7,456 miles), whichever first occurs.

(2) For Class II motorcycles and motorcycle engines (170 to 279 cc or 10.4 to 17.1 cu. in.), a period of use of five years or 18,000 kilometers (11,185 miles), whichever first occurs.

(3) For Class III motorcycles and motorcycle engines (280 cc and larger or 17.1 cu. in. and larger), a period of use of five years or 30,000 kilometers (18,641 miles), whichever first occurs.

(4) For 1982 through 1984 model-year diesel heavy-duty vehicles (except medium-duty vehicles), and 1982 through 1984 model-year motor vehicle engines used in such vehicles, a period of use of five years, 100,000 miles, or 3000 hours of operation, whichever first occurs.

(5) For 1982 through 1987 model-year gasoline heavy-duty vehicles (except medium-duty vehicles) certified using the steady-state emission standards and test procedures, and 1982 through 1987 model-year gasoline heavy-duty motor vehicle engines certified using the steady-state emission standards and test procedures, a period of use of five years or 50,000 miles, whichever first occurs.

(6) For 1987 through 2003 model-year gasoline heavy-duty vehicles (except medium-duty vehicles) certified to the transient emission standards and test procedures, and 1987 and subsequent model-year gasoline heavy-duty motor vehicle engines certified using the transient emission standards and test procedures, a period of use of eight years or 110,000 miles, whichever first occurs, except as noted in paragraph (13).

(7) For 1985 through 2003 model-year heavy-duty diesel urban buses, and 1985 through 2003 model-year heavy-duty diesel engines to be used in urban buses, and for 1985 through 2003 model-year diesel heavy-duty vehicles (except medium-duty vehicles), and 1985 through 2003 model-year motor vehicle engines used in such vehicles, a period of use of eight years or 110,000 miles, whichever first occurs, for diesel light, heavy-duty vehicles; eight years or 185,000 miles, whichever first occurs, for diesel medium, heavy-duty vehicles; and eight years or 290,000 miles, whichever first occurs, for diesel heavy, heavy-duty vehicles, except as provided in paragraphs (11), (14), (15) and (16); or any alternative useful life period approved by the Executive Officer. (The classes of diesel light, medium, and heavy, heavy-duty vehicles are defined in 40 CFR section 86.085-2, as amended November 16, 1983.)

(8) For light-duty and medium-duty vehicles certified under the Optional 100,000 Mile Certification Procedure, and motor vehicle engines used in such vehicles, a period of use of ten years or 100,000 miles, whichever first occurs.

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(9) For 2001 through 2019 model year medium-duty low-emission, ultra-low-emission and super-ultra-low-emission vehicles certified to the primary standards in section 1961(a)(1), and motor vehicle engines used in such vehicles, a period of use of ten years or 120,000 miles, whichever occurs first. For 2001 through 2019 medium-duty low-emission, ultra-low-emission and super-ultra-low-emission vehicles certified to the optional 150,000 mile standards in section 1961(a)(1), and motor vehicle engines used in such vehicles, a period of use of fifteen years or 150,000 miles, whichever occurs first. For all other 1995 and subsequent model-year medium-duty vehicles and motor vehicle engines used in such vehicles, and 1992 through 1994 model-year medium-duty low-emission and ultra-low-emission vehicles certified to the standards in Section 1960.1(h)(2), and motor vehicle engines used in such vehicles, a period of use of eleven years or 120,000 miles, whichever occurs first.

(10) For all other light-duty and medium-duty vehicles, and motor vehicle engines used in such vehicles, a period of use of five years or 50,000 miles, whichever first occurs. For those passenger cars, light-duty trucks and medium-duty vehicles certified pursuant to section 1960.1.5, Title 13, California Code of Regulations, the useful life shall be seven years, or 75,000 miles. whichever first occurs; however, the manufacturer's reporting and recall responsibility beyond 5 years or 50,000 miles shall be limited, as provided in section 1960.1.5. For those passenger cars and light-duty trucks certified pursuant to Title 13, California Code of Regulations, section 1960.1(f) and section 1960.1(g), the useful life shall be ten years or 100,000 miles, whichever first occurs; however, for those vehicles certified under section 1960.1(f), the manufacturer's warranty failure and defects reporting and recall responsibility shall be subject to the conditions and standards specified in section 1960.1(f).

(11) For 1994 through 2003 model-year heavy heavy-duty diesel urban buses, and 1994 through 2003 model-year heavy heavy-duty diesel engines to be used in urban buses, for the particulate standard, a period of use of ten years or 290,000 miles, whichever first occurs; or any alternative useful life period approved by the Executive Officer.

(12) For 1997 and subsequent model year off-road motorcycles, all terrain vehicles, and for 2007 and subsequent model year off-road sport vehicles, off-road utility vehicles, sand cars, and engines used in such vehicles, a period of use of five years or 10,000 kilometers (6,250 miles), whichever first occurs.

(13) For 1998 through 2003 model-year gasoline heavy-duty engines, for the NOx standard, a period of use of ten years or 110,000 miles, whichever first occurs; or any alternative useful life period approved by the Executive Officer.

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(14) For 1998 through 2003 model-year light heavy-duty diesel engines, for the NOx standard, a period of use of ten years or 110,000 miles, whichever first occurs; or any alternative useful life period approved by the Executive Officer.

(15) For 1998 through 2003 model-year medium heavy-duty diesel engines, for the NOx standard, a period of use of ten years or 185,000 miles, whichever first occurs; or any alternative useful life period approved by the Executive Officer.

(16) For 1998 through 2003 model-year heavy heavy-duty diesel engines, for the NOx, standard, a period of use of ten years or 290,000 miles, whichever first occurs; or any alternative useful life period approved by the Executive Officer.

(17) For those passenger cars and light-duty trucks certified to the primary standards in section 1961(a)(1), the useful life shall be ten years or 120,000 miles, whichever occurs first. For 2001 and subsequent passenger car and light-duty truck low-emission, ultra-low-emission and super-ultra-low-emission vehicles certified to the optional 150,000 mile standards in section 1961(a)(1), and motor vehicle engines used in such vehicles, a period of use of fifteen years or 150,000 miles, whichever occurs first.

(18) For those passenger cars, light-duty trucks, and medium-duty vehicles certified to the standards in section 1961.2 or 1961.3, the useful life shall be fifteen years or 150,000 miles, whichever occurs first.

(19) For 2004 and subsequent model-year light heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emissions standards, a period of use of ten years or 110,000 miles, whichever first occurs; or any alternative useful life period approved by the Executive Officer.

(19.1) For 2004 and subsequent model-year light heavy-duty diesel engines certified to the Greenhouse Gas emission standards in section 1956.8(a)(7), title 13, CCR, for carbon dioxide, nitrous oxide, and methane emission standards, a period of use of ten years or 110,000 miles, whichever first occurs, or any alternative useful life period approved by the Executive Officer.

(20) For 2004 and subsequent model-year medium heavy-duty diesel engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbons emissions standards, a period of use of ten years or 185,000 miles, whichever first occurs; or any alternative useful life period approved by the Executive Officer.

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(20.1) For 2004 and subsequent model-year medium heavy-duty diesel engines certified to the Greenhouse Gas emission standards in section 1956.8(a)(7), title 13, CCR, for carbon dioxide, nitrous oxide, and methane emission standards, a period of use of ten years or 185,000 miles, whichever first occurs, or any alternative useful life period approved by the Executive Officer.

(21) For 2004 and subsequent model-year heavy heavy-duty diesel engines, 2004 and subsequent model-year heavy-duty diesel urban buses, 2004 and subsequent model-year heavy-duty diesel engines to be used in urban buses, and 2004 and subsequent model year hybrid-electric urban buses for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbon emissions standards, a period of use of 10 years or 435,000 miles, or 22,000 hours, whichever first occurs, or any alternative useful life period approved by the Executive Officer, except as provided in paragraphs (21)(A) and (21)(B).

(A) The useful life limit of 22,000 hours in paragraph (19) of this definition is effective as a limit to the useful life only when an accurate hours meter is provided by the manufacturer with the engine and only when such hours meter can reasonably be expected to operate properly over the useful life of the engine.

(B) For an individual engine, if the useful life hours limit of 22,000 hours is reached before the engine reaches 10 years or 100,000 miles, the useful life shall become 10 years or 100,000 miles, whichever occurs first, as required under Clean Air Act section 202(d)(42 U.S.C. 7521(d)).

(21.1) For 2004 and subsequent model-year heavy heavy-duty diesel engines certified to the Greenhouse Gas emission standards in section 1956.8(a)(7), title 13, CCR, for carbon dioxide, nitrous oxide, and methane emission standards, a period of use of ten years or 435,000 miles, or 22,000 hours, whichever first occurs, or any alternative useful life period approved by the Executive Officer, except as provided in paragraphs (21)(A) and (21)(B).

(22) For 2004 and subsequent model-year heavy-duty Otto-cycle engines, for carbon monoxide, particulate, and oxides of nitrogen plus non-methane hydrocarbon emissions standards, a period of use of 10 years or 110,000 miles, whichever first occurs.

(22.1) For 2004 and subsequent model-year heavy-duty Otto-cycle engines certified to the Greenhouse Gas emission standards in section 1956.8(h)(6), title 13, CCR, for carbon dioxide, nitrous oxide, and methane emissions standards, the useful life shall be a period of use of ten years or 110,000 miles, whichever first occurs.

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(23) For 2000 and later model year off-road compression-ignition engines, for oxides of nitrogen, hydrocarbon, oxides of nitrogen plus hydrocarbon (when applicable), carbon monoxide, particulate emission standards, and for smoke opacity:

(A) For all engines rated under 19 kilowatts, and for constant-speed engines rated under 37 kilowatts with rated speeds greater than or equal to 3,000 revolutions per minute, a period of use of five years or 3,000 hours of operation, whichever first occurs.

(B) For all other engines rated above 19 kilowatts and under 37 kilowatts, a period of use of seven years or 5,000 hours of operation, whichever first occurs.

(C) For engines rated at or above 37 kilowatts, a period of use of ten years or 8,000 hours of operation, whichever first occurs.

(24) (A) For California-certified 2008 and subsequent model year spark-ignition sterndrive/inboard marine engines with maximum rated power less than or equal to 373 kilowatts and complying with the option 2 requirements in section 2442(b)(1), and for California-certified 2009 and subsequent model-year spark-ignition sterndrive/inboard marine engines with a maximum rated or maximum engine power less than or equal to 485 kilowatts, a period of ten years or 480 hours, whichever first occurs.

(25) For 2014 and subsequent model-year heavy-duty vehicles at or below 19,500 pounds GVWR, certified to the GHG emission standards of section 95663, title 17, CCR, the useful life shall be ten years or 110,000 miles, whichever first occurs.

(26) For 2014 and subsequent model-year heavy-duty vehicles above 19,500 pounds and at or below 33,000 pounds GVWR, certified to the GHG emission standards of section 95663, title 17, CCR, the useful life shall be ten years or 185,000 miles, whichever first occurs.

(27) For 2014 and subsequent model-year heavy-duty vehicles above 33,000 pounds GVWR, certified to the GHG emission standards of section 95663, title 17, CCR, the useful life shall be ten years or 435,000 miles, whichever first occurs.

(m) "Vehicle or engine manufacturer" means the manufacturer granted certification for a motor vehicle or motor vehicle engine.

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(n) "Voluntary Emission Recall" means an inspection, repair, adjustment, or modification program voluntarily initiated and conducted by a manufacturer or its agent or representative to remedy any nonconformity for which direct notification of vehicle or engine owners is necessary.

Appendix A to Article 2.1

California In-Use Vehicle Emission-Related Recall Procedures, Enforcement Test Procedures, and Failure Reporting Procedures for 1982 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles, Heavy-Duty Vehicles and Engines, Motorcycles, 1997 and Subsequent Model-Year Off-Road Motorcycles and All -Terrain Vehicles, 2000 and Subsequent Model-Year Off-Road Compression-Ignition Engines, and 2008 and Subsequent Model-Year Spark-Ignition Sterndrive/Inboard Marine Engines.

Vehicle and Engine Parameters, Components, and Specifications

I. Passenger Car, Light-Duty Truck, Medium-Duty Vehicle, Motor-cycle, and Inboard and Sterndrive Parameters and Specifications.

A. Basic Engine Parameters-Reciprocating Engines.

1. Compression ratio.

2. Cranking compression pressure.

3. Valves (intake and exhaust).

a. Head diameter dimension.

b. Valve lifter or actuator type and valve lash dimension.

4. Turbocharger calibrations.

5. Camshaft timing.

a. Valve opening (degrees BTDC).

b. Valve closing (degrees ATDC).

c. Valve overlap (inch-degrees).

B. Basic Engine Parameters-Rotary Engines.

1. Intake port(s): Timing and overlap if exposed to the combustion chamber.

2. Exhaust port(s): Timing and overlap if exposed to the combustion chamber.

3. Cranking compression pressure.

4. Compression ratio.

C. Air Inlet System: Temperature control system calibration.

D. Fuel System.

1. General

a. Engine idle speed.

b. Engine idle mixture.

2. Carburetion.

a. Air-fuel flow calibration.

b. Transient enrichment system calibration.

c. Starting enrichment system calibration.

d. Altitude compensation system calibration.

e. Hot idle compensation system calibration.

3. Fuel injection.

a. Control parameters and calibrations.

b. Fuel shutoff system calibration.

c. Starting enrichment system calibration.

d. Transient enrichment system calibration.

e. Air-fuel flow calibration.

f. Altitude compensation system calibration.

g. Operating pressure(s).

h. Injector timing calibrations.

E. Ignition System.

1. Control parameters and calibrations.

2. Initial timing setting.

3. Dwell setting.

4. Altitude compensation system calibration.

5. Spark plug voltage.

F. Engine Cooling System: Thermostat calibration.

G. Exhaust Emission Control system.

1. Air injection system.

a. Control parameters and calibrations.

b. EGR valve flow calibration.

2. EGR system.

a. Control parameters and calibrations.

b. EGR valve flow calibration.

3. Catalytic converter system.

a. Active surface area.

b. Volume of catalyst.

c. Conversion efficiency.

d. Leaded fuel restrictor or constricted fuel filler neck.

4. Backpressure.

H. Evaporative Emission Control System.

1. Control parameters and calibrations.

2. Fuel tank.

a. Pressure and vacuum relief settings.

b. Fuel fill pipe and opening specifications (Reference section 2290, Title 13, C.C.R.).

I. Crankcase Emission Control System.

1. Control parameters and calibrations.

2. Valve calibration(s).

J. Auxiliary Emission Control Devices (AECD).

1. Control parameters and calibrations.

2. Component calibration(s).

K. Emission Control Related Malfunction and Diagnostic Systems.

1. On-Board Malfunction and Diagnostic Systems

a. Control parameters and calibrations.

b. Component calibration(s).

2. Emission Control Related Warning Systems

a. Control parameters and calibrations.

b. Component calibration(s).

L. Driveline Parameters.

1. Axle ratio(s).

II. Heavy-Duty Gasoline Engine Parameters and Specifications.

A. Basic Engine Parameters.

1. Compression ratio.
2. Cranking compression pressure.
3. Supercharger/turbocharger calibration.
4. Valves (intake and exhaust).
    a. Head diameter dimension.
    b. Valve lifter or actuator type and valve lash dimension.
5. Camshaft timing.
    a. Valve opening (degrees BTDC).
    b. Valve closing (degrees ATDC).
    c. Valve overlap (inch-degrees).

B. Air Inlet System: Temperature control system calibration.

C. Fuel System.

1. General.
    a. Engine idle speed.
    b. Engine idle mixture.
2. Carburetion.
    a. Air-fuel flow calibration.
    b. Transient enrichment system calibration.
    c. Starting enrichment system calibration.
    d. Altitude compensation system calibration.
    e. Hot idle compensation system calibration.
3. Fuel injection.
    a. Control parameters and calibrations.
    b. Fuel shutoff system calibration.
    c. Starting enrichment system calibration.
    d. Transient enrichment system calibration.
    e. Air-fuel flow calibration.
    f. Altitude compensation system calibration.

g. Operating pressure(s).

h. Injector timing calibrations.

D. Ignition System.

1. Control parameters and calibrations.

2. Initial timing setting.

3. Dwell setting.

4. Altitude compensation system calibration.

5. Spark plug voltage.

E. Engine Cooling System: Thermostat calibration.

F. Exhaust Emission Control system.

1. Air injection system.

a. Control parameters and calibrations.

b. Pump flow rate.

2. EGR system.

a. Control parameters and calibrations.

b. EGR valve flow calibration.

3. Catalytic converter system.

a. Active surface area.

b. Volume of catalyst.

c. Conversion efficiency.

d. Leaded fuel restrictor or constricted fuel filler neck.

4. Backpressure.

G. Evaporative Emission Control System.

1. Control parameters and calibrations.

2. Fuel tank.

a. Pressure and vacuum relief settings.

b. Fuel fill pipe and opening specifications (Reference section 2290, Title 13, C.C.R.).

H. Crankcase Emission Control System.

1. Control parameters and calibrations.

2. Valve calibration(s).

I. Auxiliary Emission Control Devices (AECD).

1. Control parameters and calibrations.

2. Component calibration(s).

J. Emission Control Related Warning Systems.

1. Control parameters and calibrations.

2. Component calibration(s).

III. Heavy-Duty Diesel Engine and Off-Road Compression-Ignition Engine Parameters and Specifications.

A. Basic Engine Parameters-Four Stroke Cycle Reciprocating Engines.

1. Compression ratio.

2. Cranking compression pressure.

3. Supercharger/turbocharger calibration.

4. Valves (intake and exhaust).

a. Head diameter dimension.

b. Valve lifter or actuator type and valve lash dimension.

5. Camshaft timing.

a. Valve opening (degrees BTDC).

b. Valve closing (degrees ATDC).

c. Valve overlap (inch-degrees).

B. Basic Engine Parameters-Two Stoke Cycle Reciprocating Engine.

1-5. Same as section III.A.

6. Intake port(s): Timing in combustion cycle.

7. Exhaust port(s): Timing in combustion cycle.

C. Air Inlet System: Temperature control system calibration.

1. Temperature control system calibration.

2. Maximum allowable air inlet restriction.

D. Fuel System.

1. Fuel injection.

a. Control parameters and calibrations.

b. Transient enrichment system calibration.

c. Air-fuel flow calibration.

d. Altitude compensation system calibration.

e. Operating pressure(s).

f. Injector timing calibration.

E. Exhaust Emission Control System: Maximum allowable backpressure.

F. Crankcase Emission Control System.

1. Control parameters and calibrations.

2. Valve calibration(s).

G. Auxiliary Emission Control Device (AECD).

1. Control parameters and calibrations.

2. Component calibration(s).

NOTE: Authority cited: Sections 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, 43105 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 38501, 38505, 38510, 38560, 39002, 39003, 39010, 39500, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43202, 43204-43205.5, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

Title 13, California Code of Regulations

Adopt Section 2139.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2139.0.1 Testing. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

After the vehicles or trailers have been accepted and restorative maintenance, if any, has been performed, the ARB or its designated laboratory shall perform the applicable emission tests pursuant to the following:

(a) For passenger cars and light-duty trucks, in-use compliance emission tests shall be performed pursuant to section 1960.1,1961, 1961.2, or 1961.3, Title 13, California Code of Regulations, as applicable.

