FINAL REGULATION ORDER

"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

Note: Set forth below are the proposed amendments to title 13 of the California Code of Regulations. Amendments to existing section proposed and subject to comment in this rulemaking are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. Subsections for which no changes are proposed in this rulemaking are indicated with [No change] or "* * * *".

Note: The entire text of section 1961.2 and 1961.3 set forth below is new language and is shown in "normal type" proposed to be added to the California Code of Regulations.

Amend Sections 1900, 1956.8, 1960.1, 1961, 1961.1, 1965, 1968.2, 1968.5, 1976, 1978, 2037, 2038, 2062, 2112, 2139, 2140, 2145, 2147, 2235, and 2317, and Adopt new Sections 1961.2 and 1961.3, Title 13, California Code of Regulations to read as follows:

§ 1900. Definitions.

* * * *

(b) In addition to the definitions incorporated under subdivision (a), the following definitions shall govern the provisions of this chapter.

* * * *

(9) "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; ~~and~~ any 2003 ~~and subsequent~~ through 2017 model year manufacturer with California sales between 4,501 and 60,000 new light- and medium-duty vehicles

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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, ~~beginning with~~ 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 ~~all~~ 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 2015 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 ~~and subsequent~~ 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 2015 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)

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 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.

Final Regulation Order

Amend Title 13, California Code of Regulations, section 1900 to read:

§1900. Definitions.

[No changes to subsections (a) through (b)(10).]

(11) "Motorcycle Engine" means an engine which is used to propel a new, street-use motorcycle.

(~~11~~12) "Passenger car" means any motor vehicle designed primarily for transportation of persons and having a design capacity of twelve persons or less.

(~~12~~13) "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.

(~~13~~14) "Replacement part" means any aftermarket part intended to replace an original emission-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.

(~~14~~15) "Subgroup" means a set of vehicles within an engine family distinguishable by characteristics contained in the manufacturer's application for certification.

(~~15~~16) [Reserved]

(~~16~~17) "Reactivity adjustment factor" means a fraction applies 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.

Note: Authority cited: Sections 39600, 39601,43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 39002, 39003, 39010, 39500, 40000, 43000, 43013, 43101, 43101.5, 43102, 43103, 43104, 43106 and 43204, Health and Safety Code; and Section 27156, Vehicle Code.

FINAL REGULATION ORDER

Set forth below are the proposed amendments to title 13 of the California Code of Regulations. Amendments to existing section proposed and subject to comment in this rulemaking are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. Subsections for which no changes are proposed in this rulemaking are indicated with [No change] or "* * * *".

Amend Sections 1900, 1956.8, 1960.1, 1961, 1961.2, 1961.3, 1962.1, 1962.2, and 1976, Title 13, California Code of Regulations to read as follows:

§ 1900. Definitions.

* * * *

(b) In addition to the definitions incorporated under subdivision (a), the following definitions shall govern the provisions of this chapter;

* * * *

(22) "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.

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 ~~related manufacturers~~ 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.

* * * *

FINAL REGULATION ORDER

Amend the following section of Title 13, California Code of Regulations, to read as set forth in the following pages:

Section 1956.8	Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Year Heavy-Duty Engines and Vehicles

Notes:

a) Paragraphs within this section that are not proposed for amendment in this rulemaking are indicated by "[No Change]".

b) The proposed regulatory amendments are shown in underline to indicate additions to the text and ~~strikeout~~ to indicate deletions.

c) [ ] in the proposed §1956.8(b) indicates text that can be finalized only upon Board adoption.

Amend Title 13, California Code of Regulations, section 1956.8, to read:

1956.8. Exhaust Emissions Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

(a)(1) [No Change]

(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 Engines (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	Non-methane Hydrocarbons	Carbon Monoxide	Particulates ~~Matter~~
2004-2006[H] ~~and subsequent~~	2.4 [A,C,E,J]	2.5 [B,C,E,J]	n/a	n/a	15.5	0.10 [C]
October 1, 2002 ~~and subsequent~~ – 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	n/a	n/a	0.2 [I]	0.14	15.5	0.01 [K]

[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 ~~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, ~~E~~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.

[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

[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.

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.

(B) Phase-in Options. (i) 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), 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). 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.

(ii) Early PM compliant engines. A manufacturer certifying engines to the 2007 and subsequent model year PM standard listed in section 1956.8 (a)(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 (a)(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.

(3) [No Change]

(4) [No Change]

(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."

(b) The test procedures for determining compliance with standards applicable to 1985 and subsequent heavy-duty diesel engines and vehicles and the requirements for participation in the averaging, banking and trading programs, are set forth in the "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles" adopted April 8, 1985, as last amended ~~November 22 2000~~ October 25, 2001, which is incorporated herein by reference.

(c) [No Change]

(d) [No Change]

(e) [No Change]

(f) [No Change]

(g) [No Change]

(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 Incomplete Otto-Cycle Medium-Duty Low-Emission Vehicles, Ultra-Low-Emission Vehicles, and Super Ultra-Low-Emission Vehicles, and for 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 and subsequent [L]	ULEV - Opt A	14.4	2.5 [I,J,K]	n/a	n/a	0.050	0.10 [J,K]
2004 and subsequent [L]	ULEV - Opt. B	14.4	2.4 [I,J,K]	n/a	n/a	0.050	0.10 [J,K]
2007 and subsequent [D]	ULEV	15.5	n/a	0.14	0.2	0.050	0.01
1992 and subsequent [L]	SULEV	7.2	2.0 [K]	n/a	n/a	0.025	0.05 [K]
2007 and subsequent [D]	SULEV	7.7	n/a	0.07	0.1	0.025	0.005

[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 rating may choose to comply with these standards as an alternative to the primary emission standards and test procedures

specified in section 1960.1, or section 1961, 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 "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~~is~~ standards ~~shall only~~ 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 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles", incorporated by reference in ~~paragraph~~ 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 "California Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles", incorporated by reference in ~~paragraph~~ section 1956.8 (b), above.

L For 2007 and subsequent model year diesel engines used in medium-duty vehicles, these emission standards are not applicable.

(3) 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."

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104, 43105 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 43000, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43106, 43202, 43204, 43206, 43210, 43211, 43212, 43213, and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

§ 1956.8. Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

(a) [No change.]

(b) 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 ~~and Subsequent~~ through 2003 Model Heavy-Duty Diesel Engines and Vehicles," adopted April 8, 1985, as last amended ~~October 25, 2001~~ 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, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes,"~~,~~ adopted October 24, 2002, which are incorporated by reference herein.

(c)(1)(A) [No change.]

(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:

California Emission Standards for 2005 and Subsequent Model Heavy-Duty Otto-Cycle Engines[A]

(in g/bhp-hr)

~~*Model Year*~~	~~*Emission Category*~~	~~*NMHC + NOx*~~	~~*CO*~~	~~*HCHO*~~
~~***Standards for Heavy-Duty Otto-Cycle Engines Used In Incomplete Medium-Duty Vehicles 8,501 to 14,000 pounds GVW[B]***~~				
~~2005 and subsequent~~	~~ULEV~~	~~1.0[C]~~	~~14.4~~	~~0.05~~
	~~SULEV~~	~~0.5~~	~~7.2~~	~~0.025~~
~~Standards for Heavy-Duty Otto-Cycle Engines Used In Heavy-Duty Vehicles Over 14,000 pounds GVW~~				
~~2005 and subsequent~~	~~n/a~~	~~1.0[C]~~	~~37.1~~	~~0.05[D]~~

Model Year	Emission Category	NMHC + NOx	NMHC	NOx	CO[F]	HCHO	PM
Standards for Heavy-Duty Otto-Cycle Engines Used In Incomplete Medium-Duty Vehicles 8,501 to 14,000 pounds GVW[B]							
2005 through 2007	ULEV	1.0[C,E]	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[E]	0.20[E]	14.4	0.01	0.01
	SULEV	n/a	0.07[E]	0.10[E]	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[C,E]	n/a	n/a	37.1	0.05[D]	n/a
2008 and subsequent	n/a	n/a	0.14[E]	0.20[E]	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. 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, 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.

C A manufacturer may request to certify to the Option 1 or ~~or~~ Option 2 federal NMHC + NOx standards as set forth in 40 CFR § 86.005-10(f)~~, adopted October 6, 2000~~. However, for engines used in medium-duty vehicles ~~8,501 - 14,000 lbs. GVWR~~, the formaldehyde ~~and carbon monoxide~~ level ~~standards~~ must meet the standard ~~levels~~ specified above.

D This standard only applies to methanol-fueled Otto-cycle engines.

E 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).

F 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.

(c)(2) [No change.]

(d) 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," adopted December 27, 2000, as last amended December 12, 2002, the "California Non-Methane Organic Gas Test Procedures," adopted July 12, 1991, as last amended July 30, 2002, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

Subsections (e) through (h)(2) footnote [I]. [No change.]

[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 ~~1985~~2004 and Subsequent Model Heavy-Duty 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 ~~and Subsequent~~ through 2003 Model Heavy-Duty 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.

Subsections (h)(2) footnote [L] through (h)(4). [No change.]

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43100, 43101, 43104, 43105 and 43806, Health and Safety Code, and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 43000, 43013, 43018, 43100, 43101, 43102, 43104, 43106, 43202, 43204, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

Final Regulation Order

Requirements to Reduce Idling Emissions From New and In-Use Trucks, Beginning in 2008

NOTE: The regulatory amendments to existing language are shown in underline to indicate additions to the text and ~~strikeout~~ to indicate deletions. Paragraphs within a section that are not being amended in this rulemaking are indicated by "[No Change.]." Subsection headings are shown in italics so they will be published in a distinctive font in Barclays California Code of Regulations.

Amend the following sections of Title 13, California Code of Regulations, to read as set forth in the following pages:

§ 1956.8	Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Year Heavy-Duty Engines and Vehicles
§ 2404	Emission Control Labels and Consumer Information – 1995 and Later Small Off-Road Engines
§ 2424	Emission Control Labels – 1996 and Later Off-Road Compression-Ignition Engines
§ 2425	Defects Warranty Requirements for 1996 and Later Off-Road Compression-Ignition Engines
§ 2485	Airborne Toxic Control Measure to Limit Diesel-Fueled Commercial Motor Vehicle Idling

Amend Title 13, California Code of Regulations, § 1956.8, to read:

§ 1956.8. Exhaust Emissions Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

(a)(1) [No Change.]

(a)(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 Engines (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*	*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	n/a	n/a	0.2 [I]	0.14	15.5	0.01 [K]

[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.

[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.

(a)(2)(B) through (a)(5) [No Change.]

[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.

(a)(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)(13) of title 13, California Code of Regulations, military tactical vehicles as defined in section 1905 of title 13, California Code of Regulations, and authorized emergency vehicles as defined in California Vehicle Code section 165 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).

(b) 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 September 1, 2006, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

(c) through (h) [No Change.]

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43100, 43101, 43102, 43104, 43105 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 43000, 43013, 43017, 43018, 43100, 43101, 43101.5, 43102, 43104, 43106, 43202, 43204, 43205.5, 43206, 43210, 43211, 43212, 43213 and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

FINAL REGULATION ORDER

EXHAUST EMISSIONS STANDARDS AND TEST PROCEDURES – 1985 AND SUBSEQUENT MODEL HEAVY-DUTY ENGINES AND VEHICLES

Note: Proposed amendments are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions, compared to the preexisting regulatory language.

Amend section 1956.8, title 13, California Code of Regulations to read as follows:

§ 1956.8. Exhaust Emissions Standards and Test Procedures – 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

(a)(1) [No Change]

(a)(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[L] (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*	*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]

[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.

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

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[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.

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.

(a)(6) Heavy-Duty Diesel Engine Idling Requirements.

(A) ~~Engine Shutdown System~~ *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~~ *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~~ *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.~~*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 coola nt 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. ~~i~~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) above.

(B) ~~Exempt Vehicles~~ *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)(13) of title 13, California Code of Regulations, military tactical vehicles as defined in section 1905 of title 13, California Code of Regulations, ~~and~~ 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~~ *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~~ *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).

(b) through (h) [No Change.]

NOTE: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43107, and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 39667, 43000, 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.

§ 1956.8. Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

* * * *

(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 ~~December 22, 2011~~ March 22, 2012, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

* * * *

(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:

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[F-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 ~~14,000~~ 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[C,E]	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[E]	0.20[E]	14.4	0.01	0.01
	SULEV	n/a	0.07[E]	0.10[E]	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[C,~~E~~D,F]	n/a	n/a	37.1	0.05[~~D~~E]	n/a
2008 and subsequent	n/a	n/a	0.14[E]	0.20[E]	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.

[~~B~~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.

[~~C~~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.

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

[~~E~~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).

[~~F~~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.

* * * *

(3) *Optional Standards for Complete Heavy-Duty Vehicles that Use Heavy-Duty Otto-Cycle Engines.* Manufacturers may request to group complete 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 heavy-duty Otto-cycle vehicles meet the most stringent LEV III standards to which any vehicle within that test group certifies.

* * * *

(d) 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," adopted December 27, 2000, as last amended ~~September 27, 2010~~ March 22, 2012, the "California Non-Methane Organic Gas Test Procedures," adopted July 12, 1991, as last amended ~~July 30, 2002~~ March 22, 2012, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

* * * *

(h) The exhaust emissions from new:

* * * *

(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 ~~for~~ 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 ~~and subsequent~~[L]	ULEV - Opt A	14.4	2.5[I,J,K]	n/a	n/a	0.050	0.10[J,K]
2004-2006 ~~and subsequent~~[L]	ULEV - Opt. B	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 ~~and subsequent~~[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, m~~M~~anufacturers of engines used in incomplete medium-duty vehicles or diesel engines used in medium-duty vehicles from 8501-10,000 ~~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, ~~or~~ 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 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. ~~For 2007 and subsequent model year diesel engines used in medium-duty vehicles, these emission standards are not applicable.~~

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* * * *

(5) *Optional Standards for Complete Heavy-Duty Vehicles that Use Heavy-Duty Diesel Engines.* Manufacturers may request to group complete 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 heavy-duty diesel

vehicles meet the most stringent LEV III standards to which any vehicle within that test group certifies.