(b) For medium-duty vehicles certified according to the chassis standards and test procedures specified in section 1960.1, 1961, 1961.2, or 1961.3, Title 13, California Code of Regulations and the documents incorporated by reference therein, in-use compliance emission tests shall be performed pursuant to section 1960.1, 1961, 1961.2, or 1961.3, Title 13, California Code of Regulations, as applicable.

For medium-duty vehicles certified according to the Greenhouse Gas emission standards of section 95663, Title 17, California Code of Regulations, and the documents incorporated by reference therein, in-use compliance emission tests shall be performed pursuant to section 95663, Title 17, California Code of Regulations, as applicable.

(c) For medium-duty engines and vehicles certified according to the optional engine test procedures specified in section 1956.8, Title 13, California Code of Regulations and the documents incorporated by reference therein, in-use compliance emission tests shall be performed pursuant to one of the following procedures:

(1) The engines of medium-duty vehicles may be tested pursuant to the engine test procedures specified in section 1956.8, provided that the manufacturer or its designated laboratory conduct procurement and enforcement testing pursuant to Sections 2136 through 2140, Title 13, California Code of Regulation, at the manufacturer's expense.

For manufacturers that have only one engine family or test group, the manufacturer or its designated laboratory that have more than one engine family or test group, the manufacturer or its designated laboratory shall procure no more than fifteen vehicles per engine family or test group. For manufacturers that have more than one engine family or test group, the manufacturer or its designated laboratory shall procure and test at the manufacturer's expense no more than one-third of its engine families or test groups and no more than fifteen vehicles from each engine family or test group. For the purposes of this section, "one-third" of a manufacturer's engine families or test groups shall be determined by dividing the number of distinct engine families or test groups by three, adding 0.5, and truncating the result to the nearest whole number.

The specific engine families or test groups subject to enforcement testing shall be selected by the ARB. The manufacturer or its designated laboratory shall begin the engine procurement process within 10 working days of notification by the ARB and shall complete testing within 100 working days of notification by the ARB. The Executive Officer shall approve the manufacturer's procurement procedures in advance of their use by the manufacturer. The Executive Officer shall approve a manufacturer's procurement procedures if engines are screened according to the criteria specified in section 2137, Title 13, California Code of Regulations and selected randomly from registration records compiled and prepared by R. L. Polk and Company or a comparable source. In addition, no vehicle shall be selected for enforcement testing with mileage less than 60 percent of the useful-life mileage without prior approval from the Executive Officer. The manufacturer shall permit an ARB representative to witness procurement, restorative maintenance, and enforcement testing. The Executive Officer shall have the authority to accept or reject a test engine based upon criteria specified in section 2137. Once an engine has been tested and determined to be in compliance with the current in-use emission standards, no further testing will be performed on subsequent engine families or test groups that carry-over the durability data of the tested engine family or test group.

Notwithstanding the above, if a manufacturer fails to demonstrate compliance with the emission standards after one-third of its engine families or test groups have been tested, additional engine families or test groups shall be tested, by the manufacturer or its designated laboratory, at the manufacturer's expense, until compliance is demonstrated on one-third of the engine families or test groups or all of a manufacturer's engine families or test groups have been tested. In addition, any engine family or test group which has been tested and determined to be in noncompliance shall be retested by the manufacturer each subsequent year until compliance with the applicable emission standards has been demonstrated. Notwithstanding the above, the ARB may conduct engine enforcement testing pursuant to the engine test procedures specified in section 1956.8, at their own expense.

(2) Medium-duty vehicles may be tested according to the chassis test procedures specified in section 1960.1(k), 1961, or 1961.2, Title 13, California Code of Regulations or section 95663, Title 17, California Code of Regulations, as applicable, if a manufacturer develops correlation factors which establish the relationship between engine and chassis testing for each engine family or test group and submits these correlation factors within one year after the beginning of production. The correlation factors shall be applied to the measured in-use engine exhaust emission data to determine the in-use engine exhaust emission levels. All correlation factors and supporting data included in a manufacturer's application must be submitted to and approved by the Executive Officer in advance of their use by a manufacturer. Correlation factors intended to apply to a specific engine family or test group shall be applicable for each vehicle model incorporating that specific engine. Manufacturers shall submit test data demonstrating the applicability of the correlation factors for vehicle models comprising a minimum of 80 percent of their engine sales for that specific engine family or test group. The correlation factors for the remaining fleet may be determined through an engineering evaluation based upon a comparison with similar vehicle models. The Executive Officer shall approve a submitted correlation factor if it accurately corresponds to other established empirical and theoretical correlation factors and to emission test data available to the Executive Officer.

A manufacturer may choose to use the results from the chassis in-use testing as a screening test. If an engine family or test group does not demonstrate compliance with any of the applicable in-use engine standards, as determined from the chassis test data and the applied correlation factors, the manufacturer shall be subject to the requirements and cost of in-use compliance engine testing, as specified in section 2139(c)(1). The manufacturer shall be subject to engine testing for any non-complying engine family or test group for each subsequent year until compliance with the engine emission standards is demonstrated.

Subsequent to approval of the correlation factors, the Executive Officer may make a determination that the original correlation factors are not valid. Such a determination may be based upon in-use emission data, including chassis and engine testing. Upon determination that the correlation factors for a specific engine family or test group are not valid, the manufacturer of the engine family or test group shall be subject to the enforcement testing requirements and costs of in-use compliance engine testing, as specified in section 2139(c)(1).

(3) The manufacturer shall choose one of the procedures specified in subsections (c)(1) through (c)(2). The Executive Officer shall permit the use of alternative test procedures if the Executive Officer determines the alternative test procedure adequately predicts the exhaust emissions from the engine test procedure specified in section 1956.8, Title 13, California Code of Regulations. Such a determination may be based upon correlation with test data from the engine test procedures.

(4) The time limits specified in subsections (c)(1) and (c)(2) may be extended by the Executive Officer if the manufacturer demonstrates that the time limits specified could not be achieved due to reasons beyond the reasonable control of the manufacturer.

(d) For heavy-duty engines and vehicles, in-use compliance emission tests shall be performed pursuant to section 1956.8, title 13, California Code of Regulations. For heavy-duty vehicles certified to the GHG emission standards of section 95663, title 17, California Code of Regulations, in-use compliance emission tests shall be performed pursuant to section 95663, Title 17, California Code of Regulations.

(e) For motorcycles, in-use compliance emission tests shall be performed pursuant to section 1958, title 13, California Code of Regulations.

(f) For off-road motorcycles and all-terrain vehicles, in-use compliance tests shall be performed pursuant to section 2412, title 13, California Code of Regulations. The in-use compliance testing shall use the same test procedure utilized for the specific vehicle's original certification testing.

(g) For off-road compression-ignition engines, in-use compliance tests shall be performed pursuant to section 2423, title 13, California Code of Regulations. The in-use compliance testing shall use the same test procedure utilized for the specific engine's original certification testing.

(h) For spark-ignition sterndrive/inboard marine engines, in-use compliance tests shall be performed pursuant to section 2442, title 13, California Code of Regulations. The in-use compliance testing shall use the same test procedure utilized for the specific engine's original certification testing.

(i) For any emission in-use compliance test performed pursuant to subsections (a) through (h), the ARB may waive a specific test for subsequent vehicle samples if results from vehicle samples already tested are deemed sufficient to establish complying emission levels. The ARB shall inform the manufacturer at least 30 days prior to enforcement testing of its vehicles, engines, and shall permit a manufacturer representative to observe the enforcement testing.

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213, Health and Safety Code.

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Title 13, California Code of Regulations

Adopt Section 2140.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2140.0.1 Notification and Use of Test Results. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The Executive Officer shall notify the manufacturer in writing if the in-use vehicle enforcement test results indicate that the test fleet contains three or more failures of the same emission-related component. Upon receipt of the notification, the manufacturer shall submit an emissions information report in accordance with title 13, California Code of Regulations, sections 2146 and 2147. The engine family, test group, or sub-group manufacturer shall be subject to recall when a specific emission-related failure occurred in three or more test vehicles, unless the Executive Officer determines from the emissions information report that a recall is unnecessary.

(b) If the results of the in-use vehicle emission tests conducted pursuant to section 2139 indicate that the average emissions of the test vehicles for any pollutant exceed the applicable emission standards specified in title 13, California Code of Regulations, sections 1960.1, 1961, 1961.2, 1961.3, 1956.8, 1958, 2412, 2423 or 2442, the entire vehicle population so represented shall be deemed to exceed such standards. The Executive Officer shall notify the manufacturer of the test results and upon receipt of the notification, the manufacturer shall have 45 days to submit an influenced recall plan in accordance with sections 2113 through 2121, title 13, California Code of Regulations. If no such recall plan is submitted, the Executive Officer may order corrective action including recall of the affected vehicles in accordance with sections 2122 through 2135, title 13, California Code of Regulations.

38501, 38505, 38510, 38560,

Note: Authority cited: Sections 39600, 39601, 43013, 43018 and 43105, Health and Safety Code. Reference: Sections 43000, 43009.5, 43013, 43018, 43101, 43104, 43105, 43106, 43107, 43204-43205.5 and 43211-43213, Health and Safety Code.

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Title 13, California Code of Regulations

Adopt Section 2147.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2147.0.1 Demonstration of Compliance with Emission Standards. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) In order to overcome the presumption of noncompliance set forth in title 13, California Code of Regulations, section 2123(b), the average emissions of the vehicles, engines, with the failed emission-related component must comply with applicable emission standards. A manufacturer may demonstrate compliance with the emission standards by following the procedures set forth in either subsection (b) or subsection (c) of this section.

(b) A manufacturer may test properly maintained in-use vehicles with the failed emission-related component pursuant to the applicable certification emission tests specified in title 13, California Code of Regulations, section 1960.1, 1961, 1961.2, or 1961.3, , as applicable, for passenger cars, light-duty trucks, and medium-duty vehicles, section 1956.8 for heavy-duty engines and vehicles, section 1958 for motorcycles, and section 2442 for sterndrive/inboard marine engines, and in title 17, California Code of Regulations, section 95663, for heavy-duty vehicles. The emissions shall be projected to the end of the vehicle's or engine's useful life using in-use deterioration factors. The in-use deterioration factors shall be chosen by the manufacturer from among the following:

(1) "Assigned" in-use deterioration factors provided by the ARB on a manufacturer's request and based on ARB in-use testing; or,

(2) deterioration factors generated during certification, provided adjustments are made to account for vehicle aging, customer mileage-accumulation practices, type of failed component, component failure mode, effect of the failure on other emission-control components, commercial fuel and lubricant quality, and any other factor which may affect the vehicle's or engine's operating conditions; or,

(3) subject to approval by the Executive Officer, a manufacturer-generated deterioration factor. The Executive Officer shall approve such deterioration factor if it is based on in-use data generated from certification emission tests performed on properly maintained and used vehicles in accordance with the procedures set forth in section 1960.1, 1961, or 1961.2, of title 13 of the California Code of Regulations, as applicable, for passenger cars, light-duty trucks, and medium-duty vehicles; section 1956.8 of title 13 of the California Code of Regulations heavy duty vehicles and engines; and section 1958 of title 13 of the California Code of Regulations for motorcycles; and section 95663 of title 17 of the California Code of Regulations, for heavy-duty vehicles, and if the vehicles from which it was derived are representative of the in-use fleet with regard to emissions performance and are equipped with similar emission control technology as vehicles with the failed component.

(c) In lieu of the vehicle or engine emission testing described in subsection (b) above and subject to approval by the Executive Officer, a manufacturer may perform an engineering analysis, laboratory testing or bench testing, when appropriate, to demonstrate the effect of the failure.

Note: Authority cited: Sections 38501, 38505, 38510, 38560, 39600, 39601 and 43015, Health and Safety Code. Reference: Sections 43000, 43009.5, 43018, 43101, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

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Title 13, California Code of Regulations

Adopt Section 2317.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2317.0.1 Satisfaction of Designated Clean Fuel Requirements with a Substitute Fuel. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Any person may petition the state board to designate by regulation a substitute fuel which may be used instead of a primary designated clean fuel to satisfy any requirements in this chapter pertaining to a designated clean fuel. The state board shall designate such a substitute fuel if it is satisfied that the petitioner has demonstrated all of the following:

(1) That use of the fuel in low-emission vehicles certified on the primary designated clean fuel will result in emissions of NMOG (on a reactivity-adjusted basis), NOx, and CO no greater than the corresponding emissions from such vehicles fueled with the primary designated clean fuel, as determined pursuant to the procedures set forth in the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels through 2014," as amended March 22, 2012 or the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels in 2015 and Subsequent Years," as adopted March 22, 2012 as applicable, which are incorporated herein by reference.

(2) That use of the fuel in low-emission vehicles certified on the primary designated clean fuel will result in potential health risks from exposure to benzene, 1,3-butadiene, formaldehyde, and acetadehyde in the aggregate no greater than the corresponding potential health risks for such vehicles fueled with the primary designated clean fuel, as determined pursuant to the procedures set forth in the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels through 2014" or the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels in 2015 and Subsequent Years," as applicable, which are incorporated herein by reference.

(3) That if the proposed substitute fuel may be used to fuel any motor vehicle other than low-emission vehicles certified on the primary designated clean fuel:

(A) Use of the substitute fuel in such other motor vehicles would not increase emissions of NMOG (on a reactivity-adjusted basis), NOx, and CO as determined pursuant to the procedures set forth in the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels through 2014" or the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels in 2015 and Subsequent Years," as applicable, which are incorporated herein by reference; and

(B) Use of the substitute fuel in such other motor vehicles would result in potential health risks from exposure to benzene, 1,3-butadiene, formaldehyde, and acetadehyde in the aggregate no greater than the corresponding potential health risk from the emissions from such vehicles when operating on their customary fuel, as determined pursuant to the procedures set forth in the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels through 2014" or the "California Test Procedure for Evaluating Substitute Fuels and New Clean Fuels in 2015 and Subsequent Years," as applicable, which are incorporated herein by reference; and

(C) Use of the substitute fuel in such other motor vehicles would not result in increased deterioration of the emission control system on the vehicle and would not void the warranties of any such vehicles.

(b) Whenever the state board designates a substitute fuel pursuant to this section, the state board shall also establish by regulation required specifications for the substitute fuel.

(c) Commencing with the effective date of a regulatory action of the state board designating a substitute fuel pursuant to this section, any person may satisfy his or her obligations under this chapter pertaining to a primary designated clean fuel, in whole or in part, by substituting the substitute fuel in place of the primary designated clean fuel.

NOTE: Authority cited: Sections 39600, 39601, 39667, 43013, 43018 and 43101, Health and Safety Code; and *Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District*, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975). Reference: Sections 39000, 39001, 39002, 39003, 39500, 39515, 39516, 39667, 43000, 43013, 43018 and 43101, Health and Safety Code; and *Western Oil and Gas Ass'n. v. Orange County Air Pollution Control District*, 14 Cal. 3d 411, 121 Cal. Rptr. 249 (1975).

Title 13, California Code of Regulations

Adopt Section 2903.0.1 of title 13, California Code of Regulations, to read as follows:

§ 2903.0.1 Definitions (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The following definitions shall govern the provisions of this Article 2.

"Aerodynamic technologies" is defined in Title 17, section 95302 and is used to comply with the requirements of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," incorporated by reference in Title 17, section 95663, subsection (c).

"Engine family" is a basic classification unit that is used to demonstrate compliance with Title 13, section 1956.8.

"Evaporative emissions family" is a basic classification unit that is used to demonstrate compliance with Title 13, section 1976.

"Family emission limit (FEL)" is defined in Title 13, section 1956.8.

"Fuel-fired heater" means any idling emission reduction device subject to the certification requirements in Title 13, sections 1956.8 and 2485, subsection (c)(3)(B).

"Heavy-duty compression ignition (HD CI) engine family" means any heavy-duty compression ignition engine family subject to the heavy-duty engine certification requirements in Title 13, section 1956.8 that apply to: heavy-duty diesel engines, heavy-duty natural gas-fueled and liquefied-petroleum-gas-fueled engines derived from diesel-cycle engines, and heavy-duty methanol-fueled diesel engines.

"Heavy-duty Otto-cycle (HDO) engine family" means any heavy-duty Otto-cycle engine family subject to the heavy-duty engine certification requirements in Title 13, section 1956.8.

"Heavy-duty greenhouse gas vehicle family" means any heavy-duty vehicle family subject to the requirements of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," incorporated by reference in Title 17, section 95663, subsection (c).

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"Heavy-duty greenhouse gas (HD GHG) partial carry-over" means an application that is identical to the previous model year's application that resulted in the issuance of an certification except for one or more of the following: (1) model year; (2) Engine or Vehicle family name; (3) applicant contact information; (4) projected sales data; and in addition one or more of the following: 5) model names (only if the CO_2 standard to which the vehicle is certified or the lowest and highest FELs are not changed); (6) part numbers (only if the CO_2 standard to which the vehicle is certified or the lowest and highest FELs are not changed); (7) Engine families, transmission families, powertrain families, and axle families (only if the CO_2 standard to which the vehicle is certified or the lowest and highest FELs are not changed); and (8) Tires (for design-based standards only, tire changes must not impact the worst case coefficient of rolling resistance).

"Heavy-duty vehicle evaporative emissions family" means any heavy-duty vehicle family subject to the certification requirements in Title 13, sections 1976 and 1978.

"Incomplete medium-duty vehicle" means any medium-duty vehicle that meets the definition of an "incomplete vehicle" in the "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 Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," incorporated by reference in Title 13, section 1961.2, and is subject to the emission standards in Title 13, section 1956.8.

"Incomplete medium-duty vehicle (MDV) evaporative emissions family" means any medium-duty evaporative emissions family that is incorporated in an incomplete medium-duty vehicle.

"Light-duty vehicle" means any passenger car or light-duty truck that meets the applicable definitions in Title 13, section 1900 and is subject to the certification requirements in Title 13, Division 3, Chapter 1, Article 2. A street-use motorcycle is not a light-duty vehicle.

"Low California production manufacturer" means a manufacturer that produces annually for sale in California a total of no more than 300 heavy-duty vehicles that certify to the heavy-duty greenhouse gas standards in Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 12 or a total of no more than 300 street-use motorcycles and motorcycle engines. The annual number of units produced for sale in California for purposes of this definition shall be based on the average number of applicable heavy-duty vehicles or street-use motorcycles or motorcycle engines produced for sale in California for the three previous consecutive model years by the manufacturer that seeks certification as a low California production manufacturer. For manufacturers seeking certification for the first time in California, model-year production volume shall be based on projected California sales. If actual reported sales numbers are available, projected production of California sales cannot be used to determine compliance with this definition.

1) For heavy-duty vehicles that certify to the heavy-duty greenhouse gas standards, the production cap is 300 units based on final sales data reported in accordance with section 1037.250 of the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," incorporated by reference in Title 17, section 95663, subsection (c). If final sales data is not available, projected sales data reported in accordance with section 1037.205 of the procedures shall be used to determine eligibility under this definition.