NOTE: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43107 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 39667, 43000, 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.

§ 1956.8. Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

* * * *

(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 ~~March 22, 2012~~December 6, 2012, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

(c)(1)(A)

* * * *

(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.

(d) 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," adopted December 27, 2000, as last amended ~~March 22, 2012~~December 6, 2012, the "California Non-Methane Organic Gas Test Procedures," adopted July 12, 1991, as last amended ~~March 22, 2012~~December 6, 2012, and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

* * * *

(h) The exhaust emissions from new:

* * * *

(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.

NOTE: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43107 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 39667, 43000, 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.

Final Regulation Order

California's Heavy-Duty Diesel In-Use Compliance Regulation

NOTE: The regulatory amendments to existing language are shown in underline to indicate additions to the text and ~~strikeout~~ to indicate deletions. Paragraphs within a section that are not being amended in this rulemaking are indicated by "[No Change.]." Subsection headings are shown in italics so they will be published in a distinctive font in Barclays California Code of Regulations.

Amend the following section of Title 13, California Code of Regulations, to read as set forth in the following pages:

1956.8	Exhaust Emission Standards and Test Procedures for 1985 and Subsequent Model Year Heavy-Duty Engines and Vehicles

Amend Title 13, California Code of Regulations, section 1956.8, to read:

§ 1956.8. Exhaust Emissions Standards and Test Procedures - 1985 and Subsequent Model Heavy-Duty Engines and Vehicles.

(a) [No change.]

(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 ~~September 27, 2010~~[*insert date of amendment for this rulemaking*], and the "California Interim Certification Procedures for 2004 and Subsequent Model Hybrid-Electric Vehicles, in the Urban Bus and Heavy-Duty Vehicle Classes," adopted October 24, 2002, which are incorporated by reference herein.

Sections (c) through (h) [No change.]

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43100, 43101, 43102, 43104, 43105 and 43806, Health and Safety Code; and Section 28114, Vehicle Code. Reference: Sections 39002, 39003, 39500, 43000, 43013, 43017, 43018, 43100, 43101, 43101.5, 43102, 43104, 43106, 43202, 43204, 43205.5, 43206, 43210, 43211, 43212, 43213, and 43806, Health and Safety Code; and Section 28114, Vehicle Code.

Amend Title 13, California Code of Regulations, section 1958 to read:

§1958. Exhaust Emission Standards and Test Procedures — Motorcycles and Motorcycle Engines Manufactured on or after January 1, 1978.

(a) This section shall be applicable to motorcycles, motorcycle engines, and the manufacturers of either motorcycles or motorcycle engines produced on or after January 1, 1978. Motorcycles and motorcycle engines are excluded from the requirements of this section if:

~~(1) The engine displacement is less than 50 cubic centimeters, or~~

(2) An 80 kilogram (176 pound) driver cannot:

(A) start from a dead stop using only the engine, or

(B) exceed a maximum speed of 40 kilometers per hour (24.9 miles per hour) on a level paved surface.

(b) Exhaust emissions from new street-use motorcycles and motorcycle engines, subject to registration and sold and registered in this state, shall not exceed:

~~Exhaust Emission~~ Table of Standards
~~(grams per kilometer)~~

Model-Year	Engine Displacement (in cubic centimeters)	Exhaust Emission Standards (grams per kilometer)	
		Hydrocarbon (HC) + Oxides of Nitrogen (NOx)	Carbon Monoxide
1978 to 1979	50 to less than 170	5.0 (HC only)	17
1978 to 1979	170 to less than 750	5.0 + 0.0155(D-170)* (HC only)	17
1978 to 1979	750 or greater	14 (HC only)	17
1980 to 1981	All (50 cc or larger)	5.0 (HC only)	17
1982 and subsequent	50 cc to 279 cc	1.0 (HC only)	12
1982 through 1985 (manufactured prior to March 1, 1985)	280 cc or greater	2.5 (HC only)	12
1985 (manufactured after February 28, 1985) through 1987	280 cc or greater	1.4 (HC only), applied as a corporate average, ** provided that each engine family shall have only one applicable standard	12
1988 ~~and subsequent~~ through 2003	280 cc to 699 cc	1.0 (HC only), applied as a corporate average, ** provided that each engine family shall have only one applicable standard	12
1988 ~~and subsequent~~ through 2003	700 cc or greater	1.4 (HC only), applied as a corporate average, ** provided that each engine family shall have only one applicable standard	12
2004 through 2007	280 cc or greater	1.4 (HC + NOx), applied as a corporate average, ** provided that each engine family shall have only one applicable standard	12
2008 and subsequent	280 cc or greater	0.8 (HC + NOx), applied as a corporate average, ** provided that each engine family shall have only one applicable standard	12

*D = engine displacement of motorcycles in cubic centimeters.

**Compliance with a standard to be applied as a "corporate average" shall be determined as follows:

$$\frac{\sum_{J=1}^{n} (PROD_{jx}) \quad (STD_{jx})}{\sum_{J=1}^{n} (PROD_{jx})} = STD_{Ca}$$

where,

n = Class III motorcycle engine families (engines with displacement of 280 cc or greater manufactured after February 28, 1985).

$PROD_{jx}$ = Number of units of Class III engine family j produced for sale in California in model year x

STD_{jx} = The manufacturer designated HC or HC + NOx emission standard, whichever applies, for engine family j in model year x, which shall be determined by the manufacturer subject to the following conditions:

(1) ~~no individual engine family exhaust emission standard shall exceed 2.5 g/km, and~~
for Model Year 1988 through 2003 motorcycle engines and motorcycles with engine displacement of 280 cc or greater, no individual engine family exhaust emission standard shall exceed 2.5 g/km HC, and

(2) for Model Year 2004 and subsequent motorcycle engines and motorcycles with engine displacement of 280 cc or greater, no individual engine family exhaust emission standard shall exceed 2.5 g/km HC+NOx, and

(3) no engine family designation or engine family exhaust emission standard shall be amended in a model year after the engine family is certified for the model year, and

(4) prior to sale or offering for sale in California, each engine family shall be certified in accordance with Section 1958(c) and shall be required to meet the manufacturer's designated HC or HC + NOx standard, whichever applies, as a condition of the certification Executive Order. Prior to certification the manufacturer shall also submit estimated production volumes for each engine family to be offered for sale in California.

STD_{Ca} = A manufacturer's corporate average HC or HC + NOx exhaust emissions, whichever applies, from those California motorcycles or motorcycle engines subject to the California corporate average HC or HC + NOx exhaust emission standard, as established by an Executive Order certifying the California production for the model year. This order must be obtained prior to the issuance of certification Executive Orders for individual engine families for the model year and shall include but not be limited to the following requirements:

(1) During the manufacturer's production year, for each engine family, the manufacturer shall provide the following information to the Executive Officer within 30 days after the last day in each calendar quarter:

(a~~A~~) vehicle identification numbers and an explanation of the identification code;

(b~~B~~) the total number of vehicles or motorcycle engines produced for sale in California and their applicable designated emissions standards.

(2) The manufacturer's average HC or HC + NOx exhaust emissions, whichever applies, shall meet the applicable corporate average standard at the end of the manufacturer's production for the model year.

[No changes to subsections (b)(3) through (e)]

(f) (1) Small Volume Manufacturers: Exhaust emission standards for ~~from~~ Class III motorcycles and motorcycle engines ~~of~~ produced by small volume manufacturers ~~shall not be exceeded 2.5 grams per kilometer hydrocarbon for the 1984, 1985, 1986, and 1987 model years.~~ are as follows:

(A) For Model Years through 2007, Class III motorcycles and motorcycle engines shall meet the applicable HC-only and CO emission limits specified in the Table of Standards in subsection 1958(b).

(B) For Model Year 2008 and subsequent, Class III motorcycles and motorcycle engines shall emit no more than 12 grams of CO per kilometer and 1.4 grams per kilometer HC + NOx, applied as a corporate average, provided that no engine family shall emit greater than 2.5 grams per kilometer HC + NOx.

(2) To obtain certification as a small volume manufacturer pursuant to this subsection, the manufacturer shall submit product information and estimated sales data with the certification application for each engine family sold in California. As a condition of obtaining certification as a small volume manufacturer, the manufacturer shall submit annually to the ~~state board~~ Executive Officer a summary of its efforts and progress toward meeting more stringent ~~hydrocarbon~~ HC + NOx exhaust emission standards. The summary shall include a description of the manufacturer's current ~~hydrocarbon~~ HC + NOx emission control development status, along with supporting test data, and future planned development work.

(2~~3~~) ~~For purposes of this subsection, a small volume manufacturer is one which sells less than 5,000 new Class I, II, and III motorcycles per model year in California.~~ For purposes of subsection 1958(f)(1), the following provisions apply:

For Model Years (MY)	Small Volume Manufacturer (SVM) definition is	Applicable Exhaust Emissions Requirements
prior to 1984	not applicable	For all manufacturers, Section 1958(f)(1)(A) and 1958(b) apply.
1984 through 1987	one which sells less than 5,000 new Class I, II, and III motorcycles per model year in California	For SVMs, 2.5 grams per kilometer HC-only and 12 grams per kilometer CO apply only to Class III motorcycles. For all other manufacturers and Class I and II motorcycles, Section 1958(f)(1)(A) and 1958(b) apply.
1988 through 2007	not applicable	For all manufacturers, Section 1958(f)(1)(A) and 1958(b) apply.
2008 and subsequent	one which sells no more than 300 (combined) new Class I, II, and III motorcycles per model year in California, starting with the 2004 MY .	For SVMs, Section 1958(f)(1)(B) applies only to Class III motorcycles. For all other manufacturers and Class I and II motorcycles, Section 1958(b) applies.

(g) Early-Compliance Credits

(1) Manufacturers which sell Class III motorcycles or motorcycle engines in California certified as meeting either a 0.8 g/km or 0.4 g/km HC+NOx level prior to Model Year 2008 can receive credits for use in the Model Year 2008 corporate average upon written approval by the Executive Officer. Each unit of Class III motorcycle or motorcycle engine sold between Model Years 1999 and 2008 and which meets the requirements of this subsection shall be multiplied by whichever X multiplier applies, as shown in the following table:

Table of Multipliers to Encourage Early Compliance with the 0.8 g/km HC + NOx Standard and Beyond

Model Year Sold	Multiplier (X) for Use in MY 2008 Corporate Averaging	
	Certified at 0.8 g/km HC + NOx or below	Certified at 0.4 g/km HC+NOx or below
1999 through 2004	1.5	3.0
2005	1.375	2.5
2006	1.250	2.0
2007	1.125	1.5
2008 and subsequent	1.0	1.0

Note: Each unit of an early compliant certified motorcycle and motorcycle engine is counted cumulatively toward the MY 2008 corporate average.

(2) Applications for early compliance credits pursuant to this subsection shall include in writing all emissions data, test protocols, equipment specifications, operating conditions, and any other technical information requested by the Executive Officer.

(3) The Executive Order approving early compliance credits under this subsection shall specify the exact amount of credits granted, the date of expiration for the credits, and all enforcement provisions applicable to the use of early compliance credits. Each motorcycle and each motorcycle that incorporates an engine for which early compliance credits have been granted pursuant to this subsection shall specify on its "California Motor Vehicle Emission Control And Smog Index Label" (Section 1965, Title 13, California Code of Regulations), in addition to all other existing requirements, the actual HC + NOx engine family exhaust emissions level for which the vehicle or engine has been granted early compliance credit.

(h) Sunset Review

Within five years from the effective date of adoption or date of implementation, which ever comes later, the Air Resources Board, in consultation with the Secretary for Environmental Protection, shall review the provisions of this section to determine whether it should be retained, revised, or repealed.

Note: Authority cited: Sections 39600, 39601, 43013, 43101, 43104, and 43107, Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43013, 43100, 43101, 43104, and 43107, Health and Safety Code; and Cal. Stats. 83, Ch. 103.

C

BARCLAYS OFFICIAL CALIFORNIA CODE OF REGULATIONS
TITLE 13. MOTOR VEHICLES
DIVISION 3. AIR RESOURCES BOARD
CHAPTER 1. MOTOR VEHICLE POLLUTION CONTROL DEVICES
ARTICLE 1. GENERAL PROVISIONS

This database is current through 12/26/08, Register 2008, No. 52

§ 1960.1. Exhaust Emissions Standards and Test Procedures -1981 through 2006 Model Passenger Cars, Light-Duty and Medium-Duty Vehicles.

(a) The exhaust emissions from new 1981 model passenger cars, light-duty trucks, and medium-duty vehicles, subject to registration and sold and registered in this state, shall not exceed [FN1]:

_____
_____

1981 EXHAUST EMISSION STANDARDS (grams per mile)

Inertia Vehicle Type [FN2]	Equivalent Weight (lbs.) [FN3]	Durability Basis (mi.)	Non-Methane Hydrocarbons [FN4]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN5]		
PC	All		50,000		(0.41)	3.4	1.0
PC [FN6]	All	50,000	0.39		(0.41)	7.0	0.7
PC (Option 1)	All	100,000		0.39	[FN7]	3.4	1.5
PC (Option 2)	All	100,000		0.46	[FN7]	4.0	1.5
LDT, MDV	0-3999	50,000	0.39		(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	[FN7]	9.0	1.5
LDT, MDV (Option 2)	0-3999	100,000		0.46	[FN7]	10.6	1.5
LDT, MDV	4000-5999	50,000	0.50		(0.50)	9.0	1.5
LDT, MDV (Option	4000-5999	100,000	0.50	(0.50)	[FN7]	9.0	2.0

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1)							
MDV	6000 and larger	50,000	0.60		(0.60)	9.0	2.0
MDV (Option 1)	6000 and larger	100,000	0.60	(0.60)	[FN7]	9.0	2.3

[FN1] Subsection (a) shall remain in effect until December 31, 1991, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1991, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal of expiration.