2) For street-use motorcycles and motorcycle engines, the production cap is 300 units based on final annual production for sale volume reports submitted in accordance with Title 40, Code of Federal Regulations, Part 86, section 86.415-78, incorporated in Title 13, section 1958, subsection (c) or projected production for sale data reported in accordance with Title 40, Code of Federal Regulations, Part 86, section 86.416-80, incorporated in Title 13, section 1958, subsection (c), if final sales data is not available.

"Low California production for sale engine family" means a street-use motorcycle family or street-use motorcycle engine family with a maximum of 100 units. The maximum allowable number of units shall be calculated based on the final annual production for sale volume reports submitted in accordance with Title 40, Code of Federal Regulations, Part 86, section 86.415-78, incorporated in Title 13, section 1958, subsection (c) or projected production for sale data reported in accordance with Title 40, Code of Federal Regulations, Part 86, section 86.416-80, incorporated in Title 13, section 1958, subsection (c), if final sales data is not available.

The number of "low California production for sale engine family" applications that a manufacturer may submit for each model year is based on the average total number of units that manufacturer produced for sale in California for the three previous consecutive model years. For manufacturers seeking certification for the first time in California, model-year production volume shall be based on projected California sales.

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1) A manufacturer that produced for sale in California more than an average of 2,500 total units for the previous three model years may submit no more than three "low California production for sale engine family" applications for each model year and may not use the low California production manufacturer provision for any other applications of the same model year.

2) A manufacturer that produces for sale in California an average of 2,500 or fewer total units for the previous three model years may submit up to six "low California production for sale engine family" applications for each model year and may not use the low California production manufacturer provision for any other applications of the same model year.

"Medium-duty compression ignition (MD CI) engine family" means any engine family subject to the medium-duty compression ignition engine certification requirements in Title 13, section 1956.8.

"Medium-duty Otto-cycle (MDO) engine family" means any engine family subject to the medium-duty Otto-cycle engine certification requirements in Title 13, section 1956.8.

"Medium-duty vehicle" means any vehicle that meets the definition of a medium-duty vehicle (including medium-duty passenger vehicles) in Title 13, section 1900 and is subject to the certification requirements in Title 13, Division 3, Chapter 1, Article 2.

"On-road heavy-duty exempt engine" means a federally-certified heavy-duty engine that can legally be sold in California under the provisions of Title 13, section 1956.8, subdivision (f).

"Specially constructed vehicle (SPCNS) certified engine package" is a "certified engine package," as defined in Title 13, section 2211, that is subject to the certification requirements in Title 13, section 2212.

"Specially constructed vehicle (SPCNS) certified engine package extension" is a "SPCNS certified engine package," that complies with the requirements in Title 13, section 2209.2, subsection (b).

"Specially produced motor vehicle (SPMV) certified engine package" is a "certified engine package," as defined in Title 13, section 2209.1, that is subject to the certification requirements in Title 13, section 2209.2.

"Specially produced motor vehicle (SPMV) manufacturer" is described in the "California Certification Procedures for Light-Duty Engine Packages for Use in New Light-Duty Specially-Produced Motor Vehicles for 2019 and Subsequent Model Years," incorporated by reference in Title 13, section 2209.1.

"Street-use motorcycle or motorcycle engine" means any motorcycle or motorcycle engine subject to the certification requirements in Title 13, section 1958.

"Test group" is a basic classification unit that has the meaning given in the "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," incorporated by reference in Title 13, section 1961.2 subsection (d).

"Trailer Family" means any trailer family subject to the certification requirements in Title 17, Division 3, Chapter 1, Subchapter 10, Article 4, Subarticle 12.

Note: Authority cited: Sections 39600, 39601, 43019, 43019.1, and 43202.6, Health and Safety Code. Reference: Sections 43000, 43000.5, 43013, 43018, 43019, and 43019.1, Health and Safety Code.

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Appendix A-3

Proposed Amendments to Title 17 Regulation Order

Emergency Vehicle Emissions Regulation

[Note:]This version of the Proposed Amendments to Title 17 Regulation Order also complies with Government Code section 11346.2 subdivision (a)(3), and 11346.8, subdivision (c). It is provided to also improve the accessibility and readability of the regulatory text. The existing, original regulatory language currently adopted into the California Code of Regulations is shown as plain, clean text, while the final amendments are shown in tracked changes. To review this document in a clean format (no underline or strikeout to show changes), please select "Simple Markup" or "No Markup" in Microsoft Word's Review menu, or accept all changes. You can also change the view to the original (originally proposed regulatory text prior to proposed modifications) by selecting "Original" or rejecting all tracked changes. Additionally, "Advanced Track Changes Options" will allow for further options regarding color and other markings. Instructions on using/viewing Track Changes can be found here.

Subsections for which no changes are made in this rulemaking are indicated with "* * * * *."

The Sections of title 17, CCR that are being proposed for amendment per this regulatory proposal are as follows.

Chapter 1. Air Resources Board

Subchapter 10. Climate Change

Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions

Subarticle 1: Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Regulation

Section 95300.	Purpose.
Section 95301.	Applicability.
Section 95302.	Definitions.
Section 95303.	Requirements and Compliance Deadlines.
Section 95304.	Good Operating Condition Requirements.
Section 95305.	Exemptions.
Section 95306.	Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements.
Section 95307.	Optional Trailer Fleet Compliance Schedules.
Section 95308.	Enforcement.
Section 95309.	Right of Entry.
Section 95310.	Penalties.
Section 95311.	Record Keeping.
Section 95312.	Severability.

Subarticle 12. Greenhouse Gas Emission Requirements for New 2014 and Subsequent Model Heavy-Duty Vehicles

Section 95660.	Purpose.
Section 95661.	Applicability.
Section 95662.	Definitions.

Section 95663. Greenhouse Gas Exhaust Emission Standards and Test Procedures for New 2014 and Subsequent Model Heavy-Duty Vehicles.

Section 95664. Severability.

Proposed Regulation Order

Amendments to Title 17, California Code of Regulations

Amend Sections 95300, 95301, 95302, 95303, 95304, 95305, 95306, 95307, 95308, 95309, 95310, 95311, 95312, 95660, 95661, 95662, 95663, and 95664.

§ 95300. Purpose.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95300 or section 95300.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95300 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95301. Applicability.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95301 or section 95301.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95301 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95302. Definitions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95302 or section 95302.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95302 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95303. Requirements and Compliance Deadlines.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95303 or section 95303.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95303 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95304. Good Operating Condition Requirements.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95304 or section 95304.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95304 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95305. Exemptions.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95305 or section 95305.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95305 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95306. Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95306 or section 95306.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95306 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95307. Optional Trailer Fleet Compliance Schedules.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95307 or section 95307.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95307 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95308. Enforcement.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95308 or section 95308.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95308 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95309. Right of Entry.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95309 or section 95309.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95309 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95310. Penalties.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95310 or section 95310.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95310 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95311. Record kKeeping.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95311 or section 95311.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95311 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95312. Severability.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95312 or section 95312.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95312 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95660. Purpose.

Unless and until a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, regulated parties may choose to follow either this section 95660 or section 95660.0.1.

However, if a court of competent jurisdiction issues a final ruling that H.J. Res. 88 (119th Congress) and H.J. Res. 89 (119th Congress) are invalid or that the waivers U.S. EPA granted California on January 6, 2025, 90 Federal Register 642 and 90 Federal Register 643, are in effect, the regulated parties are subject to the requirements of this section 95660 to the extent consistent with the court's final ruling. Notice of the court's ruling will be posted on CARB's website, https://arb.ca.gov.

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NOTE: Authority cited: Sections 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39600, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43205, 43205.5 and 43211, Health and Safety Code.

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Appendix A-4

Proposed New Sections to Title 17 Regulation Order For the Emergency Vehicle Emissions Regulation

[Note: The entire text of sections below is new language in "normal type" proposed to be added to title 17, California Code of Regulations]

The Sections of title 17, CCR that are being proposed for adoption per this regulatory proposal are as follows.

Chapter 1. Air Resources Board

Subchapter 10. Climate Change

Article 4. Regulations to Achieve Greenhouse Gas Emission Reductions

Subarticle 1: Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Regulation

Section 95300.0.1.	Purpose. (Alternative)
Section 95301.0.1.	Applicability. (Alternative)
Section 95302.0.1.	Definitions. (Alternative)
Section 95303.0.1.	Requirements and Compliance Deadlines. (Alternative)
Section 95304.0.1.	Good Operating Conditions Requirements. (Alternative)
Section 95305.0.1.	Exemptions. (Alternative)
Section 95306.0.1.	Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements. (Alternative)
Section 95307.0.1.	Optional Trailer Fleet Compliance Schedules. (Alternative)
Section 95308.0.1.	Enforcement. (Alternative)
Section 95309.0.1.	Right of Entry. (Alternative)
Section 95310.0.1.	Penalties. (Alternative)
Section 95311.0.1.	Recordkeeping. (Alternative)
Section 95312.0.1.	Severability. (Alternative)

Subarticle 12. Greenhouse Gas Emission Requirements for New 2014 and Subsequent Model Heavy-Duty Vehicles

Section 95660.0.1.	Purpose. (Alternative)
Section 95661.0.1.	Applicability. (Alternative)
Section 95662.0.1.	Definitions. (Alternative)

Section 95663.0.1.	Greenhouse Gas Exhaust Emission Standards and Test Procedures for New 2014 and Subsequent Model Heavy-Duty Vehicles. (Alternative)
Section 95664.0.1.	Severability. (Alternative)

Proposed Regulation Order

Amendments to Title 17, California Code of Regulations

Adopt New Sections 95300.0.1, 95301.0.1, 95302.0.1, 95303.0.1, 95304.0.1, 95305.0.1, 95306.0.1, 95307.0.1, 95308.0.1, 95309.0.1, 95310.0.1, 95311.0.1, 95312.0.1, 95660.0.1, 95661.0.1, 95662.0.1, 95663.0.1, and 95664.0.1.

§ 95300.0.1. Purpose. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The purpose of this subarticle is to reduce greenhouse gas emissions from heavy-duty (HD) tractors and 53-foot or longer box-type semitrailers (trailers) that transport freight on a highway within California by establishing emission standards and other requirements applicable to both new 2011 and subsequent model year HD tractors and trailers and to 2010 and earlier model year HD tractors and trailers. The use of compliant aerodynamic technologies and low-rolling resistance tires will ensure reductions of greenhouse gas emissions from affected HD tractors and trailers by reducing the aerodynamic drag and tire rolling resistance forces acting on such HD tractors and trailers.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95301.0.1. Applicability. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) This subarticle applies to owners and drivers of the following equipment when driven on a highway within California, as well as motor carriers, California-based brokers, and California-based shippers that use, or cause to be used, the following equipment on a highway within California:

(1) HD tractors that pull 53-foot or longer box-type trailers; and

(2) 53-foot or longer box-type trailers that are pulled by HD tractors.

(b) The requirements in this subarticle do not apply to the following trailer types and the tractors that pull them:

(1) drop-frame trailers;

(2) chassis trailers;

(3) curtain-side trailers;

(4) livestock trailers;

(5) refuse trailers;

(6) box-type trailers less than 53 feet in length;

(7) emergency vehicles;

(8) military tactical support vehicles;

(c) In accordance with the provisions of section 95305, *Exemptions,* specified requirements of this subarticle do not apply to:

(1) local-haul trailers and the tractors pulling local-haul trailers,

(2) local-haul tractors and the trailers pulled by local-haul tractors,

(3) short-haul tractors and the trailers pulled by short-haul tractors,

(4) drayage tractors and the trailers pulled by drayage tractors,

(5) storage trailers and the tractors pulling storage trailers, and

(6) empty 53-foot and longer box-type trailers pulled by HD tractors.

Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code.
Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95302.0.1 Definitions. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The following definitions apply to this subarticle:

(1) "*Aerodynamic technologies*" means components designed to reduce wind resistance on the tractor or trailer resulting in improved overall tractor fuel economy and reduced carbon dioxide emissions. There are two types of aerodynamic technologies: fairings and flow control devices.

(2) "*Box-type trailer*" means a dry-van trailer or refrigerated-van trailer that is not a drop-frame trailer.

(3) "*Broker*" means a person who, for compensation, arranges or offers to arrange the transportation of property by a motor carrier. A motor carrier, or person who is an employee or bona fide agent of a carrier, is not a broker within the meaning of this section when it arranges or offers to arrange the transportation of shipments which it is authorized to transport and which it has accepted and legally bound itself to transport.

(4) "*Cab side extender*" means an air flow control device placed vertically on the rear side of the tractor that reduces the space between the tractor and trailer.

(5) "*California-based broker*" means a broker that maintains a business location in California.

(6) "*California-based shipper*" means a shipper that operates a facility in California where freight is located prior to its transportation.

(7) "*Chassis trailer*" means a trailer composed of a simple chassis for the mounting of a containerized load.

(8) "*Compliance year*" means the calendar year in which a fleet owner may bring trailers into compliance to meet the minimum fleet conformance threshold that takes effect on January 1 of the following year.

(9) "*Compliant trailer*" means a trailer that complies with the equipment requirements set forth in section 95303(b). For the purposes of the optional trailer fleet compliance schedules, to bring a trailer into compliance means to either retrofit the trailer with the necessary aerodynamic technology or technologies to comply with the equipment requirements set forth in section 95303(b), or remove the trailer from the owner's fleet.

(10) "*Conformance*" means meeting or exceeding the minimum fleet conformance thresholds defined in section 95307, *Optional Trailer Fleet Compliance Schedules*, Tables 1, 2 and 3. A conformance threshold defines the percentage of trailers in a

fleet that are required to be compliant in accordance with a large fleet compliance schedule or a small fleet compliance schedule.

(11) "*Curtain-side trailer*" means a trailer with tarp sides that can be loaded from the sides, top, or rear.

(12) "*Delayed compliance trailer*" means a trailer for which compliance may be delayed pursuant to section 95307(b)(4).

(13) "*Dispatch*" means to coordinate delivery, pickup, and drop-off schedules of vehicles; and monitor the delivery of freight from these vehicles.

(14) "*Drayage tractor*" means any in-use on-road tractor with a gross vehicle weight rating of greater than 26,000 pounds operating on or transgressing through port or intermodal railyard property for the purpose of loading, unloading or transporting freight.

(15) "*Driver*" means a person who physically operates a HD tractor.

(16) "*Drop-frame trailer*" means an enclosed rectangular trailer with a deck that is lower to the ground in the area between the trailer hitch and the trailer wheels, to create more cargo space.

(17) "*Dry-van trailer*" means an enclosed rectangular trailer that is not a refrigerated-van trailer.

(18) "*Early compliance trailer*" means a trailer that has been brought into compliance with the equipment requirements set forth in section 95303(b)(3) as applicable, before January 1, 2010, and for which the owner receives credit, in accordance with the *early compliance option* set forth in section 95307(b)(4), that may be used to delay the compliance of delayed compliance trailers.

(19) "*Emergency vehicle*" means a vehicle as defined in California Vehicle Code section 165.

(19.1) "Emission standard," as it applies to the compliance with the requirements and standards set forth in this section, and the remedies provided for in the Health and Safety Code for noncompliance, relates to the emission characteristics of a motor vehicle or motor vehicle engine and means:

(A) a numerical limit on the amount of a given pollutant that a motor vehicle or motor vehicle engine may emit into the atmosphere; or

(B) a requirement that a motor vehicle or motor vehicle engine be equipped with a certain type of pollution-control device or some other design feature related to the control of emissions.

(19.2) "Evaporative emission standards" are a subset of emission standards that refer to the specific motor vehicle fuel evaporative emission standards and test procedures incorporated by reference in title 13, CCR section 1976 to which the engine is certified.

(19.3) "Exhaust emission standards" or "tailpipe emission standards" are a subset of emission standards that collectively refer to the specific standards or family

certification Level (FCL) and family emission limit (FEL) emission levels to which an engine is certified.

(20) "*Empty trailer*" means a trailer that does not contain freight. A trailer that contains only items used for the handling or securing of freight, such as moving blankets, straps, moving dollies, and tool kits that are used in the transport of other items in the trailer, or to maintain the tractor or trailer on the road, is considered an empty trailer.

(21) "*Fairing*" means a structure with smoothly contoured solid surfaces that reduces the wind resistance of the objects it covers.

(22) "*Fleet*" means one or more trailers owned by a person, business, or government agency. A fleet consists of the total number of 53-foot or longer box-type trailers under common ownership or control even if they are part of different subsidiaries, divisions, or other organizational structures of a company or agency.

(23) "*Flow control device*" means a design element that manipulates the air flow around an object by changing the air flow characteristics in order to reduce the pressure force exerted on the vehicle.

(24) "*Freight*" means any item being transported for delivery in a 53-foot or longer box-type trailer. Items that remain in the trailer after all freight is delivered are not considered freight. These include items that are used exclusively to secure items being transported in the trailer, protect items being transported in the trailer, load items being transported in the trailer, or repair the tractor or trailer. Items that are not considered freight could include moving blankets, straps, tool kits, and moving dollies.

(25) "*Fuel tank fairing,*" also known as a chassis skirt, means a fairing located at the base of the cab between the front wheel of the tractor and the forward-most rear wheel, covering the open space and streamlining the fuel tank.

(26) "*Good operating condition*" means the condition of a HD tractor or box-type trailer that meets the applicable standards in section 95304, *Good Operating Condition Requirements*, for continued aerodynamic efficiency.

(27) "*Gross vehicle weight rating*" or "*GVWR*" means the "GVWR" as defined in California Vehicle Code section 350.

(28) "*Heavy-duty tractor*" or "*HD tractor*" means a class 7 or class 8 motor vehicle designed to pull a semitrailer on a highway by means of a fifth wheel mounted over the rear axle(s).

(29) "*Highway*" means a "highway" as defined in California Vehicle Code section 360.

(30) "*Integrated sleeper cab roof fairing*" means a fairing located on the roof of a sleeper-cab-equipped tractor that extends from the front windshield of the tractor cab to the rear edge of the sleeper cab, with enclosed sides that line up with the sides of the sleeper cab.