[FN2] "PC" means passenger cars.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR part 600, Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded to the nearest 0.1 gm/mi before being compared.

[FN6] The second set of 50,000 mile passenger car standards is optional. A manufacturer must select either the primary or optional sets of 50,000 mile standards for its full product line for both 1981 and 1982 model years.

[FN7] For vehicles from evaporative emission families with projected 50,000 mile evaporative emissions values below 1.0 gm/test, an adjustment to the hydrocarbon exhaust emission standards may be granted by the Executive Officer. The adjusted standard will be calculated using the following formula: $HC_{ex} = .75 (.185 - [(Di + 3.3 Hs) (29.4)])+ HCo$ Where: HC_{ex} = adjusted exhaust hydrocarbon standard HC_{o} = unadjusted exhaust hydrocarbon standard Di= diurnal evaporative emissions Hs= hot soak evaporative emissions.

(b) The exhaust emissions from new 1982 model passenger cars, light-duty trucks, and medium-duty vehicles, subject to registration and sold and registered in this state, shall not exceed [FN1]:

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1982 EXHAUST EMISSION STANDARDS (grams per mile)

Inertia Vehicle Type [FN2]	Equivalent Weight (lbs.) [FN3]	Durability Basis (mi.)	Non-Methane Hydrocarbons [FN4]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN5]	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN6]	All	50,000	0.39	(0.41)	7.0	0.7
PC (Option 1)	All	100,000	0.39	(0.41)	7.0	1.5
PC (Option 2)	All	100,000		0.46	8.3	1.5
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	9.0	1.5
LDT, MDV (Option 2)	0-3999	100,000		0.46	10.6	1.5
LDT, MDV	4000-5999	50,000	0.50	(0.50)	9.0	1.5
LDT, MDV (Option 1)	4000-5999	100,000	0.50	(0.50)	9.0	2.0
MDV	6000 and larger	50,000	0.60	(0.60)	9.0	2.0
MDV (Option 1)	6000 and larger	100,000	0.60	(0.60)	9.0	2.3

[FN1] Subsection (b) shall remain in effect until December 31, 1992, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1992, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal or expiration.

[FN2] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] The maximum projected emissions of oxides of nitrogen measured on the

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federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600, Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded to the nearest 0.1 gm/mi before being compared.

[FN6] The second set of 50,000 mile passenger car standards is optional. A manufacturer must select either the primary or optional sets of 50,000 mile standards for its full product line for both 1981 and 1982 model years.

(c) The exhaust emissions from new 1983 model passenger cars, light-duty trucks, and medium-duty vehicles, subject to registration and sold and registered in this state, shall not exceed [FN1]:

1983 EXHAUST EMISSION STANDARDS (grams per mile)

Inertia Vehicle Type [FN2]	Equivalent Weight (lbs.) [FN3]	Durability Basis (mi)	Non-Methane Hydrocarbons [FN4]	Vehicle Carbon Monoxide	Oxides of Nitrogen	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN6]	All	50,000	0.39	(0.41)	7.0	0.7
PC (Option 1)	All	100,000	0.39	(0.41)	7.0	1.5
PC (Option 2)	All	100,000		0.46	8.3	1.5
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0	0.4
LDT, MDV [FN6]	0-3999	50,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	9.0	1.5
LDT, MDV (Option	0-3999	100,000		0.46	10.6	1.5

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2)						
LDT, MDV	4000-5999	50,000	0.50	(0.50)	9.0	1.0
LDT, MDV (Option 1)	4000-5999	100,000	0.50	(0.50)	9.0	2.0
MDV	6000 and larger	50,000	0.60	(0.60)	9.0	1.5
MDV (Option 1)	6000 and larger	100,000	0.60	(0.60)	9.0	2.0

[FN1] Subsection (C) shall remain in effect until December 31, 1993, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1993, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal or expiration.

[FN2] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600, Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded to the nearest 0.1 gm/mi before being compared.

[FN6] This set of standards for 1983 model vehicles is optional. A manufacturer may choose to certify these optional standards pursuant to the conditions set forth in Section 1960.15.

(d)(1) The exhaust emissions from new 1984 through 1987 model passenger cars, light-duty trucks, and medium-duty vehicles subject to registration and sold and registered in this state, shall not exceed:

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____

1984 THROUGH 1987 EXHAUST EMISSION STANDARDS [FN6] (grams per mile)

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Inertia Vehicle Type [FN1]	Equivalent Weight (lbs.) [FN2]	Durability Basis (mi)	Non-Methane Hydrocarbons [FN3]	Vehicle Carbon Monoxide	Oxides of Nitrogen	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN5]	All	50,000	0.39	(0.41)	7.0	0.7
PC (Option 1)	All	100,000	0.39	(0.41)	7.0	1.0
PC (Option 2)	All	100,000		0.46	8.3	1.0
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0	0.4
LDT, MDV [FN5]	0-3999	50,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3999	100,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 2)	0-3999	100,000		0.46	10.6	1.0
LDT, MDV	4000-5999	50,000	0.50	(0.50)	9.0	1.0
LDT, MDV (Option 1)	4000-5999	100,000	0.50	(0.50)	9.0	1.5
MDV	6000 and larger	50,000	0.60	(0.60)	9.0	1.5
MDV (Option 1)	6000 and larger	100,000	0.60	(0.60)	9.0	2.0

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN3] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN4] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600, Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded to the nearest 0.1 gm/mi before being compared.

[FN5] This set of standards for 1984 through 1987 model vehicles is optional. A manufacturer may choose to certify these optional standards pursuant to the conditions set forth in Section 1960.15.

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[FN6] Diesel-powered passenger cars, light-duty trucks, and medium-duty vehicles are subject to the following particulate exhaust emission standards: 0.4/g.mi for the 1985 model year and 0.2 g/mi for the 1986 and 1987 model years. The particulate compliance shall be determined on a 50,000 mile durability vehicle basis.

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(2) The exhaust emissions from new 1988 model passenger cars, light-duty trucks, and medium-duty vehicles and new 1988 through 1990 model passenger cars, light-duty trucks and medium-duty vehicles produced by a small volume manufacturer, subject to registration and sold and registered in this state, shall not exceed:

1988 EXHAUST EMISSION STANDARDS [FN5]
(grams per mile)

Inertia Vehicle Type [FN1]	Equivalent Weight (lbs.)	Durability Basis (mi)	Non-Methane Hydrocarbons [FN2]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN3]	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN4]	All	50,000	0.39	(0.41)	7.0	0.7
PC (Option 1)	All	100,000	0.39	(0.41)	7.0	1.0
PC (Option 2)	All	100,000		0.46	8.3	1.0
LDT, MDV	0-3750	50,000	0.39	(0.41)	9.0	0.4
LDT, MDV [FN4]	0-3750	50,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 1)	0-3750	100,000	0.39	(0.41)	9.0	1.0
LDT, MDV (Option 2)	0-3750	100,000		0.46	10.6	1.0
LDT, MDV	3751-5750	50,000	0.50	(0.50)	9.0	1.0

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LDT, MDV (Option 1)	3751-5750	100,000	0.50	(0.50)	9.0	1.5
MDV	5751 and larger	50,000	0.60	(0.60)	9.0	1.5
MDV (Option 1)	5751 and larger	100,000	0.60	(0.60)	9.0	2.0

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN3] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600, Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty trucks and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[FN4] This set of standards is optional. A manufacturer may choose to certify to these optional standards pursuant to the conditions set forth in Section 1950.1.5.

[FN5] Diesel-powered passenger cars, light-duty trucks, and medium-duty vehicles are subject to a particulate exhaust emission standard of 0.2 g/mi for the 1988 model year. The particulate compliance shall be determined on a 50,000 mile durability vehicle basis.

(e)(1) The exhaust emissions from (A) new 1989 through 1992 model passenger cars and light-duty trucks, except those produced by a small volume manufacturer, (B) new 1991 through 1994 model passenger cars and light-duty trucks produced by a small volume manufacturer, (C) new 1989 through 1994 model medium-duty vehicles, except those produced by a small volume manufacturer, and (D) new 1991 through 1994 model medium-duty vehicles produced by a small volume manufacturer, shall not exceed:

____
____

1989 THROUGH 1994 MODEL-YEAR EXHAUST EMISSION STANDARDS [FN5] (grams per mile)

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Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.)	Durability Basis (mi)	Non-Methane Hydrocarbons [FN2]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN3,-4]	
PC	All	50,000	0.39	(0.41)	7.0	0.4
PC [FN6]	All	50,000	0.39	(0.41)	7.0	0.7
Diesel PC (Option 2)	All	100,000 [FN8]	0.46	8.3	1.0	
LDT, MDV	0-3750	50,000	0.39	(0.41)	9.0	0.4
LDT, MDV [FN6]	0-3750	50,000	0.39	(0.41)	9.0	0.7 [FN7]
Diesel LDT, MDV (Option 2)	0-3750	100,000	[FN8]	0.46	10.6	1.0
LDT, MDV	3751-5750	50,000	0.50	(0.50)	9.0	1.0
LDT, MDV (Option 1)	3751-5750	100,000 [FN8]	0.50	(0.50)	9.0	1.5
MDV	5751 and larger	50,000	0.60	(0.60)	9.0	1.5
MDV (Option 1)	5751 and larger	100,000 [FN8]	0.60	(0.60)	9.0	2.0

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] Hydrocarbon standards in parentheses apply to total hydrocarbons. For 1993 through 1994 model methanol-fueled vehicles certifying to these standards, including flexible-fueled vehicles, "Non-Methane Hydrocarbons" shall mean "Organic Material Hydrocarbon Equivalent" (or "OMHCE").

[FN3] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600, Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[FN4] The standard for in-use compliance for passenger cars, light-duty trucks and medium-duty vehicles certifying to the 0.4 g/mi NOx standard shall be 0.55 g/mi NOx for 50,000 miles. If the in-use compliance level is above 0.4

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g/mi NOx but does not exceed 0.55 g/mi NOx, and based on a review of information derived from a statistically valid and representative sample of vehicles, the Executive Officerdetermines that a substantial percentage of any class or category of such vehicles exhibits, prior to 50,000 miles or 5 years, whichever occurs first, an identifiable, systematic defect in a component listed in section 1960.1.5(c)(2) which causes a significant increase in emissions above those exhibited by vehicles free of such defects and of the same class or category and having the same period of use and mileage, then the Executive Officer may invoke the enforcement authority under subchapter 2.5, Title 13, California Code of Regulations, commencing with section 2111, to require remedial action by the vehicle manufacturer. Such remedial action shall be limited to owner notification and repair or replacement of the defective component. As used in this section, the term "defect" shall not include failures which are the result of abuse, neglect, or improper maintenance. This provision is applicable for the 1989 through 1992 model years only. For small volume manufacturers, this provision is applicable for the 1991 through 1994 model years only.

[FN5] Diesel passenger cars, light-duty trucks, and medium-duty vehicles certifying to these standards are subject to a particulate exhaust emission standard of 0.08 g/mi for the 1989 and subsequent model years. The particulate compliance shall be determined on a 50,000 mile durability vehicle basis.

[FN6] This set of standards is optional. A manufacturer may choose to certify to these standards pursuant to the conditions set forth in section 1960.1.5.

[FN7] Pursuant to section 1960.1.5(a)(1)(B), the optional standard for 1989 model-year light-duty trucks and medium-duty vehicles only is 1.0 g/mi NOx.

[FN8] The optional 100,000 mile certification standards and provisions are not applicable to methanol vehicles.

(e)(2) The exhaust emissions from new 1993 through 2003 model methanol-fueled vehicles, including fuel-flexible vehicles, shall meet all the applicable requirements in (e)(1), (f)(1) and (f)(2) with the following modifications and additions:

____
____

1993 through 2003 METHANOL-SPECIFIC EXHAUST EMISSION STANDARDS

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Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.) [FN3]	Durability Basis (mi)	Vehicle Formaldehyde (mg/mi) Certification	In-Use Compliance [FN2]
PC	All	50,000	15	23 (1993-1995) 15 (1996-2003)
LDT, MDV	0-3750	50,000	15	23 (1993-1995) 15 (1996-2003)
LDT, MDV	3751-5750	50,000	18	27 (1993-1995) 18 (1996-2003)
MDV	5751-8500	50,000	22	33 (1993-1995) 22 (1996-2003)
MDV	8501-10,000	50,000	28	36 (1995) 28 (1996-2003)
MDV	10,001-14,000	50,000	36	45 (1995) 36 (1996-2003)

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] If the formaldehyde in-use compliance level is above the respective certification level but does not exceed the in-use compliance level, and based on a review of information derived from statistically valid and representative sample of vehicles, the Executive Officer determines that a substantial percentage of any class or category of such vehicle exhibits, prior to 50,000 miles or 5 years, whichever occurs first, an identifiable, systematic defect in a component listed in section 1960.1.5(c)(2), Title 13, California Code of Regulations, which causes a significant increase in emissions above those exhibited by vehicles free of such defects and of the same class or category and having the same period of use and mileage, the Executive Officer may invoke the enforcement authority under subchapter 2.5, Title 13, California Code of Regulations, commencing with section 2111, to require remedial action by the vehicle manufacturer. Such remedial action shall be limited to owner notification and repair or replacement of the defective component. As used in this section, the term "defect" shall not include failures which are the result of abuse, neglect, or improper maintenance.

[FN3] For 1995-2003 model-year medium-duty vehicles certifying to the standards specified in section 1960.1 (h)(1), "Loaded Vehicle Weight" shall mean "Test Weight," which is the average of the vehicle's curb weight and gross vehicle weight.