(31) "*Intermodal railyard*" means any rail facility where trailers are transferred from drayage tractor to train or vice versa.
(32) "*Livestock trailer*" means a semitrailer designed to transport live animals.
(33) "*Local-haul base*" means the location where a local-haul tractor or local-haul trailer is garaged or from which it is routinely dispatched.
(34) "*Local-haul tractor*" means a HD tractor that travels exclusively within a 100-mile radius of its local-haul base.
(35) "*Local-haul trailer*" means a 53-foot or longer box-type trailer that travels exclusively within a 100-mile radius of its local-haul base.
(36) "*Low-rolling-resistance tire*" means a tire that is designed to improve fuel efficiency of a tractor pulling a trailer by minimizing its rolling resistance, which consists of the energy lost as heat within the rubber itself, as well as aerodynamic drag of the tire, and friction between the tire and the road and between the tire and the rim when the tire is rolling under load; rolling resistance is expressed as the energy consumed per unit distance as the tire rolls under load.
(37) "*Military tactical support vehicle*" means a "Military Tactical Support Vehicle" as defined in title 13, California Code of Regulations (CCR), section 1905.
(38) "*Motor carrier*" means a "Motor carrier" as defined in California Vehicle Code section 408.
(39) "*Non-compliant Tractor Pass*" means a temporary permit issued by the Executive Officer in accordance with the requirements of section 95305(h) that allows a HD tractor to pull a 53-foot or longer box-type trailer on a highway within California without meeting the requirements of sections 95303(a) and 95305(b) for a defined time period not to exceed five consecutive days.
(40) "*Ocean-going vessel*" means a commercial, government, or military vessel meeting any one of the following criteria:
    (A) A vessel greater than or equal to 400 feet in length overall (LOA) as defined in 50 Code of Federal Regulations (CFR) section 679.2, as adopted June 19, 1996;
    (B) A vessel greater than or equal to 10,000 gross tons (GT ITC) pursuant to the convention measurement (international system) as defined in 46 CFR sections 69.51-.61, as adopted September 12, 1989; or
    (C) A vessel propelled by a marine compression ignition engine with a per-cylinder displacement of greater than or equal to 30 liters.
(41) "*Open-shoulder tire*" means a tire that is constructed such that the two outer tread ribs, located where the tread and sidewalls meet, are separated into individual tread blocks and is designed to improve traction when traveling on mud or snow covered highways.
(42) *"Owner"* of a tractor or trailer means the person or persons registered as the owner of the tractor or trailer by the California Department of Motor Vehicles or its

equivalent in another state, province, or country (presumed at the time of any citation to be the person or persons identified as the owner on the registration document or title carried on the vehicle), except in the following circumstances:

(A) for a tractor or trailer owned by the federal government and not registered in any state or local jurisdiction, the owner means the branch, agency or other organization within the federal government that operates the tractor or trailer, that is required to maintain accountability for the vehicle, or that is shown by the accountable entity to be responsible for the tractor's or trailer's maintenance.

(B) for a leased tractor, the person or persons registered as the owner of the tractor or trailer by the California Department of Motor Vehicles or its equivalent in another state, province, or country (usually the lessor) is the owner for purposes of this subarticle, except that the lessee of the tractor is the owner for purposes of this subarticle if the lessor demonstrates that either the lessor provided the lessee with the following statement on a document separate from the lease agreement, or the lease agreement includes the following statement:

"The lessee of this heavy-duty tractor understands that when using a heavy-duty tractor to pull a 53-foot or longer box-type trailer on a highway within California, the heavy-duty tractor must be compliant with sections 95300-95312, title 17, California Code of Regulations, and that it is the responsibility of the lessee to ensure this heavy-duty tractor is compliant. The regulations may require this heavy-duty tractor to have low-rolling-resistance tires that are U.S. Environmental Protection Agency (U.S. EPA) SmartWay Verified Technologies prior to current or future use in California, or may entirely prohibit use of this tractor in California if it is a model year 2011 or later tractor and is not a U.S. EPA SmartWay Certified Tractor."

(C) for a leased trailer that is leased prior to January 1, 2013, the person or persons registered as the owner of the tractor or trailer by the California Department of Motor Vehicles or its equivalent in another state, province, or country (usually the lessor) is the owner for purposes of this subarticle, except that the lessee of the trailer is the owner for purposes of this subarticle if both of the following requirements are met:

1. The lessor demonstrates that the lessor provided the lessee with actual written notice that clearly informed the lessee about the requirements of this subarticle and about the lessee's obligation under terms of the lease to ensure the trailer complies with those requirements prior to use of the trailer in California. This

requirement may be satisfied if either the lessee is provided with the following statement on a document separate from the lease agreement, or the following statement is included in the lease agreement:

"The lessee of this box-type trailer understands that when using a heavy-duty tractor to pull a 53-foot or longer box-type trailer on a highway within California, the box-type trailer must be compliant with sections 95300-95312, title 17, California Code of Regulations, and that it is the responsibility of the lessee to ensure this box-type trailer is compliant. The regulations may require this trailer to have low-rolling-resistance tires and aerodynamic technologies that are U.S. Environmental Protection Agency SmartWay Verified Technologies prior to current or future use in California."

2. The lessor demonstrates and informs the lessee that either:
   a. the lease agreement does not prohibit the lessee from modifying the trailer to be compliant with the requirements of this subarticle; or
   b. the lessor provides a reasonable method to exchange the trailer for one that is compliant with this subarticle.

(D) for a leased trailer that is leased on or after January 1, 2013, the person or persons registered as the owner of the tractor or trailer by the California Department of Motor Vehicles or its equivalent in another state, province, or country (usually the lessor) is the owner for purposes of this subarticle, except that the lessee of the trailer is the owner for purposes of this subarticle if either the lessor demonstrates that the lessor provided the lessee with the following statement on a document separate from the lease agreement prior to entering the lease agreement, or the lease agreement includes the following statement:

"*The lessee of this box-type trailer understands that when using a heavy-duty tractor to pull a 53-foot or longer box-type trailer on a highway within California, the box-type trailer must be compliant with sections 95300-95312, title 17, California Code of Regulations,; and that it is the responsibility of the lessee to ensure this box-type trailer is compliant. The regulations may require this trailer to have low-rolling-resistance tires and aerodynamic technologies that are U.S. Environmental Protection Agency SmartWay Verified Technologies prior to current or future use in California.*"

(E) For purposes of this subarticle, the terms "lease agreement," "leased," "lessor," and "lessee" mean the same as "rental agreement," "rented," "owner of the rented vehicle," and "renter," respectively.

(43) "*Person*" means an individual, corporation, business trust, estate, trust, partnership, limited liability company, association, joint venture, government, governmental subdivision, agency, instrumentality, public corporation, or any other legal or commercial entity.

(43.1)"*Phase 1 Certified Tractor*" means a tractor that has been certified in accordance with either the Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, as adopted by the USEPA (76 Fed. Reg. 57106 (September 15, 2011)); or the Greenhouse Gas Emission Requirements for New 2014 and Subsequent Model Heavy-Duty Vehicles, as adopted by the California Air Resources Board, sections 95660 to 95664, Subarticle 12, title 17, California Code of Regulations.

(44) "*Port*" means the port property where marine and port terminals are typically located for the loading and unloading of water-borne commerce onto and from ocean-going vessels. Ports covered by this regulation include, but are not limited to, the Port of Long Beach, Port of Los Angeles, Port of Humboldt Bay, Port of San Diego, Port of Hueneme, Port of Oakland, Port of San Francisco, Port of Sacramento, Port of Stockton, Port of Redwood City, Port of Crockett, Port of Richmond, Port of Pittsburg, and the Port of Benicia.

(45) "*Rear trailer fairing*" means a fairing that attaches to the perimeter outer edges of the trailer's rear-facing surface to provide a continuous surface for the air passing over the side and top surfaces of the trailer.

(46) "*Refrigerated-van trailer*" means a rectangular trailer van that has a refrigeration or heating unit built into the front of the trailer to maintain precise temperatures and is designed to haul freight that requires climate control, such as frozen food, fresh produce, hot or warm food, and other perishable items.

(47) "*Refuse trailer*" means a trailer that is used to haul solid waste material. Solid waste includes garbage, construction debris, commercial refuse, and other discarded materials.

(48) "*Register*" means to provide the Executive Officer with the information identified in sections 95306 (b) through (f) and sections 95307(b)(3) and 95307(c)(2), as required, by means of TRUCRS.

(49) "*Relocation Pass*" means a temporary permit issued by the Executive Officer in accordance with the requirements of section 95305(f) that allows a local-haul trailer to relocate to either a new local-haul base or to an out-of-state location while hauling freight, or a storage trailer to relocate to a new storage trailer location or to

an out-of-state location while hauling freight, without meeting all of the applicable requirements of section 95303(b).

(50) "*Semitrailer*" means a "Semitrailer" as defined in section 550 of the California Vehicle Code.

(51) "*Shipper*" means a person that has possession of freight prior to its transportation. This may include, but is not limited to, owners of freight distribution centers, and temporary freight storage facilities.

(52) "*Short-haul tractor*" means a HD tractor that travels less than 50,000 miles per year, including all miles accrued both inside and outside of California.

(53) "*Sleeper-cab tractor*" means a HD tractor originally manufactured with a tractor body that has a compartment, typically containing a bed, located behind the driving compartment.

(54) "*Storage trailer*" means a trailer that is used for the storage of items at a fixed location.

(55) "*Storage trailer location*" means the street address where a registered storage trailer is used to store items.

(56) "*Tractor*" means a "Truck Tractor" as defined in section 655 of the California Vehicle Code.

(57) "*Trailer*" means a semitrailer.

(58) *"Transfer of Ownership Pass"* means a temporary permit issued by the Executive Officer in accordance with the requirements of section 95305(g) that allows a HD tractor to pull a non-compliant 53-foot or longer box-type trailer on a highway within California without meeting all of the applicable requirements of section 95303(b) for the purpose of delivering that trailer from its current location to the transferee's location.

(59) "*Transport refrigeration unit*" or "TRU" means a refrigeration system powered by an integral internal combustion engine designed to control the environment of temperature sensitive products that are transported in refrigerated-van trailers. TRUs may be capable of both cooling and heating.

(60) "*TRUCRS (Truck Regulation Upload, Compliance, and Reporting System)*" is the on-line reporting tool for this subarticle.

(61) "*U.S. EPA SmartWay Certified Tractor*" means a tractor that has been certified or designated by the United States Environmental Protection Agency (U.S. EPA) to meet the technical specifications and requirements of the U.S. EPA SmartWay Transport Partnership Program.

(62) *"U.S. EPA SmartWay Certified Trailer"* means a 53-foot or longer box-type trailer that has been certified or designated by the U.S. EPA to meet the technical specifications and requirements of the U.S. EPA SmartWay Transport Partnership Program.

(63) "*U.S. EPA SmartWay Transport Partnership Program*" means the U.S. EPA's voluntary program that is a collaboration between the U.S. EPA and the transportation industry to improve energy efficiency, reduce greenhouse gas and air pollutant emissions, and improve energy security. This program establishes incentives for improving freight movement efficiency and the fuel efficiency of freight moving equipment.

(64) "*U.S. EPA SmartWay Verified Technology*" or "*U.S. EPA Smart-Way Verified Technologies*" means one or more aerodynamic technologies or low-rolling-resistance tire models that have been identified by the U.S. EPA as meeting the technical specifications and requirements of the U.S. EPA SmartWay Transport Partnership Program.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95303.0.1. Requirements and Compliance Deadlines. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) Tractor Requirements.

(1) Except as provided in section 95305, *Exemptions*, beginning January 1, 2010, no 2011 through 2013 model year sleeper-cab tractor pulling a 53-foot or longer box-type trailer shall operate on a highway within California unless such tractor is either:

(A) a U.S. EPA SmartWay Certified Tractor, or

(B) a U.S. EPA SmartWay Certified Tractor that has been modified provided:

1. the modification is necessary for the tractor to perform its designed job function,

2. there is no reasonable alternative to the modification that would involve or require a lesser degree of modifications to the tractor, and

3. the Executive Officer has previously approved the modification.

a. An applicant requesting an exemption pursuant to section 95303(a)(1)(B) must submit information to the Executive Officer that describes the proposed modification(s), the need therefor, and the absence or lack of reasonable alternatives to the modification. Such information includes, without limitation, engineering drawings, blueprints, schematics, scientific or technical articles, contract specifications, etc.

b. The Executive Officer will approve or disapprove a request for an exemption pursuant to section 95303(a)(1)(B) upon information submitted by an applicant as specified in section 95303(a)(1)(B)3.a. and good engineering judgment.

(2) Except as provided in section 95305, *Exemptions*, beginning January 1, 2010, no 2011 through 2013 model year HD tractor, including but not limited to sleeper-cab tractors, pulling a 53-foot or longer box-type trailer shall operate on a highway within California unless such tractor's tires are U.S. EPA SmartWay Verified Technologies.

(3) Except as provided in section 95305, *Exemptions*, beginning January 1, 2013, no 2010 or previous model year HD tractor, pulling a 53-foot or longer box-type trailer shall operate on a highway within California unless such tractor's tires are U.S. EPA SmartWay Verified Technologies.

(b) Trailer Requirements.

(1) *2011 and Subsequent Model Year Dry-Van Trailer Requirements.*

Except as provided in section 95305, *Exemptions,* beginning January 1, 2010, no 2011 or subsequent model-year 53-foot or longer dry-van trailer shall travel on a highway within California unless such trailer is either:

(A) a U.S. EPA SmartWay Certified Trailer, or

(B) equipped with both:

1. tires that are U.S. EPA SmartWay Verified Technologies; and

2. a dry-van trailer aerodynamic technology or combination of technologies that is either

a. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that has been demonstrated to the U.S. EPA to meet or exceed a 5 percent fuel savings in accordance with the requirements defined by the U.S. EPA SmartWay Partnership Program, or

b. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that met the criteria defined in section 95303(b)(1)(B)2.a., but has been modified in any manner from the U.S. EPA SmartWay Verified Technology configurations. Only modifications that are required to enable a particular SmartWay technology to be installed on a trailer are allowed. Such modifications must not significantly increase the aerodynamic drag of the base, unmodified SmartWay verified configuration, and the modifications may only be used if prior written approval is obtained from the Executive Officer. The Executive Officer will base his or her approval on information submitted that describes the modification, the need therefor, and any test data or other information that demonstrates the proposed modifications would not significantly increase the aerodynamic drag of the SmartWay verified configuration, and on good engineering judgment.

(2) *2011 and Subsequent Model Year Refrigerated-Van Trailer Requirements.*

Except as provided in section 95305, *Exemptions,* beginning January 1, 2010, no 2011 or subsequent model year 53-foot or longer refrigerated-van trailer shall travel on a highway within California unless such trailer is either:

(A) a U.S. EPA SmartWay Certified Trailer, or

(B) equipped with both:

1. tires that are U.S. EPA SmartWay Verified Technologies; and

2. a dry-van trailer or refrigerated-van trailer aerodynamic technology or combination of technologies that is either

a. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that has been demonstrated to the U.S. EPA to meet or exceed a 4 percent fuel savings in accordance with the requirements defined by the U.S. EPA SmartWay Partnership Program, or

b. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that met the criteria defined in section 95303(b)(2)(B)2.a., but has been modified in any manner from the U.S. EPA SmartWay Verified Technology configurations. Only modifications that are required to enable a particular SmartWay technology to be installed on a trailer are allowed. Such modifications must not significantly increase the aerodynamic drag of the base, unmodified SmartWay verified configuration, and the modifications may only be used if prior written approval is obtained from the Executive Officer. The Executive Officer will base his or her approval on information submitted that describes the modification, the need therefor, and any test data or other information that demonstrates the proposed modifications would not significantly increase the aerodynamic drag of the SmartWay verified configuration, and on good engineering judgment.

(3) *2010 or Previous Model Year Dry-Van and Refrigerated-Van Trailer Requirements.*

Except as provided in section 95305, *Exemptions,* a 2010 or previous model year 53-foot or longer box-type trailer pulled by a HD tractor may not travel on a highway within California unless all of the following requirements are met by the compliance dates specified.

(A) By January 1, 2017, a 2010 or previous model year 53-foot or longer box-type trailer not identified in section 95303(b)(3)(F) must be equipped with tires that are U.S. EPA SmartWay Verified Technologies.

(B) By January 1, 2013, a 2010 or previous model year 53-foot or longer dry-van trailer that is not participating in an optional trailer fleet compliance schedule as defined in section 95307, *Optional Trailer Fleet Compliance Schedules,* must either be

1. a U.S. EPA SmartWay Certified Trailer, or

2. equipped with a dry-van trailer aerodynamic technology or combination of technologies that is either

a. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that has been demonstrated to the U.S. EPA to meet or exceed a 5 percent fuel savings in accordance with the requirements defined by the U.S. EPA SmartWay Partnership Program, or

b. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that met the criteria defined in section 95303(b)(3)(B)2.a., but has been modified in any manner from the U.S. EPA SmartWay Verified Technology configurations. Only modifications that are required to enable a particular SmartWay technology to be installed on a trailer are allowed. Such modifications must not significantly increase the aerodynamic drag of the base, unmodified SmartWay verified configuration, and the modifications may only be used if prior written approval is obtained from the Executive Officer. The Executive Officer will base his or her approval on information submitted that describes the modification, the need therefor, and any test data or other information that demonstrates the proposed modifications would not significantly increase the aerodynamic drag of the SmartWay verified configuration, and on good engineering judgment.

(C) By January 1, 2013, a 2010 or previous model year 53-foot or longer refrigerated-van trailer that is not participating in an optional trailer fleet compliance schedule as defined in section 95307, *Optional Trailer Fleet Compliance Schedules,* and not identified in section 95303(b)(3)(F), must either be

1. a U.S. EPA SmartWay Certified Trailer, or

2. equipped with a dry-van or refrigerated-van trailer aerodynamic technology or combination of technologies that is either

a. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that has been demonstrated to the U.S. EPA to meet or exceed a 4 percent fuel savings in accordance with the requirements defined by the U.S. EPA SmartWay Partnership Program, or

b. a U.S. EPA SmartWay Verified Technology or combination of U.S. EPA SmartWay Verified Technologies that met the criteria defined in section 95303(b)(3)(C)2.a., but has been modified in any manner from the U.S. EPA SmartWay Verified Technology configurations. Only modifications that are required to enable a particular SmartWay technology to be installed on a trailer are allowed. Such modifications must not significantly increase the aerodynamic drag of the base, unmodified SmartWay verified configuration, and the modifications may only be used if prior written approval is obtained from the Executive Officer. The Executive Officer will base his or her approval

on information submitted that describes the modification, the need therefor, and any test data or other information that demonstrates the proposed modifications would not significantly increase the aerodynamic drag of the SmartWay verified configuration, and on good engineering judgment.

(D) For dry-van trailers participating in an optional trailer fleet compliance schedule as defined in section 95307, *Optional Trailer Fleet Compliance Schedules,* a 2010 or previous model year 53-foot or longer dry-van trailer must either meet the requirements defined in section 95303(b)(3)(B)1. or the requirements defined in section 95303(b)(3)(B)2. by the applicable compliance dates in section 95307, Optional Trailer Fleet Compliance Schedules.

(E) For refrigerated-van trailers participating in an optional trailer fleet compliance schedule as defined in section 95307, *Optional Trailer Fleet Compliance Schedules,* a 2010 or previous model year 53-foot or longer refrigerated-van trailer must either meet the requirements defined in section 95303(b)(3)(C)1. or the requirements defined in section 95303(b)(3)(C)2. by the applicable compliance dates in section 95307, *Optional Trailer Fleet Compliance Schedules.*

(F) A 2003 through 2009 model year 53-foot or longer refrigerated-van trailer equipped with 2003 or subsequent model year transport refrigeration unit engine must be equipped with tires that are U.S. EPA SmartWay Verified Technologies and either meet the requirements defined in section 95303(b)(3)(C)1. or the requirements defined in section 95303(b)(3)(C)2. by:

1. January 1, 2018 for a 2003 or 2004 model year trailer
2. January 1, 2019 for a 2005 or 2006 model year trailer
3. January 1, 2020 for a 2007, 2008, or 2009 model year trailer

(c) Requirements for Drivers.