(e)(3) The exhaust emissions from new 1992 through 2006 model-year "LEV I" transitional low-emission

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vehicles, low-emission vehicles, ultra-low emission vehicles, and super ultra-low-emission vehicles, including fuel-flexible and dual-fuel vehicles, shall meet all the requirements of (g)(1) and (h)(2) with the following additions:

_____
_____

FORMALDEHYDE EXHAUST EMISSION STANDARDS IN THE LIGHT-DUTY AND MEDIUM-DUTY VEHICLE WEIGHT CLASSES [FN5,6,7] ["milligrams per mile" (or "mg/mi")]

Vehicle Type [FN1]	Vehicle Weight (lbs.) [FN2]	Durability Vehicle Basis (mi)	Emission Category [FN3]	Vehicle Formaldehyde (mg/mi) [FN4,5]
PC and	All	50,000	TLEV	15(23)
LDT		0-3750	LEV	15(15)
			ULEV	8(12)
		100,000	TLEV	18
			LEV	18
			ULEV	11
LDT	3751-5750	50,000	TLEV	18(27)
			LEV	18(18)
			ULEV	9(14)
		100,000	TLEV	23
			LEV	23
			ULEV	13
MDV	0-3750	50,000	LEV	15(15)
			ULEV	8(12)
		120,000	LEV	22
			ULEV	12
MDV	3751-5750	50,000	LEV	18(18)
			ULEV	9(14)
			SULEV	4(7)
		120,000	LEV	27
			ULEV	13
			SULEV	6
MDV	5751-8500	50,000	LEV	22(22)
			ULEV	11(17)
			SULEV	6(8)
		120,000	LEV	32
			ULEV	16

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			SULEV	8
MDV	8501-10,000	50,000	LEV	28(28)
			ULEV	14(21)
			SULEV	7(10)
		120,000	LEV	40
			ULEV	21
			SULEV	10
MDV	10,001-14,000	50,000	LEV	36(36)
			ULEV	18(27)
			SULEV	9(14)
		120,000	LEV	52
			ULEV	26
			SULEV	13

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN2] For light-duty or medium-duty vehicles, Vehicle Weight shall mean "Loaded Vehicle Weight" (or "LVW") or "Test Weight" (or "TW"), respectively.

[FN3] "TLEV" means transitional low-emission vehicle. "LEV" means low-emission vehicle. "ULEV" means ultra-low-emissions vehicle. "SULEV" means super ultra-low-emssion vehicle.

[FN4] Formaldehyde exhaust emission standards apply to vehicles certified to operate on any available fuel, including fuel-flexible and dual-fuel vehicles.

[FN5] The standards in parentheses are intermediate in-use compliance standards for 50,000 miles.

FN a. For PCs and LDTs from 0-5750 lbs. LVW, including fuel-flexible and dual-fuel vehicles, intermediate in-use compliance standards shall apply to TLEVs through the 1995 model year, and LEVs and ULEVs through the 1998 model year. In-use compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs, and through the 1998 model year for LEVs and ULEVs.

FN b. For MDVs from 0-14,000 lbs. TW, including fuel-flexible and dual-fuel vehicles, intermediate in-use compliance standards shall apply to LEVs, ULEVs and SULEVs through the 1999 model year. In-use compliance with standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs, ULEVs, and SULEVs.

[FN6] Manufacturers shall demonstrate compliance with the above standards for formaldehyde at 505F according to the procedures specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k) or section E.1.4 of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as incorporated by reference in section 1961(d). Hybrid electric, natural gas, and diesel-fueled vehicles shall be exempt from 505F test

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requirements.
[FN7] In-use compliance testing shall be limited to PCs and LDTs with fewer than 75,000 miles and MDVs with fewer than 90,000 miles.

(f)(1) The exhaust emissions from new 1993 and 1994 model passenger cars and light-duty trucks, except those produced by a small volume manufacturer, shall not exceed:

1993 AND 1994 MODEL YEAR PASSENGER CAR AND LIGHT-DUTY TRUCK EXHAUST EMISSIONS STANDARDS [FN5,8,9] (grams per mile)

Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.)	Durability Basis (mi)	Non-Methane Hydrocarbons [FN2,7]	Vehicle Carbon Monoxide [FN7]	Oxides of Nitrogen [FN1,3,4]
PC	All	50,000	0.39 (0.25)	7.0 (3.4)	0.4
PC [FN6]	All	50,000	0.39 (0.25)	7.0 (3.4)	0.7
PC	All	100,000	(0.31)	(4.2)	n/a
Diesel PC (Option 2)	All	100,000	0.46 (0.31)	8.3 (4.2)	1.0
LDT	0-3750	50,000	0.39 (0.25)	9.0 (3.4)	0.4
LDT [FN6]	0-3750	50,000	0.39 (0.25)	9.0 (3.4)	0.7
LDT	0-3750	100,000	(0.31)	(4.2)	n/a
Diesel LDT (Option 2)	0-3750	100,000	0.46 (0.31)	10.6 (4.2)	1.0
LDT	3751-5750	50,000	0.50 (0.32)	9.0 (4.4)	1.0
LDT	3751-5750	100,000	(0.40)	(5.5)	n/a
Diesel LDT (Option 1)	3751-5750	100,000	0.50 (0.40)	9.0 (5.5)	1.5

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "n/a" means not applicable.
[FN2] For methanol-fueled vehicles certifying to these standards, including fuel-flexible vehicles, when certifying on methanol , "Non-Methane Hydrocarbons" shall mean "Organic Material Hydrocarbon Equivalent" (or

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"OMHCE"). For methanol- or ethanol-fueled vehicles certifying to the phase-in standards in parenthesis, including fuel-flexible vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent" (or "OMNMHCE").

[FN3] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[FN4] The standard for in-use compliance for passenger cars and light-duty trucks certifying to the 0.4 g/mi NOx standard shall be 0.55 g/mi NOx for 50,000 miles. If the in-use compliance level is above 0.4 g/mi NOx but does not exceed 0.55 g/mi NOx, and based on a review of information derived from a statistically valid and representative sample of vehicles, the Executive Officer determines that a substantial percentage of any class or category of such vehicles exhibits, prior to 50,000 miles or 5 years, whichever occurs first, an identifiable, systematic defect in a component listed in section 1960.1.5(c)(2), Title 13, California Code of Regulations, which causes a significant increase in emissions above those exhibited by vehicles free of such defects and of the same class or category and having the same period of use and mileage, then the Executive Officer may invoke the enforcement authority under subchapter 2.5, Title 13, California Code of Regulations commencing with section 2111, to require remedial action by the vehicle manufacturer. Such remedial action shall be limited to owner notification and repair or replacement of the defective component. As used in this section, the term "defect" shall not include failures which are the result of abuse, neglect, or improper maintenance. This provision is applicable for the 1993 model year only.

[FN5] Diesel passenger cars and light-duty trucks certifying to these standards are subject to a particulate exhaust emission standard of 0.08 g/mi, determined on a 50,000 mile durability vehicle basis.

[FN6] This set of standards is optional. A manufacturer may choose to certify to these standards pursuant to the conditions set forth in section 1960.1.5.

[FN7] The emission standards in parenthesis are phase-in standards. For the 1993 model-year, each manufacturer must certify a minimum of 40% of their vehicles to the phase-in standards or the more stringent standards in section 1960.1 (g)(1). The percentage shall be applied to the manufacturer's total projected sales of California-certified passenger cars and light-duty trucks for the 1993 model year. For 1994 and subsequent model years, each manufacturer shall comply with the fleet average requirements specified in section 1960.1(g)(2).