(1) A driver may not operate a HD tractor to pull a 53-foot or longer box-type trailer on a highway within California unless both the tractor and the trailer:

(A) comply with the applicable requirements and compliance deadlines set forth in sections 95303(a) and 95303(b); and

(B) are in good operating condition as defined in section 95304, *Good Operating Condition Requirements.*

(2) A driver must, upon request, provide the following information to authorized enforcement personnel identified in section 95308:

(A) driver's license;

(B) vehicle odometer reading, if the tractor is an exempt short-haul tractor;

(C) tractor registration;

(D) trailer registration;

(E) origin of freight;

(F) destination of freight;

(G) if dispatched by a motor carrier, the motor carrier information set forth in section 95303(g)(1)(B);

(H) if dispatched by a broker, the broker information set forth in section 95303(f)(1)(B);

(I) if operating a drayage tractor that is exempt pursuant to the requirements of section 95305(d), documentation indicating the port or intermodal railyard of origin or destination, as applicable; and

(J) if operating a HD tractor pulling a 53-foot or longer box-type trailer that is operating under either a Relocation Pass pursuant to section 95305(f), Transfer of Ownership Pass pursuant to section 95305(g), or Non-compliant Tractor Pass pursuant to section 95305(h), the pass approval number, as applicable.

(3) A driver of a HD tractor pulling a 53-foot or longer box-type trailer that is exempt pursuant to section 95305(l) must, upon request, allow authorized enforcement personnel to directly view the inside of the trailer.

(4) A driver shall not operate a HD tractor to pull a 53-foot or longer box-type trailer on a highway within California if the tractor or the trailer has aerodynamic technologies that are not deployed or not in their operational configuration.

(d) Requirements for Owners of HD Tractors.

(1) An owner of a HD tractor may not use or cause to be used a HD tractor to pull a 53-foot or longer box-type trailer on a highway within California unless both the HD tractor and the box-type trailer:

(A) comply with the applicable requirements and compliance deadlines set forth in sections 95303(a) and 95303(b); and

(B) are in good operating condition as defined in section 95304, *Good Operating Condition Requirements.*

(e) Requirements for Owners of Box-Type Trailers.

(1) An owner of a 53-foot or longer box-type trailer must ensure that the 53-foot or longer box-type trailer will not be pulled by a HD tractor on a highway within California unless the 53-foot or longer box-type trailer:

(A) complies with the requirements and compliance deadlines set forth in section 95303(b); and

(B) is in good operating condition as defined in section 95304, Good Operating Condition Requirements.

(2) An owner of one or more 2010 or previous model year 53-foot or longer box-type trailers that are subject to the requirements of section 95303(b)(3) may elect to follow an alternative compliance schedule, if applicable. Owners that choose to follow an alternative compliance schedule must meet the requirements of section 95307, *Optional Trailer Fleet Compliance Schedules.*

(f) Requirements for California-based Brokers.

(1) A California-based broker must:

(A) only dispatch a HD tractor or a 53-foot or longer box-type trailer for travel on a highway within California if the tractor or trailer complies with the applicable operating requirements and compliance deadlines set forth in sections 95303(a) and 95303(b);

(B) provide the following information to a dispatched driver who will be traveling on a highway within California:

1. broker's business name;

2. broker's street address, state, zip code;

3. broker contact person's name; and

4. broker contact person's business phone number.

(g) Requirements for Motor Carriers.

(1) A motor carrier must:

(A) only dispatch a HD tractor or a 53-foot or longer box-type trailer for travel on a highway within California if the tractor or trailer complies with the applicable operating requirements and compliance deadlines set forth in sections 95303(a) and 95303(b);

(B) provide the following information to a dispatched driver who will be traveling on a highway within California:

1. motor carrier's business name;

2. motor carrier's street address, state, zip code;

3. motor carrier contact person's name; and

4. motor carrier contact person's business phone number.

(h) Requirements for California-based Shippers.

(1) A California-based shipper must not ship freight from its California facility or facilities in a 53-foot or longer box-type trailer pulled by a HD tractor on a highway within California unless the HD tractor and the 53-foot or longer box-type trailer comply with the operating requirements and compliance deadlines set forth in sections 95303(a) and 95303(b).

(i) Requirements for California-licensed Vehicle Dealers.

(1) Any California-licensed vehicle dealer selling a HD tractor or 53-foot or longer box-type trailer subject to this regulation must provide the buyer with the following disclosure in writing:

"A heavy-duty tractor and 53-foot or longer box-type trailer operated in California may be subject to the Heavy-Duty Vehicle Greenhouse Gas Emission Reduction Regulation set forth under sections 95300 - 95312, title 17, California Code of Regulations. These vehicles may be required to use low-rolling-resistance tires and meet aerodynamic equipment requirements to reduce greenhouse gas emissions."

Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95304.0.1. Good Operating Condition Requirements. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *Good Operating Condition Criteria for U.S. EPA SmartWay Certified Tractor Aerodynamic Technologies.*

(1) An aerodynamic technology such as an aerodynamic mirror, a cab side extender, a fuel tank fairing, and an integrated sleeper cab roof fairing on a U.S. EPA Certified SmartWay Tractor must meet the following criteria:

(A) Each must be installed in accordance with manufacturer's specifications;

(B) Each must be securely fastened to the tractor; and

(C) Each must not be used if it is damaged to such an extent as to compromise its aerodynamic effectiveness.

(b) *Good Operating Condition Criteria for Trailer Aerodynamic Technologies.*

(1) An aerodynamic technology installed on a box-type trailer must meet the following criteria:

(A) The aerodynamic technology must either be installed:

1. in accordance with the aerodynamic technology manufacturer's specifications such that the technology continues to maintain its verified status in accordance with the requirements of the U.S. EPA SmartWay Transport Partnership Program, or

2. in a configuration approved by the Executive Officer.

(B) The aerodynamic technology must be securely fastened to the trailer;

(C) The aerodynamic technology must not be used with missing sections; and

(D) The aerodynamic technology must not be used if damaged to such an extent as to compromise its aerodynamic effectiveness.

Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95305.0.1. Exemptions. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *Short-Haul Tractor Exemption Requirements.*

(1) A short-haul tractor pulling a 53-foot or longer box-type trailer on a California highway is exempt from the requirements of sections 95303(a)(1), 95303(a)(2), and 95303(a)(3), as applicable, if the short-haul tractor

(A) has been registered in accordance with the requirements of section 95306, *Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements,* and

(B) is driven less than 50,000 miles annually, including all miles accrued both inside and outside of California.

(2) A 53-foot or longer box-type trailer is exempt from the requirements of section 95303(b) while it is being pulled by an exempt short-haul tractor.

(3) The use of an exempt short-haul tractor in excess of 50,000 miles traveled during the one year period from the date the owner submitted the applicable information identified in sections 95306(b) through (f) is a violation of this subarticle.

(4) The driver of an exempt short-haul tractor must, upon request, provide the applicable information specified in section 95303(c)(2) to authorized enforcement personnel identified in section 95308, *Enforcement.*

(5) The driver of an exempt short-haul tractor must, upon request, allow authorized enforcement personnel identified in section 95308, *Enforcement,* to directly view the odometer of the exempt short-haul tractor.

(6) For an exempt short-haul tractor that is removed from an owner's exempt short-haul tractor fleet, taken out of service, or is otherwise no longer exempt, the owner must notify the Executive Officer and update the short-haul tractor information submitted in accordance with section 95306(d) to reflect this change in status prior to change in ownership of the tractor or prior to the tractor traveling on a highway within California, whichever occurs first, or within 30 days of the tractor being taken out of service. A tractor that is removed from the owner's short-haul tractor fleet or that for any other reason loses its exempt status is ineligible for the short-haul exemption under that owner for 36 months from the date its exempt status was terminated.

(7) A short-haul tractor exemption remains in effect for a period of one year from the date that the information required in sections 95306(b) through 95306(d) and section 95306(f) is submitted to the Executive Officer if the owner and the exempt tractor are in continuing compliance with the requirements of this section. To extend the exemption for an additional one year from the expiration date of the exemption, the owner must submit to the Executive Officer the tractor's odometer reading taken at the end of the one year period no more than 15 days after the expiration date of the exemption.

(8) The owner of more than one short-haul tractor may consolidate the dates to apply for an extension with approval of the Executive Officer.

(9) A 2014 or subsequent model year tractor that meets the requirements of sections 95305(a)(1)(A) and 95305(a)(1)(B) is an exempt short-haul tractor.

(b) *Local-Haul Tractor Exemption Requirements.*

(1) A local-haul tractor pulling a 53-foot or longer box-type trailer is exempt from the requirements of sections 95303(a)(1), but still must comply with the requirements of sections 95303(a)(2) and 95303(a)(3), as applicable if

(A) the local-haul tractor has been registered in accordance with the requirements of section 95306, *Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements,* and

(B) the tractor-trailer combination is traveling within 100 miles of the local-haul tractor's local-haul base.

(2) A 2011 or subsequent model year 53-foot or longer box-type trailer is exempt from the requirements of sections 95303(b)(1)(A), 95303(b)(1)(B)2., 95303(b)(2)(A), and 95303(b)(2)(B)2., but still must comply with the requirements of sections 95303(b)(1)(B)1. or 95303(b)(2)(B)1. while it is being pulled by an exempt local-haul tractor.

(3) A 2010 or previous model year 53-foot or longer box-type trailer is exempt from the requirements of sections 95303(b)(3)(B) and 95303(b)(3)(C), but still must comply with the requirements of section 95303(b)(3)(A) while it is being pulled by an exempt local-haul tractor.

(4) The driver of an exempt local-haul tractor must, upon request, provide the applicable information listed in section 95305(c)(2) to authorized enforcement personnel identified in section 95308, *Enforcement.*

(5) A local-haul tractor exemption will remain in effect as long as the owner and the exempt tractor remain in compliance with the requirements of this section.

(6) The owner of an exempt local-haul tractor must notify the Executive Officer if the information submitted in accordance with sections 95306(b) through 95306(d) and section 95306(f) has changed, and must submit the updated information to the Executive Officer within 15 days of change.

(7) For a local-haul tractor that is removed from an owner's local-haul fleet, taken out of service, or is otherwise no longer exempt, the owner must notify the Executive Officer and update the local-haul tractor information submitted in accordance with section 95306(d) to reflect this change in status prior to change in ownership of the tractor, or prior to the tractor traveling on a highway within California, whichever occurs first, or within 30 days of the tractor being taken out of service.

(8) A 2014 or subsequent model year tractor that meets the requirements of sections 95305(b)(1)(A) and 95305(b)(1)(B) is an exempt local-haul tractor.

(c) *Local-Haul Trailer Exemption Requirements.*

(1) A 2011 or subsequent model year local-haul trailer is exempt from the requirements of sections 95303(b)(1)(A), 95303(b)(1)(B)2., 95303(b)(2)(A), and 95303(b)(2)(B)2., but still must comply with the requirements of sections 95303(b)(1)(B)1. or 95303(b)(2)(B)1. if the trailer has been registered in accordance with the requirements of section 95306, *Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements*, and the following conditions are met:

(A) the local-haul trailer is being pulled by a HD tractor on a California highway within 100 miles of the local-haul trailer's local-haul base, or

(B) the local-haul trailer is traveling under a valid Relocation Pass.

(2) A 2010 or previous model year local-haul trailer is exempt from the requirements of sections 95303(b)(3)(B) and 95303(b)(3)(C), but still must comply with the requirements of section 95303(b)(3)(A) if the trailer has been registered in accordance with the requirements of section 95306, *Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements,* and the following conditions are met:

(A) the local-haul trailer is being pulled by a HD tractor on a California highway within 100 miles of the local-haul trailer's local-haul base, or

(B) the local-haul trailer is traveling under a valid Relocation Pass.

(3) A local-haul trailer exemption will remain in effect as long as the owner and the exempt trailer are in compliance with the requirements of this section.

(4) The owner of an exempt local-haul trailer must notify the Executive Officer if the information submitted in accordance with sections 95306(b), 95306(c), and 95306(e) has changed, and must submit the updated information to the Executive Officer within 15 days of change.

(5) For an exempt local-haul trailer that is removed from an owner's local-haul fleet, taken out of service, or is otherwise no longer exempt, the owner must notify the Executive Officer and update the local-haul trailer information submitted in accordance with section 95306(e) to reflect this change in status prior to change in ownership of the trailer, or prior to the trailer traveling on a highway within California, whichever occurs first, or within 30 days of the trailer being taken out of service.

(6) A 2011 or subsequent model year sleeper cab HD tractor is exempt from the requirements of section 95303(a)(1), but still must comply with the requirements of section 95303(a)(2), while it is pulling a local-haul trailer that is exempt under section 95305(c).

(d) *Drayage Tractor-Trailer Exemption Requirements.*

(1) A drayage tractor pulling a 53-foot or longer box-type trailer on a California highway within 100 miles of a port or intermodal railyard, and the trailer it pulls, are exempt from sections 95303(a) and 95303(b), as applicable, provided:

(A) the trailer was off-loaded from an ocean-going vessel or rail car at the port or intermodal railyard prior to being pulled by the drayage tractor, and the driver has documentation indicating the port or intermodal railyard of origin; or

(B) the drayage tractor is transporting the trailer to the port or intermodal railyard to be loaded onto an ocean-going vessel or rail car, and the driver has documentation indicating the port or intermodal railyard of destination.

(e) *Storage Trailer Exemption Requirements.*

(1) A storage trailer is exempt from the requirements of section 95303(b) if the storage trailer has been registered in accordance with the requirements of section 95306, *Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements,* and the storage trailer is traveling under a valid Relocation Pass.

(2) A storage trailer exemption will remain in effect as long as the owner and the exempt storage trailer are in compliance with the requirements of this section.

(3) The owner of an exempt storage trailer must notify the Executive Officer if the information submitted in accordance with sections 95306(b) and 95306(e) has changed, and must submit the updated information to the Executive Officer within 15 days of the change.

(4) For an exempt storage trailer that is removed from an owner's storage trailer fleet, taken out of service, or is otherwise no longer exempt, the owner must notify the Executive Officer and update the exempt storage trailer information submitted in accordance with section 95306(e) to reflect this change in status prior to change in ownership of the trailer, or prior to the trailer traveling on a highway within California, whichever occurs first, or within 30 days of the trailer being taken out of service.

(5) A HD tractor is exempt from the requirements of section 95303(a) while it is pulling a storage trailer that is exempt under section 95305(e).

(f) *Relocation Pass for Trailers.*

(1) An owner that obtains a Relocation Pass for a registered local-haul trailer or a registered storage trailer may operate that vehicle in accordance with the provisions of sections 95305(f)(1)(A) or 95305(f)(1)(B) for a specified period, as determined by the Executive Officer, not to exceed five consecutive days.

(A) A registered local-haul trailer traveling under a Relocation Pass may transport freight on a California highway further than 100 miles from its local-haul base while en route to a new local-haul base that is located further than 100 miles from its current local-haul base, or en route to an out-of-state location.

(B) A registered storage trailer traveling under a Relocation Pass may transport freight on a California highway while en route to a new storage trailer location, or en route to an out-of-state location.

(2) An owner that obtains a Relocation Pass for a 53-foot or longer box-type trailer that is not a registered local-haul trailer or registered storage trailer may operate that vehicle on a California highway exempt from the requirements of section 95303(b) for a specified period, as determined by the Executive Officer, not to exceed five consecutive days provided that the following requirements are met:

(A) after the trailer's Relocation Pass expires, the trailer may not be used to transport freight on a California highway until it is a registered local-haul trailer and operated in accordance with the provisions of section 95305(c), or

(B) after the trailer's Relocation Pass expires, the trailer will not be used to transport freight on a California highway until it is registered as a storage trailer and operated in accordance with the provisions of section 95305(e), or

(C) after the trailer's Relocation Pass expires, the trailer will not be used to transport freight on a California highway until it complies with the equipment requirements of 95303(b).

(3) An owner that relocates a registered local-haul trailer to a new local-haul base under a Relocation Pass must assign the trailer to the local-haul base of destination prior to beginning travel under the Relocation Pass.

(4) To obtain a Relocation Pass, a request to the Executive Officer must be made prior to the trailer's relocation. In the request, the owner must provide the Executive Officer with the following information:

(A) Owner contact information, as specified in section 95306(b).

(B) Trailer vehicle identification number (VIN).

(C) Street address of location of trailer where travel under the Relocation Pass will begin.

(D) Street address of location of trailer where travel under the Relocation Pass will end.

(E) Anticipated date trailer will begin relocation travel.

(5) Regardless of ownership, a trailer will be granted no more than four Relocation Passes per year that are issued in accordance with the requirements of section 95305(f) .

(6) A trailer that has been issued a Relocation Pass in accordance with section 95305(f)(1) may not be issued another Relocation Pass until 30 days after the Pass was issued.

(7) A trailer that has been issued a Relocation Pass in accordance with section 95305(f)(2) may not be issued another Relocation Pass until 30 days after the trailer was registered as a local-haul trailer or storage trailer in accordance with sections 95305(c) or 95305(e), respectively.

(8) The Executive Officer will respond to a request for a Relocation Pass within 15 days of receiving the information identified in section 95305(f)(4) and notify the owner in writing of the decision.

(A) If approved, and upon confirmation of the date of travel by the owner, the Executive Officer will provide the owner with a Relocation Pass in electronic or written format that will contain the following information:

1. Effective dates of the Relocation Pass which shall not exceed five consecutive days beginning with the date the trailer will begin travel.

2. Relocation Pass Approval Number.

(g) *Transfer of Ownership Pass for Trailers.*

(1) Either party (the transferor or transferee) involved in the transfer of ownership of a 53-foot or longer box-type trailer may obtain a Transfer of Ownership Pass for that trailer up to 30 days prior to the transfer of ownership.

(2) A 53-foot or longer box-type trailer traveling under a Transfer of Ownership Pass for the purpose of delivering such trailer from the transferor to the transferee is temporarily exempt from the requirements of section 95303(b).

(3) To obtain a Transfer of Ownership Pass, a request to the Executive Officer must be made prior to the start of trailer delivery from the transferor to the transferee. The request must be made by whomever is the trailer's registered owner at the time of delivery, either the transferor or transferee. In the request, the transferor or transferee must provide the Executive Officer the following information for each trailer:

(A) Transferor's contact information:

1. Transferor's name, and if a corporate entity or governmental agency is selling the trailer, the responsible official and title (if applicable);

2. Name of transferor's company, corporation, or governmental agency (if applicable);

3. Corporate parent (if applicable);

4. Motor carrier identification number and type (if applicable);

5. Vehicle dealer license number and state where it was issued (if applicable);

6. Street address of transferor or transferor's company including city, state or province, zip code, colonia (Mexico only), and country;

7. Mailing address including city, state or province, zip code, colonia (Mexico only), and country;

8. Physical address of location where records pertaining to the applicable sale will be maintained including city, state or province, zip code, colonia (Mexico only), and country;

9. Transferor's contact person's name;

10. Telephone number of contact person;

11. Email address of contact person (if available);

12. Company taxpayer identification number (if applicable); and

13. TRUCRS identification number of corporate parent (if one has been obtained).

(B) Transferee's contact information:

1. Transferee's name, and if a corporate entity or governmental agency is buying the trailer, the responsible official and title (if applicable);

2. Name of transferee's company, corporation, or governmental agency (if applicable);

3. Corporate parent (if applicable);

4. Motor carrier identification number and type (if applicable);

5. Vehicle dealer license number and state where it was issued (if applicable);

6. Street address of transferee or transferee's company including city, state or province, zip code, colonia (Mexico only), and country;

7. Mailing address including city, state or province, zip code, colonia (Mexico only), and country;

8. Physical address of location where records pertaining to the applicable sale will be maintained including city, state or province, zip code, colonia (Mexico only), and country;

9. Transferee's contact person's name;

10. Telephone number of contact person;

11. Email address of contact person (if available);

12. Company taxpayer identification number (if applicable); and

13. TRUCRS identification number of corporate parent (if one has been obtained).

(C) Trailer identification number (VIN).

(D) Address of trailer location prior to start of delivery.

(E) Address of trailer location when delivery is complete.

(F) Date when trailer is scheduled to begin travel on a California highway under the Transfer of Ownership Pass.

(G) Date when trailer is scheduled to end travel on a California highway under the Transfer of Ownership Pass.

(H) If the total length of time from when the trailer is scheduled to begin travel on a California highway under the Transfer of Ownership Pass to when the trailer is

scheduled to end travel on a California highway under the Transfer of Ownership Pass is greater than five consecutive days, the Executive Officer may request additional information from the transferee.

(4) For transfers of ownership where the transferor or transferee is not a licensed vehicle dealer, once a Transfer of Ownership Pass has been approved for a trailer, the transferor and transferee are not jointly eligible for another Transfer of Ownership Pass for that same trailer until one year from the last effective date of the approved Transfer of Ownership Pass.

(5) For transfers of ownership where the transferor or transferee is a licensed vehicle dealer, once a Transfer of Ownership Pass has been approved for a trailer, the transferor and transferee are jointly eligible for only one additional Transfer of Ownership Pass for that same trailer within the one year period that begins with the last effective date of the first approved Transfer of Ownership Pass.

(6) The Executive Officer will respond to a request for a Transfer of Ownership Pass within 15 days of receiving the information identified in section 95305(g)(3) and notify the transferor or transferee in writing of the decision.

(A) If approved, The Executive Officer will provide a Transfer of Ownership Pass in electronic or written format that will contain the following information:

1. Effective dates of the Transfer of Ownership Pass.

2. Transfer of Ownership Pass Approval Number.

(h) *Non-compliant Tractor Pass*

(1) Until January 1, 2015, a HD tractor traveling under a Non-compliant Tractor Pass while pulling a 53-foot or longer box-type trailer on a highway within California is temporarily exempt from the requirements of section 95303(a) for a specified period, as determined by the Executive Officer, not to exceed five consecutive days.

(2) A 53-foot or longer box-type trailer pulled by a HD tractor traveling under a Non-compliant Tractor Pass on a highway within California is temporarily exempt from the requirements of section 95303(b) for a specified period, as determined by the Executive Officer, not to exceed five consecutive days.

(3) To obtain a Non-compliant Tractor Pass, the tractor owner must make a request to the Executive Officer prior to affected travel. In the request, the owner must provide the following information for each tractor.

(A) Owner contact information, as specified in section 95306(b).

(B) Tractor identification number (VIN).

(C) Date tractor will begin travel, or enter California if traveling from out of state location, under the Non-compliant Tractor Pass.

(4) No owner will be granted more than one Non-compliant Tractor Pass per year

(5) Only one tractor per fleet operating under a common United States Department of Transportation (USDOT) number, motor carrier identification number, or International Registration Plan (IRP) fleet number will be granted a Non-compliant Tractor Pass per year.

(6) The Executive Officer will respond to a request for a Non-compliant Tractor Pass within 15 days of receiving the information identified in section 95305(h)(3) and notify the owner in writing of the decision.

(A) If approved, the Executive Officer will provide the owner with a Non-compliant Tractor Pass in electronic or written format that will contain the following information:

1. Effective dates of the Non-compliant Tractor Pass.

2. Non-compliant Tractor Pass Approval Number.

(i) *Trailer Aerodynamic Equipment Compliance Delay*

(1) An owner of a dry-van or refrigerated-van trailer that is subject to the requirements of section 95303(b) may apply for a Trailer Aerodynamic Equipment Compliance Delay if the trailer is configured such that existing aerodynamic technologies necessary to meet the requirements defined in sections 95303(b)(1)(B)2. or 95303(b)(3)(B)2. for dry-van trailers, or 95303(b)(2)(B)2. or 95303(b)(3)(C)2. for refrigerated-van trailers, cannot be installed.

(2) To apply for a Trailer Aerodynamic Equipment Compliance Delay, an owner must provide the Executive Officer the following information

(A) Owner contact information

1. Trailer owner's name, and if a corporate entity or governmental agency owns the trailer, the responsible official and title (if applicable);

2. Street address of owner or owner's company including city, state or province, zip code, colonia (Mexico only), and country;

3. Mailing address including city, state or province, zip code, colonia (Mexico only), and country;

4. Owner contact person's name;

5. Telephone number of contact person;

6. Email address of contact person (if available);

7. TRUCRS identification number (if applicable)

(B) Trailer Information (for each candidate trailer for compliance delay)

1. Trailer vehicle identification number (VIN).

2. Trailer participating in Optional Compliance Schedule? (Y or N)

3. Current scheduled compliance dates of trailers.

4. Narrative description of why exemption is necessary. Description should clearly explain why all available aerodynamic technologies that meet the requirements defined in sections 95303(b)(1)(B)2. or 95303(b)(3)(B)2. for dry-van trailers, or 95303(b)(2)(B)2. or 95303(b)(3)(C)2. for refrigerated-van trailers cannot be installed on the trailer, and why modification of such technologies is infeasible without compromising the aerodynamic effectiveness of the technology or technologies.

5. Additional supporting materials as requested by the Executive Officer

(3) Applications for a Trailer Aerodynamic Equipment Compliance Delay may be submitted to the Executive Officer in written or electronic format no sooner than one year prior to the trailer's current compliance date.

(4) The Executive Officer will respond to the application for a Trailer Aerodynamic Equipment Compliance Delay within 30 days of receipt of the application, and notify the applicant in writing of the decision.

(A) The Executive Officer will review the existing list of U.S. EPA SmartWay verified aerodynamic technologies and determine if any of the existing technologies can be installed to meet the requirements defined in sections 95303(b)(1)(B)2. or 95303(b)(3)(B)2. for dry-van trailers, or 95303(b)(2)(B)2. or 95303(b)(3)(C)2. for refrigerated-van trailers.

(B) If the Executive Officer determines that the candidate trailer(s) identified in the application can be equipped with an aerodynamic technology that meets the requirements defined in sections 95303(b)(1)(B)2. or 95303(b)(3)(B)2. for dry-van trailers, or 95303(b)(2)(B)2. or 95303(b)(3)(C)2. for refrigerated-van trailers, the application will be denied.

(C) If approved, the Trailer Aerodynamic Compliance Delay will remain in effect until the Executive Officer notifies the applicant that the U.S. EPA has verified an aerodynamic technology that can be installed on the trailer(s) to meet the requirements defined in sections 95303(b)(1)(B)2. or 95303(b)(3)(B)2. for dry-van trailers, or 95303(b)(2)(B)2. or 95303(b)(3)(C)2. for refrigerated-van trailers. The

Executive Officer will use the owner contact information provided in accordance with section 95305(i)(2)(A) to contact the applicant. Once notified, the applicant will be required to install the aerodynamic technology on the trailer(s) within one year from notification.

(j) Exemption for 2011 or Subsequent Model Year Tractors with Open-shoulder Drive Tires

(1) Until January 1, 2013, a 2011 or subsequent model year HD tractor pulling a 53-foot or longer box-type trailer subject to the requirements of section 95303(a) may operate on a highway within California with two or more open-shoulder drive tires mounted on the drive axle or axles that are not SmartWay Verified Technologies.

(k) An owner may be prohibited by the Executive Officer from operating his or her vehicles under the provisions of section 95305 if the owner or any of the owner's vehicles that are registered exempt short-haul tractors, local-haul tractors, local-haul trailers, or storage trailers are found in violation of any requirement of section 95305.

(l) *Tractor-Trailer Exemption for Tractors Pulling Empty Trailers*

(1) A HD tractor and the 53-foot or longer box-type trailer it is pulling are exempt from the requirements of sections 95303(a) and 95303(b) if the following conditions are met:

(A) the trailer is empty, and

(B) the driver of the HD tractor pulling the empty trailer, upon request, allows authorized enforcement personnel to directly view the inside of the trailer.

(m) *Tractor Exemption for Phase 1 Certified Tractors*

(1) A 2013 model year Phase 1 Certified Tractor is exempt from the requirements of section 95303(a).

(n) *Exemption for New Trailers*

(1) A 53-foot or longer box-type trailer is exempt from the requirements of section 95303(b) for three consecutive months following the month of its manufacture. For example, if the month of manufacture is September 2013, the exemption would apply through December 2013.

Note: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95306.0.1. Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) To qualify for an exemption set forth in sections 95305(a), 95305(b), 95305(c), or 95305(e), the owner of a HD tractor or the owner of a 53-foot or longer box-type trailer must submit to the Executive Officer all applicable information and statements identified in sections 95306(b) through (f).

(b) *Owner Contact Information:*

(1) Short-haul or local-haul tractor owner's name, and if a corporate entity or governmental agency owns the tractor, the responsible official and title (if applicable);

(2) Local-haul or storage trailer owner's name, and if a corporate entity or governmental agency owns the trailer, the responsible official and title (if applicable);

(3) Name of owner's company, corporation, or governmental agency (if applicable);

(4) Corporate parent (if applicable);

(5) Motor carrier identification number and type;

(6) Street address of owner or owner's company including city, state or province, zip code, colonia (Mexico only), and country;

(7) Mailing address including city, state or province, zip code, colonia (Mexico only), and country;

(8) Owner contact person's name;

(9) Telephone number of contact person;

(10) Email address of contact person (if available);

(11) Company taxpayer identification number (if applicable); and

(12) TRUCRS identification number of corporate parent (if one has been obtained).

(c) *Local-Haul Base Information for Owners of Local-haul Tractors or Trailers* (an owner may have multiple local-haul bases):

(1) Local-haul base contact person's name;

(2) Contact person's title;

(3) Street address of local-haul base including city, state, zip code, colonia (Mexico only), and country; and

(4) Telephone number of local-haul base.

(d) *Short-haul or Local-haul Tractor Fleet Information.* For each tractor to be exempted, the following information:

(1) Type of exemption applied for:

(A) Limit annual miles traveled to 50,000 (short-haul); or

(B) Limit total area of operation to within a 100-mile radius from its local-haul base (local-haul);

(2) Tractor identification number (vehicle identification number (VIN));

(3) Tractor make;

(4) Tractor model;

(5) Tractor model year;

(6) State or province of registration;

(7) Country of registration;

(8) Registration type (state, IRP, temporary, seasonal, monthly, or other);

(9) License plate number;

(10) For short-haul tractors: Odometer reading; and

(11) For local-haul tractors: tractor's local-haul base street address, including city, state, zip code, colonia (Mexico only), and country.

(e) *Local-haul and Storage Trailer Fleet Information.* For each trailer to be exempted, the following information:

(1) Trailer type (dry van or refrigerated van);

(2) Trailer identification number (vehicle identification number (VIN));

(3) Trailer make;

(4) Trailer model;

(5) Trailer model year;

(6) State or province of registration;

(7) Country of registration;

(8) Registration type;

(9) License plate number; and

(10) For a local-haul trailer only, the local-haul trailer's local-haul base street address, including city, state, and zip code.

(f) A dated written submittal by the owner with the information required by sections 95306(b) through 95306(e) and one or all of the following statements, as applicable:

(1) For all local-haul trailers and tractors:

"I agree to limit the use of this [or these] tractor[s] [or trailer[s]] to the area within a 100-mile radius of the local-haul base[s] identified in this submittal when hauling freight with vehicles subject to sections 95303(a) and (b), title 17, California Code of Regulations. I understand that if I transport any freight in the trailer[s] when pulling it [or them] on California highways outside the 100-mile radius, the tractor[s] [or trailer[s]] will be subject to the equipment requirements of this regulation and may lose exempt status if non-compliant. I also understand that if my tractor[s] [or trailer[s]] is [or are] non-compliant, I may be subject to possible enforcement actions for violations of sections 95300-95312, title 17, California Code of Regulations. I also understand that I am allowed to relocate the trailer[s] to a new location, but only if the trailer[s] is [or are] empty or I have obtained a Relocation Pass[es] for the trailer[s]. If stopped for inspection by authorized enforcement personnel, I will allow inspection of the inside[s] of the trailer[s]. I declare under penalty of perjury that the information provided is true, accurate, and complete."

(2) For short-haul tractors:

"I agree to limit use of this [or these] tractor[s] to 50,000 or fewer miles per year. I understand that operation of the equipment for more than 50,000 miles per year may result in loss of exempt status and possible enforcement actions for violations of sections 95300-95312, title 17, California Code of Regulations. If stopped for inspection by authorized enforcement personnel, I will allow visual inspection of the tractor's [or tractors'] odometer[s]. I declare under penalty of perjury that the information provided is true, accurate, and complete."

(3) For storage trailers:

"I agree to limit use of this [or these] trailer[s] exclusively for the storage of items at a fixed location. I understand that I am allowed to relocate the trailer[s] to a new location, but only if the trailer[s] is [are] empty or I have obtained a Relocation Pass[es] for the trailer[s]. Without a Relocation Pass, if I transport any items in the trailer[s] when pulling it [them] on California highways, the trailer[s] may lose exempt status, which may result in enforcement action for violations of sections 95300-95312, title 17, California Code of Regulations. If stopped for inspection by authorized enforcement personnel, I will allow inspection of the inside[s] of the trailer[s]. I declare under penalty of perjury that the information provided is true, accurate, and complete."

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95307.0.1. Optional Trailer Fleet Compliance Schedules. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) *Trailer Fleet Compliance Schedule Applicability.*

(1) As specified in section 95303(b)(3), an owner of one or more 2010 or previous model year 53-foot or longer box-type trailers may bring such trailers into compliance in accordance with an applicable compliance schedule set forth in this section.

(2) Trailers participating in Option 1 of the large fleet compliance schedule specified in section 95307(b)(1) must be acquired by the fleet owner prior to July 1, 2010.

(3) Trailers participating in Option 2 of the large fleet compliance schedule specified in section 95307(b)(2) must be acquired by the fleet owner prior to July 1, 2011.

(4) Trailers participating in the small fleet compliance schedule specified in section 95307(c) must be acquired by the fleet owner prior to July, 1, 2012.

(5) Trailer fleet size determination. For purposes of this section, fleet size is the total of all 53-foot or longer box-type trailers within the owner's fleet, including:

(A) trailers that do not operate in California; and

(B) trailers that operate in California, including but not limited to:

1. existing compliant trailers;

2. non-compliant trailers;

3. trailers exempted in accordance with section 95305, *Exemptions*; and

4. refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F).

(6) *Applicable Compliance Schedules.*

(A) A fleet owner with a trailer fleet size of 21 or more trailers, as determined in accordance with section 95307(a)(5) above, may elect to participate in

either of the following two compliance schedule options. A large fleet owner who does not register for one of these options must bring all trailers in the fleet into compliance as specified in section 95303(b)(3)(B) or section 95303(b)(3)(F).

1. Option 1 of the large fleet compliance schedule specified in section 95307(b)(1), or

2. Option 2 of the large fleet compliance schedule specified in section 95307(b)(2).

(B) A fleet owner with a trailer fleet size of 20 or fewer trailers may elect to participate in either of the large fleet compliance schedule options in section 95307(b), or in the small fleet compliance schedule in section 95307(c).

(b) *Large Fleet Compliance Schedule.*

(1) Option 1 of the large fleet compliance schedule:

(A) Minimum fleet conformance thresholds (Table 1): A trailer owner participating in this large fleet compliance schedule option must ensure that the percentage of compliant trailers on the compliance plan base list, as described in section 95307(d)(3), is equal to or greater than:

1. 5 percent by January 1, 2011;

2. 15 percent by January 1, 2012;

3. 30 percent by January 1, 2013;

4. 50 percent by January 1, 2014;

5. 75 percent by January 1, 2015; and

6. 100 percent by January 1, 2016.

Table 1: Minimum Fleet Conformance Thresholds for the Large Fleet Compliance Schedule (Option 1)

Compliance Year (Y)	***Minimum Fleet Conformance Threshold (P_Y)***	***Conformance Threshold Deadline***
2010	5%	January 1, 2011

2011	15%	January 1, 2012
2012	30%	January 1, 2013
2013	50%	January 1, 2014
2014	75%	January 1, 2015
2015	100%	January 1, 2016

(2) Option 2 of the large fleet compliance schedule:

(A) Minimum fleet conformance thresholds (Table 2): A trailer owner participating in this large fleet compliance schedule option must ensure that the percentage of compliant trailers on the compliance plan base list, as described in section 95307(d)(3), is equal to or greater than:

1. 20 percent by January 1, 2012;
2. 40 percent by January 1, 2013;
3. 60 percent by January 1, 2014;
4. 80 percent by January 1, 2015; and
5. 100 percent by January 1, 2016.

Table 2: Minimum Fleet Conformance Thresholds for the Large Fleet Compliance Schedule (Option 2)

Compliance Year (Y)	***Minimum Fleet Conformance Threshold (P_Y)***	***Conformance Threshold Deadline***
2010	--	--
2011	20%	January 1, 2012
2012	40%	January 1, 2013
2013	60%	January 1, 2014

2014	80%	January 1, 2015
2015	100%	January 1, 2016

(3) To participate in either Option 1 or Option 2, a trailer owner must provide the following information to the Executive Officer, electronically or in a document package entitled "Large Fleet Compliance Plan," by July 1, 2010 for Option 1, and by July 1, 2011 for Option 2. This submittal must include the following:

(A) Statement of intent, in accordance with section 95307(d)(1);

(B) Trailer fleet list, in accordance with section 95307(d)(2);

(C) Large fleet compliance plan base number, calculated in accordance with section 95307(e)(1);

(D) Compliance plan base list, in accordance with section 95307(d)(3);

(E) Annual conformance number for each compliance year, calculated in accordance with section 95307(e)(5); and

(F) Early compliance option reporting, if applicable: If a trailer owner elects to delay the compliance of trailers in accordance with section 95307(b)(4), such owner must submit the following trailer information within the compliance plan:

1. Early compliance trailer number: The number of early compliance trailers determined in accordance with section 95307(b)(4);

2. Early compliance trailer list: A trailer owner participating in the early compliance option must clearly identify on the trailer fleet list all early compliance trailers;

3. Delayed compliance trailer number, calculated in accordance with section 95307(e)(3); and

4. Delayed compliance trailer list: A trailer owner participating in the early compliance option must clearly identify on the trailer fleet list all delayed compliance trailers.

(4) Early compliance option: Subject to the requirements and limitations set forth in this section, for every one early compliance trailer in an owner's fleet, a trailer owner

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may delay the retrofit or replacement of 1.5 non-compliant trailers until December 31, 2016.

(A) Maximum allowable number of early compliance trailers, as calculated in accordance with section 95307(e)(4): The number of early compliance trailers within a fleet may not exceed the equivalent of 20 percent of the sum of: 1) all trailers that the owner elects to bring into compliance under the large fleet compliance schedule and 2) the total number of trailers within the fleet that are in compliance before January 1, 2010.

(B) A trailer owner must bring all delayed compliance trailers into compliance before January 1, 2017.

(C) Early compliance option report: To participate in the early compliance option, a trailer owner must submit all information required by section 95307(b)(3)(F), as part of the large fleet compliance plan by July 1, 2010 for Option 1, and by July 1, 2011 for Option 2.

(c) *Small Fleet Compliance Schedule.*

(1) Minimum fleet conformance thresholds (Table 3): A trailer owner participating in the small fleet compliance schedule must ensure that the percentage of compliant trailers on the compliance plan base list, as defined in section 95307(d)(3), is equal to or greater than:

(A) 25 percent by January 1, 2014;

(B) 50 percent by January 1, 2015;

(C) 75 percent by January 1, 2016; and

(D) 100 percent by January 1, 2017.

Table 3: Minimum Fleet Conformance Thresholds for the Small Fleet Compliance Schedule

Compliance Year (Y)	***Minimum Fleet Conformance Threshold (P_Y)***	***Conformance Threshold Deadline***
2013	25%	January 1, 2014
2014	50%	January 1, 2015

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2015	75%	January 1, 2016
2016	100%	January 1, 2017

(2) Small fleet compliance plan: To participate in the small fleet compliance schedule, a trailer owner must provide the following information to the Executive Officer, electronically or in a document package entitled "Small Fleet Compliance Plan," by July 1, 2012. This submittal must include the following:

(A) Statement of intent, in accordance with section 95307(d)(1);

(B) Trailer fleet list, in accordance with section 95307(d)(2);

(C) Small fleet compliance plan base number, calculated in accordance with section 95307(e)(2);

(D) Compliance plan base list, in accordance with section 95307(d)(3); and

(E) Annual conformance number for each compliance year, calculated in accordance with section 95307(e)(5).

(d) *General Compliance Plan Components.*

(1) Statement of intent: The statement of intent must be provided to the Executive Officer as part of the owner's compliance plan by the applicable compliance plan due date. The statement of intent must include the following:

(A) A statement indicating that the trailer owner elects to participate in an optional trailer fleet compliance schedule;

(B) A statement identifying the compliance schedule in which the trailer owner elects to participate;

(C) For trailer owners electing to participate in the small fleet compliance schedule, a statement affirming that the owner's trailer fleet contains 20 or fewer 53-foot or longer box-type trailers;

(D) A statement affirming that the trailer owner will bring all non-compliant trailers subject to the requirements of this regulation into compliance in accordance with the applicable compliance schedule;

(E) A statement affirming that the trailer owner understands that participation in an applicable compliance schedule may be terminated by the Executive

Officer should the fleet owner, or any of the owner's vehicles, be found in violation of this regulation;

(F) A statement affirming that the trailer owner understands that if participation in a compliance schedule is terminated by the Executive Officer, the owner must bring all affected trailers into compliance within 90 days or by December 31, 2012, whichever is later, but in no case later than December 31, 2015 if participating in the large fleet compliance schedule and December 31, 2016 if participating in the small fleet compliance schedule;

(G) A statement affirming that the trailer owner understands that if participation in an applicable trailer fleet compliance schedule is withdrawn, such owner will not be allowed to operate a non-compliant trailer on a highway within California beginning January 1, 2013, except for refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F) and exempted trailers;

(H) A statement affirming that the trailer owner agrees to allow the Executive Officer, or any person authorized by the Executive Officer, to conduct periodic audits of vehicles and records to ensure compliance with the applicable compliance schedule, this regulation, and other air quality regulations; and

(I) A signature, or electronic attestation, of the trailer owner or, where applicable, a company or governmental official, affirming that all information contained within the compliance plan, including information contained within the statement of intent and the trailer fleet list, is true and correct.

(2) Trailer fleet list: The trailer fleet list, as defined in this section, must be provided to the Executive Officer as part of the owner's compliance plan by the applicable compliance plan due date. Except upon specific Executive Officer approval, the trailer owner may not change the number or identity of trailers included on the trailer fleet list once the submission due date for the applicable compliance plan has passed. The trailer fleet list must include the following:

(A) Name of trailer fleet owner, or responsible official and title if the owner is a business entity or governmental agency;

(B) Name of company, corporation, or governmental agency;

(C) Company's motor carrier identification number and type, if applicable;

(D) Company address including city, state or province, zip code, colonia (Mexico only), and country;

(E) Mailing address including city, state or province, zip code, colonia (Mexico only), and country;

(F) Physical address of location where records pertaining to the applicable compliance schedule will be maintained including city, state or province, zip code, colonia (Mexico only), and country;

(G) Contact person's name;

(H) Telephone number;

(I) Email address (if available);

(J) Company taxpayer identification number (if applicable);

(K) Name of corporate parent (if applicable);

(L) TRUCRS identification number of corporate parent (if applicable);

(M) List of all 2010 and previous model-year 53-foot or longer box-type trailers that are subject to the requirements of this subarticle while the owner is participating in an optional trailer fleet compliance schedule:

1. For an owner who elects to participate in one of the large fleet compliance schedules, the trailer list must include all trailers that will operate in California including compliant trailers, non-compliant trailers, exempted trailers, and refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F);

2. For an owner that elects to participate in the small fleet compliance schedule, the trailer list must include all trailers in the owner's fleet, including compliant trailers, non-compliant trailers, exempted trailers, and refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F). For the sole purpose of documenting the owner's eligibility for the small fleet compliance schedule, the trailer list for those submitting a small fleet compliance plan must also include trailers in the fleet that do not travel on a highway within California;

(N) For each trailer listed, provide the following:

1. Trailer type (dry van or refrigerated van);

2. Vehicle identification number (VIN);

3. Trailer make;

4. Trailer model;

5. Trailer model year;

6. License plate number;

7. State or province of registration;

8. Registration type;

9. Country of registration;

10. Compliance status (compliant or non-compliant);

11. Exemption Status (not exempt, exempt local-haul, exempt storage, dedicated to short-haul or local-haul tractors);

12. California operating status (indicate whether the trailer will operate in California during the applicable optional compliance schedule);

13. Transport refrigeration unit model year (as applicable); and

14. Transport refrigeration unit engine model year (as applicable).

(3) Compliance plan base list: The compliance plan base list is the list of all non-compliant trailers identified on the trailer fleet list as trailers that will be brought into compliance in accordance with the applicable compliance schedule. Trailers that are not early compliance trailers but are in compliance before January 1, 2010, may also be included on the compliance plan base list and used to meet minimum fleet conformance thresholds. The compliance plan base list shall not include the following trailers:

(A) Exempted trailers, including those local-haul trailers and storage trailers exempt under sections 95305(c) and 95305(e);

(B) Refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F);

(C) Early compliance trailers, if applicable;

(D) Delayed compliance trailers, if applicable; and

(E) Trailers that will not operate in California for the duration of the applicable trailer fleet compliance schedule.

(e) *Calculation Methodology.*

(1) Large fleet compliance plan base number: The compliance plan base number for large fleets is the number of trailers that a trailer owner elects to bring into compliance in accordance with the large fleet compliance schedule.

$N_{LB} = N_T - N_D - N_E - N_R - N_X$ (Equation 1)

"N_{LB}" = Large fleet compliance plan base number.

"N_T" = Total number of trailers listed on the trailer fleet list.

"N_D" = Number of delayed compliance trailers, as determined in accordance with section 95307(e)(3), if applicable.

"N_E" = Number of early compliance trailers, not to exceed $N_{E,\ max}$ as determined in accordance with Equation 5, if applicable.

"N_R" = Number of refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F), if applicable.

"N_X" = Number of trailers with a trailer fleet list exemption status of "exempt local-haul," "exempt storage," "dedicated to short-haul tractors," or "dedicated to local-haul tractors," if applicable.

(2) Small fleet compliance plan base number: The compliance plan base number for small fleets is the number of trailers that a trailer owner elects to bring into compliance in accordance with the small fleet compliance schedule.

$N_{CA} = N_T - N_{NC}$ (Equation 2)

"N_{CA}" = Total number of trailers in California fleet.

"N_T" = Total number of trailers listed on the trailer fleet list.

"N_{NC}" = Number of trailers that will not operate in California for the duration of an applicable trailer fleet compliance schedule

$N_{SB} = N_{CA} - N_R - N_X$ (Equation 3)

"N_{SB}" = Small fleet compliance plan base number.

"N_{CA}" = Total number of trailers in California fleet, as determined in accordance with Equation 2.

"N_R" = Number of refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F), if applicable.

"N_X" = Number of trailers with a trailer fleet list exemption status of "exempt local-haul," "exempt storage," "dedicated to short-haul tractors," or "dedicated to local-haul tractors," if applicable.

(3) Large fleet delayed compliance trailer number: The delayed compliance trailer number is the number of trailers for which compliance may be delayed, pursuant to section 95307(b)(4), *Early Compliance Option.*

$N_D = N_E \times 1.5$ (Equation 4)

"N_D" = Number of delayed compliance trailers, if applicable. If N_D is not a whole number, round down to the next whole number.

"N_E" = Number of early compliance trailers, not to exceed $N_{E,\,max}$ as determined in accordance with Equation 5, if applicable.

(4) Large fleet maximum allowable number of early compliance trailers:

The resultant number must be rounded down to the nearest whole trailer.

$N_{E,\,max} = (N_T - N_R - N_X) \times 0.20$ (Equation 5).

"$N_{E,\,max}$" = Maximum allowable number of early compliance trailers. If $N_{E,\,max}$ is not a whole number, round down to the next whole number.

"N_T" = Total number of trailers listed on the trailer fleet list.

"N_R" = Number of refrigerated-van trailers that are eligible for the compliance deadlines set forth in section 95303(b)(3)(F), if applicable.

"N_X" = Number of trailers with a trailer fleet list exemption status of "exempt local-haul," "exempt storage," "dedicated to short-haul tractors," or "dedicated to local-haul tractors," if applicable.

(5) Annual conformance number: The annual conformance number is the number of trailers that a trailer owner must bring into compliance by December 31st of a particular compliance year to ensure that the percentage of compliant trailers within the compliance plan base list meets or exceeds the applicable minimum fleet conformance threshold that takes effect on January 1 of the following year.

$N_Y = (N_B \times P_Y) - N_{C,\,Y-1}$ (Equation 6)

"N_Y" = Annual conformance number for compliance year Y. If N_Y is not a whole number, round up to the next whole number if the fractional part is equal to or greater than 0.5, and round down if less than 0.5.

"N_B" = The compliance plan base number, either N_{LB} as calculated in section 95307(e)(1) for a large fleet or N_{SB} as calculated in section 95307(e)(2) for a small fleet.

"P_Y" = Minimum fleet conformance threshold for compliance year Y, as defined in section 95307(b)(1) for large fleets and 95307(c)(1) for small fleets, expressed as a decimal (e.g. 5 percent is entered into equation as 0.05).

"$N_{C,\,Y-1}$" = Total number of trailers within the compliance base that would already be in compliance prior to January 1 of compliance year Y. This number must not include early compliance trailers.

(f) Reporting Requirements

(1) For each trailer listed in the compliance plan base list that is brought into compliance in order to meet the conformance threshold of a particular year, the owner must provide the trailer identification number (vehicle identification number (VIN)) and the applicable compliance method for the trailer as defined in (A), (B), or (C) below, to the Executive Officer by no later than December 31st of that year.

(A) Install on the trailer aerodynamic devices that meet the requirements defined in section 95303(b)(3), or

(B) Remove the trailer from the owner's fleet, or

(C) Restrict the trailer from traveling on California highways.

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(2) For each trailer listed in the compliance plan base list that is re-designated into local-haul or storage trailer service in a specific compliance year, the owner must provide the trailer identification number (vehicle identification number (VIN)) to the Executive Officer by no later than December 31st of that year, and meet all applicable requirements specified in sections 95305, *Exemptions*, and 95306, *Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements*. Trailers re-designated into local-haul or storage trailer service do not count toward meeting an annual conformance number.

(g) General Requirements for All Compliance Schedules: To participate in a trailer fleet compliance schedule, a trailer owner must comply with the following requirements:

(1) The trailer owner must ensure that, by December 31st of each compliance year, the percentage of compliant trailers on the owner's compliance plan base list is equal to or greater than the applicable minimum fleet conformance threshold for that compliance year;

(2) The trailer owner must ensure that the actual number of trailers brought into compliance each compliance year is equal to or greater than the annual conformance number for that same year;

(3) The trailer owner must allow the Executive Officer, or any other authorized enforcement personnel, to conduct periodic audits of records and equipment to verify compliance with an applicable compliance schedule, the owner's compliance plan, and other applicable air quality regulations;

(4) Should the Executive Officer terminate the trailer owner's participation in a trailer feet compliance schedule, such trailer owner must bring all trailers into compliance within 90 days of such termination or by December 31, 2012, whichever is later, but no later than December 31, 2015 if participating in the large fleet compliance schedule and December 31, 2016 if participating in the small fleet compliance schedule;

(5) Starting January 1, 2013, except for eligible refrigerated-van trailers that the trailer owner elects to bring into compliance in accordance with section 95303(b)(3)(F) and exempted trailers, a trailer owner may not allow the operation of a non-compliant trailer on a highway within California if such owner withdraws participation from an applicable trailer fleet compliance schedule;

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(6) The trailer owner must provide to the Executive Officer any documentation and information required by an applicable trailer fleet compliance schedule by the compliance plan due date specified in such compliance schedule;

(7) The trailer owner must ensure that all information and documentation provided to the Executive Officer is accurate and true;

(8) The trailer owner must ensure that all required information and documentation is received by the Executive Officer by the applicable due dates; the Executive Officer will not be responsible for materials lost in transit;

(9) The trailer owner must maintain all documentation pertaining to an applicable compliance schedule at the location indicated on the trailer fleet list;

(10) Upon the request of the Executive Officer or other authorized enforcement personnel, the trailer owner must provide all information and documentation necessary to verify compliance with this subarticle, including applicable compliance schedules and the owner's compliance plan, and information and documentation necessary to verify compliance with any other air quality regulation;

(11) A trailer owner who is participating in the small fleet compliance schedule may not allow a 2010 or previous model year trailer subject to the requirements of this subarticle to operate on a highway within California after July 1, 2012, unless:

(A) the trailer is listed on the owner's trailer fleet list; or

(B) the trailer was acquired after July 1, 2012 and both of the following criteria are met:

1. the owner provides documented proof to the Executive Officer of the trailer's acquisition (purchase or transfer of ownership) date; and

2. the trailer is a compliant trailer, a refrigerated-van trailer that is eligible to be brought into compliance in accordance with the compliance deadlines set forth in section 95303(b)(3)(F), or exempt under section 95305;

(12) A trailer owner may not allow the operation of a non-compliant trailer on a highway within California after December 31st of the compliance year in which the trailer was reportedly brought into compliance;

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(13) A compliance plan revision may only be made with the approval of the Executive Officer if the Executive Officer determines that a company merger, acquisition, split, or other changed circumstances affecting operations of the owner, necessitate revisions to the compliance plan;

(14) Executive Officer approval will not be granted to allow a newly-formed business, or an existing business commencing operations in California, to participate in a compliance schedule after the submission due date for the applicable compliance plan has passed;

(15) The Executive Officer may make non-confidential information provided pursuant to an optional trailer fleet compliance schedule available to the public for the purpose of helping determine the compliance status of a trailer or fleet;

(16) Although participation in an optional trailer fleet compliance schedule does not require the Executive Officer's specific approval, the Executive Officer may terminate a fleet's participation in a compliance schedule if the fleet or any tractor or trailer within the fleet is found in violation of this subarticle. Should the Executive Officer terminate a fleet's participation in a compliance schedule, the owner must bring all trailers into compliance within 90 days or by December 31, 2012, whichever is later, but in no case later than December 31, 2015, if participating in the large fleet compliance schedule, and December 31, 2016, if participating in the small fleet compliance schedule;

(17) A trailer owner who is participating in one of the large fleet compliance schedule options may not allow a trailer subject to the requirements of this subarticle to operate on a highway within California after July 1, 2010 if participating in Option 1, or July 1, 2011 , if participating in Option 2, unless:

(A) the trailer is a compliant trailer; or

(B) the trailer is listed on the owner's compliance plan base list and is in compliance with all requirements of the large fleet compliance schedule; or

(C) the trailer is a refrigerated-van trailer that is eligible to be brought into compliance in accordance with a compliance deadline set forth in section 95303 (b)(3)(F) and such deadline has not yet passed; or

(D) the trailer is exempt under section 95305;

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(18) Any violation of the requirements of this subsection constitutes a violation of this subarticle;

(19) A trailer owner who has elected to participate in Option 1 and submitted information in accordance with section 95307(b)(3) may withdraw such participation and elect to participate in Option 2 instead. The notice to withdraw must be received by the Executive Officer no later than June 30, 2011;

(20) A trailer owner that has identified an exempt storage trailer or an exempt local-haul trailer in his or her trailer fleet list in accordance with section 95307(d)(2)(N) must register that trailer in accordance with the requirements of section 95306, *Short-Haul Tractor, Local-Haul Tractor, Local-Haul Trailer, and Storage Trailer Registration Requirements*, by July 1, 2010, if participating in Option 1, by July 1, 2011, if participating in Option 2, and by July 1, 2012, if participating in the Small Fleet Compliance Schedule;

(21) A trailer owner that elects to withdraw participation in a trailer feet compliance schedule must notify the executive officer and bring all trailers on the compliance plan base list into compliance by January 1, 2013.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

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§ 95308.0.1. Enforcement. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

Enforcement of this subarticle may be carried out by authorized enforcement personnel, which includes representatives of the California Air Resources Board (CARB); peace officers as defined in California Penal Code, title 3, chapter 4.5, sections 830 et seq. and their respective law enforcement agencies; authorized representatives of air pollution control or air quality management districts; and any other designee of the Executive Officer.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95309.0.1. Right of Entry. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

For purposes of inspecting HD tractors and box-type trailers covered in the subarticle, and inspecting or auditing the records of drivers, owners of trailers and tractors, motor carriers, California-based brokers, California-based shippers, and California-licensed vehicle dealers to determine compliance with this subarticle, an agent or employee of CARB, upon presentation of proper credentials, has the right to enter any facility (with any necessary safety clearances) where HD tractors and box-type trailers are located or HD tractor and box-type trailer records, including dispatch records, are kept.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95310.0.1. Penalties. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

As provided in Health and Safety Code section 38580, any person who violates any requirement of this subarticle is subject to the penalties set forth in Article 3 (commencing with section 42400) of Chapter 4 of Part 4, Division 26 of the Health and Safety Code. Failure to comply with any requirement of this subarticle shall constitute a single, separate violation for each day during any portion of which the person is not in compliance.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95311.0.1. Recordkeeping. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) A California-licensed vehicle dealer of a HD tractor or 53-foot longer box-type trailer that is subject to the disclosure of regulation applicability requirements of section 95303(i) must maintain a record of the disclosure of regulation applicability for three years after the sale.

(b) A lessor of a HD tractor or 53-foot longer box-type trailer that has provided a lessee with a statement or written notice that informs the lessee about the lessee's obligation under terms of the lease to ensure compliance with sections 95300 through 95312, title 17, California Code of Regulations, must maintain a record of this statement or written notice for three years after it is provided to the lessee.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95312.0.1. Severability. (Alternative)

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

If any section, paragraph, subparagraph, sentence, clause, phrase, or portion of the subarticle is, for any reason, held invalid, unconstitutional, or unenforceable by any court of competent jurisdiction, such portion shall be deemed as a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions of this subarticle.

NOTE: Authority cited: Sections 39600, 39601, 38510, 38560 and 38560.5, Health and Safety Code. Reference: Sections 39600, 38560, 38560.5 and 38580, Health and Safety Code.

§ 95660.0.1. Purpose. (Alternative).

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

The purpose of this subarticle is to reduce greenhouse gas (GHG) emissions from new medium- and heavy-duty vehicles by establishing emission standards and other requirements applicable to such vehicles. These greenhouse gas emissions include: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and hydrofluorocarbons (HFCs).

NOTE: Authority cited: Sections 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39600, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43205, 43205.5, and 43211, Health and Safety Code.

§ 95661.0.1. Applicability. (Alternative).

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

This subarticle applies to all new 2014 and subsequent model medium- and heavy-duty vehicles, including vehicles fueled by conventional and alternative fuels, and electric vehicles. This subarticle contains emission standards and test procedures incorporated by reference that control greenhouse gas emissions from such vehicles.

NOTE: Authority cited: Sections 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39600, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43205, 43205.5, and 43211, Health and Safety Code.

§ 95662.0.1. Definitions. (Alternative).

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) The definitions in Section 1900(b), chapter 1, title 13 of the California Code of Regulations (CCR) apply to these procedures with the following additions:

(1) "Diesel" means relating to a type of reciprocating, internal combustion engine that is not an Otto-cycle engine.

(2) "Day cab" means a type of tractor cab that is not a sleeper cab.

(3) "Deteriorated emission level" means the emission level that results from applying the appropriate deterioration factor to the official emission result of the emission-data vehicle. Note that where no deterioration factor applies, references in this part to the deteriorated emission level mean the official emission result.

(4) "Emission standard," as it applies to compliance with the Greenhouse Gas Requirements for new 2014 and subsequent model medium and heavy-duty vehicles, and the remedies provided for in the Health and Safety Code for noncompliance, relates to the emission characteristics of a motor vehicle and means:

(A) a numerical limit on the amount of a given pollutant that a motor vehicle engine may emit into the atmosphere; or
(B) a requirement that a motor vehicle engine be equipped with a certain type of pollution-control device or some other design feature related to the control of emissions.

(5) "Gross combination weight rating" (GCWR) means the value specified by the vehicle manufacturer as the maximum weight of a loaded vehicle and trailer, consistent with good engineering judgment. For example, compliance with SAE J2807 is generally considered to be consistent with good engineering judgment, especially for Class 3 and smaller vehicles.

(6) "Gross vehicle weight rating" (GVWR) means the value specified by the vehicle manufacturer as the maximum design loaded weight of a single vehicle, consistent with good engineering judgment.

(7) "Heavy-duty engine" means any engine used for (or for which the engine manufacturer could reasonably expect to be used for) motive power in a heavy-duty vehicle.

(8) "Heavy-duty vehicle" means any motor vehicle above 8,500 pounds GVWR or that has a vehicle curb weight above 6,000 pounds or that has a basic vehicle frontal area greater than 45 square feet.

(9) "Manufacturer" means any person engaged in the manufacturing or assembling of new motor vehicles or new motor vehicle engines, or importing such vehicles or engines for resale, or who acts for and is under the control of any such person in connection with the distribution of new motor vehicles and new motor vehicle engines, but shall not include any dealer with respect to new motor vehicles or new motor vehicle engines received by him in commerce. In general, this term includes any person who manufactures a vehicle or vehicle for sale in California or otherwise introduces a new motor vehicle into commerce in California. This includes importers who import vehicles or vehicles for resale.

(10) "Medium-duty engine" means any heavy-duty engine that is used to propel a medium-duty vehicle.

(11) "Medium-duty vehicle" means any heavy-duty low-emission, ultra-low-emission, super-ultra-low-emission or zero-emission vehicle certified to the standards in title 13, CCR section 1956.8(h), having a manufacturer's gross vehicle weight rating between 8,501 and 14,000 pounds.

(12) "Model year" means the manufacturer's annual new model production period, except as restricted under this definition and 40 CFR part 85, subpart X. It must include January 1 of the calendar year for which the model year is named, may not begin before January 2 of the previous calendar year, and it must end by December 31 of the named calendar year.

(A) The manufacturer who holds the Executive Order for the vehicle must assign the model year based on the date when its manufacturing operations are completed relative to its annual model year period. In unusual circumstances where completion of your assembly is delayed, we may allow you to assign a model year one year earlier, provided it does not affect which regulatory requirements will apply.

(B) Unless a vehicle is being shipped to a secondary manufacturer that will hold the Executive Order, the model year must be assigned prior to introduction of the vehicle into California commerce. The certifying manufacturer must redesignate the model year if it does not complete its manufacturing operations within the originally identified model year. A vehicle introduced into California commerce without a model year is deemed to have a model year equal to the calendar year of its introduction into California commerce unless the certifying manufacturer assigns a later date.

(13) "Motor vehicle" has the meaning given in Health and Safety Code section 39039.

(14) "Sleeper cab" means a type of tractor cab that has a compartment behind the driver's seat intended to be used by the driver for sleeping. This includes cabs accessible from the driver's compartment and those accessible from outside the vehicle.

(15) "Otto-cycle" means relating to a gasoline-fueled engine or any other type of engine with a spark plug (or other sparking device) and with operating characteristics significantly similar to the theoretical Otto combustion cycle. Otto-cycle engines usually use a throttle to regulate intake air flow to control power during normal operation.

(16) "Tractor" has the meaning given for "truck tractor" in 49 CFR §571.3. This includes most heavy-duty vehicles specifically designed for the primary purpose of pulling trailers but does not include vehicles designed to carry other loads. For purposes of this definition "other loads" would not include loads carried in the cab, sleeper compartment, or toolboxes. Examples of vehicles that are similar to tractors but that are not tractors under this part include dromedary tractors, automobile haulers, straight trucks with trailers hitches, and tow trucks. Note that the provisions of this part that apply for tractors do not apply for tractors that are classified as vocational tractors under 40 CFR §1037.630.

(17) "Useful life" means the period during which a vehicle is required to comply with all applicable emission standards.

(18) "Vehicle" means equipment intended for use on highways that meets the criteria of paragraph (A)1. or (A)2. of this definition, as follows:

(A) The following equipment are vehicles:

1. A piece of equipment that is intended for self-propelled use on highways becomes a vehicle when it includes at least an engine, a transmission, and a frame. (Note: For purposes of this definition, any electrical, mechanical, and/or hydraulic devices attached to engines for the purpose of powering wheels are considered to be transmissions.)

2. A piece of equipment that is intended for self-propelled use on highways becomes a vehicle when it includes a passenger compartment attached to a frame with axles.

(B) Vehicles may be complete or incomplete vehicles as follows:

1. A complete vehicle is a functioning vehicle that has the primary load carrying device or container (or equivalent equipment) attached. Examples of equivalent equipment would include fifth wheel trailer hitches, firefighting equipment, and utility booms.

2. An incomplete vehicle is a vehicle that is not a complete vehicle. Incomplete vehicles may also be cab-complete vehicles. This may include vehicles sold to secondary vehicle manufacturers.

3. The primary use of the terms "complete vehicle" and "incomplete vehicle" are to distinguish whether a vehicle is

complete when it is first sold as a vehicle.

4. You may ask us to allow you to certify a vehicle as incomplete if you manufacture the engines and sell the unassembled chassis components, as long as you do not produce and sell the body components necessary to complete the vehicle.

(C) Equipment such as trailers that are not self-propelled are not "vehicles" under 40 CFR part 1037.

(19) "Vocational tractor" means a vehicle classified as a vocational tractor under 40 CFR §1037.630. Vocational vehicle means relating to a vehicle subject to the standards of 40 CFR §1037.105 (including vocational tractors).

NOTE: Authority cited: Sections 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39600, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43205, 43205.5, and 43211, Health and Safety Code.

§ 95663.0.1. Greenhouse Gas Exhaust Emission Standards and Test Procedures for New 2014 and Subsequent Model Heavy-Duty Vehicles. (Alternative).

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

(a) GHG Exhaust Emission Standards for New 2014 and Subsequent Model Heavy-Duty Vehicles over 14,000 Pounds GVWR

(1) Diesel and Otto-Cycle Vocational Vehicles.

(A) The CO_2 emissions for new 2014 and subsequent model heavy-duty vehicles shall not exceed:

GVWR (pounds)	***CO_2 standard (g/ton-mile) for model years 2014 - 2016***	***CO_2 standard (g/ton-mile) for model year 2017 and later***
GVWR ≤ 19,500	388	373
19,500 < GVWR ≤ 33,000	234	225
GVWR > 33,000	226	222

1. *Averaging, Banking, and Trading and Credits.* The requirements for the optional averaging, banking, and trading program and for generating credits are described in the applicable test procedures incorporated by reference in section (c).
2. *Useful Life Requirements.* Heavy-duty vocational vehicles must comply with the emission standards in this subsection (a)(1)(A) throughout the full useful life, as follows:
   a. 110,000 miles or 10 years, whichever comes first, for vehicles at or below 19,500 pounds GVWR.
   b. 185,000 miles or 10 years, whichever comes first, for vehicles above 19,500 pounds GVWR and at or below 33,000 pounds GVWR.
   c. 435,000 miles or 10 years, whichever comes first, for vehicles above 33,000 pounds GVWR.

(2) Diesel and Otto-Cycle Tractors above 26,000 Pounds GVWR.

(A) The CO_2 emissions for new 2014 and subsequent model tractors above 26,000 pounds GVWR shall not exceed:

GVWR (pounds)	***Sub-Category***	***CO_2 standard (g/ton-mile) for model years 2014 – 2016***	***CO_2 standard (g/ton-mile) for model year 2017 and later***
26,000 < GVWR ≤ 33,000	Low-Roof (all cab styles)	107	104
	Mid-Roof (all cab styles)	119	115
	High-Roof (all cab styles)	124	120
GVWR > 33,000	Low-Roof Day Cab	81	80
	Low-Roof Sleeper Cab	68	66
	Mid-Roof Day Cab	88	86
	Mid-Roof Sleeper Cab	76	73
	High-Roof Day Cab	92	89
	High-Roof Sleeper Cab	75	72

1. *Averaging, Banking, and Trading Program and Credits.* The requirements for the optional averaging, banking, and trading program and for generating credits are described in the applicable test procedures incorporated by reference in section (c).
2. *Useful Life Requirements.* Heavy-duty tractors must comply with the emission standards in this subsection (a)(2)(A) throughout the full useful life, as follows:
   a. 185,000 miles or 10 years, whichever comes first, for vehicles above 26,000 pounds GVWR and at or below 33,000 pounds GVWR.
   b. 435,000 miles or 10 years, whichever comes first, for vehicles above 33,000 pounds GVWR.

(B) *Air Conditioning Leakage.* Loss of refrigerant from air conditioning systems from 2014 and later heavy-duty tractors may not exceed 1.50 percent per year, except as allowed by subsections (a)(2)(B)1. and (a)(2)(B)2. below.

1. For air condition refrigerants other than HFC–134a, the leakage rate is adjusted by multiplying it by the global warming potential of the refrigerant and dividing the product by 1430 (which is the global warming potential of HFC–134a).
2. If the total refrigerant capacity is less than 734 grams, the leakage rate may exceed 1.50 percent, as long as the total leakage rate does not exceed 11.0 grams per year.

(b) GHG Exhaust Emission Standards for New 2014 and Subsequent Model Diesel and Otto-Cycle Medium-Duty Vehicles between 8,501 to 14,000 Pounds GVWR

(1) Diesel and Otto-Cycle Vehicles between 8,501 to 14,000 Pounds GVWR.

(A) *Diesel Fleet-Average Emission Standards.*

1. *CO_2 Fleet-Average Standards.* For each model year, a manufacturer's national fleet-average CO_2 emissions for its diesel medium-duty vehicles shall not exceed the CO_2 fleet-average standard. The CO_2 fleet-average standard is calculated by a national production-weighted average of target values and rounded to the nearest 0.1 grams per mile, as follows:

$$Fleet\ Average\ Standard = \frac{\sum[Target_i \times Volume_i]}{\sum[Volume_i]}$$

The target values, for each vehicle configuration, are calculated as follows:

$$CO_2\ Target\ \left(\frac{g}{mile}\right) = 0.0416 \times WF + 320$$

where WF is the work factor.

$$WF = 0.75 \times (GVWR - Curb\ Weight + xwd) + 0.25 \times (GCWR - GVWR)$$

Where:
xwd = 500 pounds if the vehicle has four-wheel drive or all-wheel drive; xwd = 0 pounds for all other vehicles.

a. *Phase-In Provisions.* A manufacturer must choose either Option A or Option B below for phasing in the diesel fleet-average CO_2 target of this subsection (b)(1)(A).

Option A Phase-In Provisions for Diesel Fleet-Average CO_2 Target	
Vehicle model year	Option A CO_2 target (g/mile)
2014	[0.0478 × (WF)] + 368
2015	[0.0474 × (WF)] + 366
2016	[0.0460 × (WF)] + 354
2017	[0.0445 × (WF)] + 343
2018 and subsequent	[0.0416 × (WF)] + 320
Option B Phase-In Provisions for Diesel Fleet-Average CO_2 Target	
Vehicle model year	Option B CO_2 target (g/mile)
2014	[0.0478 × (WF)] + 368
2015	[0.0474 × (WF)] + 366

2016 – 2018	[0.0440 × (WF)] + 339
2019 and subsequent	[0.0416 × (WF)] + 320

b. *Useful Life Provisions.* A medium-duty vehicle must comply with the emission standards in this subsection (b)(1)(A) throughout its full useful life, of 11 years or 120,000 miles, whichever occurs first.

c. *Production and In-use CO_2 standards.* Each vehicle a manufacturer produces that is subject to the standards of this section has an "in-use" CO_2 standard that is calculated from the test result and that applies for selective enforcement audits and in- use testing. This in-use CO_2 standard for each vehicle is equal to the applicable deteriorated emission level multiplied by 1.10 and rounded to the nearest 0.1 g/mile.

2. *N_2O and CH_4 Emission Standards.* The N_2O emissions for new 2014 and subsequent model medium-duty vehicles shall not exceed 0.05 g/mi, and CH_4 emissions for new 2014 and subsequent model medium-duty vehicles shall not exceed 0.05 g/mi. Alternate standards using CO_2 emission credits may be used and are described in the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," incorporated by reference in section (c).

(B) *Otto-Cycle Fleet-Average Emission Standards.*

1. *CO_2 Fleet-Average Standards.* For each model year, a manufacturer's national fleet-average CO_2 emissions for its Otto-cycle medium-duty vehicles shall not exceed the CO_2 fleet-average standard. The CO_2 fleet-average standard is calculated by a national production-weighted average of target values and rounded to the nearest 0.1 grams per mile, as follows:

$$Fleet\ Average\ Standard = \frac{\sum[Target_i \times Volume_i]}{\sum[Volume_i]}$$

The target values, for each vehicle configuration, are calculated as follows:

$$CO_2\ Target\left(\frac{g}{mile}\right) = 0.0440 \times WF + 339$$

where WF is the work factor.

$$WF = 0.75 \times (\text{GVW}R - Curb\ Weight + xwd) + 0.25 \times (GCWR - GVWR)$$

Where:

xwd = 500 pounds if the vehicle has four-wheel drive or all-wheel drive; xwd = 0 pounds for all other vehicles.

a. *Phase-In Provisions.* A manufacturer must choose either Option A or Option B below for phasing in the Otto-cycle fleet-average CO_2 target of this subsection (b)(1)(B).

Option A Phase-In Provisions for Otto-Cycle Fleet-Average CO_2 Target	
Vehicle model year	Option A CO_2 target (g/mile)
2014	[0.0482 × (WF)] + 371
2015	[0.0479 × (WF)] + 369
2016	[0.0469 × (WF)] + 362
2017	[0.0460 × (WF)] + 354
2018 and subsequent	[0.0440 × (WF)] + 339
Option B Phase-In Provisions for Otto-Cycle Fleet-Average CO_2 Target	
Vehicle model year	Option B CO_2 target (g/mile)
2014	[0.0482 × (WF)] + 371
2015	[0.0479 × (WF)] + 369
2016–2018	[0.0456 × (WF)] + 352
2019 and subsequent	[0.0440 × (WF)] + 339

b. *Useful Life Provisions.* A medium-duty vehicle must comply with the emission standards in this subsection (b)(1)(B) throughout its full useful life, which is 11 years or 120,000 miles, whichever occurs first.

c. *Production and In-use CO_2 standards.* Each vehicle a manufacturer produces that is subject to the standards of this section has an "in-use" CO_2 standard that is calculated from the test result and that applies for selective enforcement audits and in- use testing. This in-use CO_2 standard for each vehicle is equal to the applicable deteriorated emission level multiplied by 1.10 and rounded to the nearest 0.1 g/mile.

2. *N_2O and CH_4 Emission Standards.* The N_2O emissions for new 2014 and subsequent model medium-duty vehicles shall

not exceed 0.05 g/mi, and CH_4 emissions for new 2014 and subsequent model medium-duty vehicles shall not exceed 0.05 g/mi. Alternate standards using CO_2 emission credits may be used and are described in the applicable test procedures incorporated by reference in section (c).

(C) *Air Conditioning Leakage*. Loss of refrigerant from air conditioning systems from 2014 and later medium-duty vehicles may not exceed 1.50 percent per year, except as allowed by subsections (b)(1)(C)1. and (b)(1)(C)2. below.

1. For air condition refrigerants other than HFC–134a, the leakage rate is adjusted by multiplying it by the global warming potential of the refrigerant and dividing the product by 1430 (which is the global warming potential of HFC–134a).
2. If the total refrigerant capacity is less than 734 grams, the leakage rate may exceed 1.50 percent, as long as the total leakage rate does not exceed 11.0 grams per year.

(c) The test procedures for determining compliance with GHG emission standards applicable to 2014 and subsequent model medium- and heavy-duty vehicles are set forth in the "California Greenhouse Gas Exhaust Emission Standards and Test Procedures for 2014 and Subsequent Model Heavy-Duty Vehicles," adopted October 21, 2014, which is incorporated by reference herein.

NOTE: Authority cited: Sections 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39600, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43205, 43205.5, and 43211, Health and Safety Code.

§ 95664.0.1. Severability. (Alternative).

For purposes of this section, any cross-referenced section in title 13 or title 17 of the California Code of Regulations shall refer to the section identified as the alternative version "(Alternative)" for the corresponding section, to the extent an alternative version of that section exists.

If any section, paragraph, subparagraph, sentence, clause, phrase, or portion of the subarticle is, for any reason, held invalid, unconstitutional, or unenforceable by any court of competent jurisdiction, such portion shall be deemed as a separate, distinct, and independent provision, and such holding shall not affect the validity of the remaining portions of this subarticle.

NOTE: Authority cited: Sections 38501, 38505, 38510, 38560, 39010, 39600, 39601, 43013, 43018, 43101, 43104, and 43105, Health and Safety Code. Reference: Sections 38501, 38505, 38510, 38560, 38580, 39002, 39003, 39600, 39601, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43205, 43205.5, and 43211, Health and Safety Code.