[FN8] The following conditions shall apply to the in-use compliance standards for 1993 and 1994 model-year passenger cars and light-duty trucks only.

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FNa. The in-use compliance standards for those passenger cars and light-duty trucks certifying to the 0.25 g/mi non-methane hydrocarbon and 3.4 g/mi carbon monoxide standards shall be 0.32 g/mi non-methane hydrocarbon and 5.2 g/mi carbon monoxide for 50,000 miles.
FNb. The in-use compliance standards for those light-duty trucks certifying to the 0.32 g/mi non-methane hydrocarbon and 4.4 g/mi carbon monoxide standards shall be 0.41 g/mi non-methane hydrocarbon and 6.7 g/mi carbon monoxide for 50,000 miles.
FNc. In-use compliance standards shall be waived beyond 50,000 miles.
[FN9] All passenger cars and light-duty trucks, except those diesel vehicles certifying to optional 100,000 mile standards, are subject to non-methane hydrocarbon, carbon monoxide, and oxides of nitrogen standards determined on a 50,000 mile durability basis and non-methane hydrocarbon and carbon monoxide standards determined on a 100,000 mile basis.

(f)(2) "Tier 1" Exhaust Emission Standards for PCs and LDTs. The exhaust emissions from new 1995 through 2003 model Tier 1 passenger cars and light-duty trucks shall not exceed:

1995-2003 MODEL-YEARtier1PASSENGER CAR AND LIGHT-DUTY TRUCK EXHAUST EMISSIONS STANDARDS [FN5,6,8,10] (grams per mile)

Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.)	Durability Basis (mi)	Non-Methane Hydrocarbons [FN2,7]	Vehicle Carbon Monoxide [FN7]	Oxides of Nitrogen [FN1,3]
PC	All	50,000	0.25	3.4	0.4 [FN4]
PC	All	100,000	0.31	4.2	0.6 [FN9]
Diesel PC (Option 2)	All	100,000	0.31	4.2	1.0
LDT	0-3750	50,000	0.25	3.4	0.4 [FN4]
LDT	0-3750	100,000	0.31	4.2	0.6 [FN9]
Diesel LDT (Option 2)	0-3750	100,000	0.31	4.2	1.0

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LDT	3751-5750	50,000	0.32	4.4	0.7
LDT	3751-5750	100,000	0.40	5.5	0.97 [FN9]
Diesel LDT (Option 1)	3751-5750	100,000	0.40	5.5	1.5

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks.

[FN2] For methanol- or ethanol-fueled vehicles certifying to these standards, including fuel-flexible vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent" (or "OMNMHCE").

[FN3] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall be not greater than 1.33 times the applicable passenger car standards and 2.00 times the applicable light-duty truck standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[FN4] Small volume manufacturers may choose to certify to an optional 0.7 g/mi NOx standard for the 1995 model-year only, pursuant to the conditions set forth in sections 1960.1 (f)(1) and 1960.1.5.

[FN5] Diesel passenger cars and light-duty trucks certifying to these standards, are subject to a particulate exhaust emission standard of 0.08 g/mi, determined on a 50,000 mile durability vehicle basis.

[FN6] For all vehicles, except those certifying to optional diesel standards, in-use compliance with the exhaust emission standards shall be limited to vehicles with less than 75,000 miles.

[FN7] For the 1995 and 1996 model years, all manufacturers, except those certifying to optional diesel standards, are permitted alternative in-use compliance. Alternative in-use compliance is permitted for 60% of a manufacturer's vehicles in the 1995 model year and 20% of a manufacturer's vehicles in the 1996 model year. For the 1995 and 1996 model years, small volume manufacturers only are permitted alternative in-use compliance for 100% of the fleet. The percentages shall be applied to the manufacturer's total projected sales of California-certified passenger cars and light-duty trucks for the model year. "Alternative in-use compliance" shall consist of the following:

FN a. For all passenger cars and those light-duty trucks from 0-3750 lbs. loaded vehicle weight, except those diesel vehicles certifying to optional 100,000 mile standards, in-use compliance standards shall be 0.32 g/mi non-methane hydrocarbon and 5.2 g/mi carbon monoxide for 50,000 miles.

FN b. For light-duty trucks from 3751-5750 lbs., loaded vehicle weight, except those diesel light-duty trucks certifying to optional 100,000 mile standards, in-use compliance standards shall be 0.41 g/mi non-methane hydrocarbon and 6.7 g/mi carbon monoxide for 50,000 miles.

FN c. In-use compliance standards shall be waived beyond 50,000 miles.

[FN8] All passenger cars and light-duty trucks, except those diesel vehicles certifying to optional standards, are subject to non-methane hydrocarbon,

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carbon monoxide, and oxides of nitrogen standards determined on a 50,000 mile durability basis and non-methane hydrocarbon and carbon monoxide standards determined on a 100,000 mile durability basis.

[FN9] 100,000 mile NOx standards are applicable for 1996 and subsequent model-year vehicles.

[FN10] Each manufacturer shall also comply with the requirements specified in section 1960.1(g)(2).

(g)(1) "LEV I" Exhaust Emission Standards for PCs and LDTs.The exhaust emissions from new 1992 through 2003 model-year "LEV I" transitional low-emission vehicles, and new 1992 through 2006 model-year "LEV I" low-emission vehicles and ultra-low-emission vehicles, in the passenger car and light-duty truck classes shall not exceed:

LEV I EXHAUST EMISSION STANDARDS FOR TRANSITIONAL LOW-EMISSION VEHICLES, LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES AND ZERO-EMISSION VEHICLES IN PASSENGER CAR AND LIGHT-DUTY TRUCK

VEHICLE CLASSES [FN6,7,8,9,10] [grams per mile (or "g/mi")]

Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.)	Durability Basis (mi)	Emission Category [FN2]	Non-Methane Organic Gases [FN3,4]	Vehicle Carbon Monoxide	Oxides of Nitrogen [FN5]
PC and LDT	All 0-3750	50,000	TLEV	0.125	3.4	0.4
			LEV	0.075	3.4	0.2
			ULEV	0.040	1.7	0.2
		100,000	TLEV	0.156	4.2	0.6
			LEV	0.090	4.2	0.3
			ULEV	0.055	2.1	0.3
LDT	3751-57-50	50,000	TLEV	0.160	4.4	0.7
			LEV	0.100	4.4	0.4
			ULEV	0.050	2.2	0.4
		100,000	TLEV	0.200	5.5	0.9

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LEV	0.130	5.5	0.5
ULEV	0.070	2.8	0.5

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "LVW" means loaded vehicle weight. "Non-Methane Organic Gases" or "NMOG" means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

[FN2] "TLEV" means transitional low-emission vehicle. "LEV" means low-emission vehicle. "ULEV" means ultra-low-emissions vehicle.

[FN3] Compliance with NMOG Standard. To demonstrate compliance with an NMOG standard, NMOG emissions shall be measured in accordance with the "California Non-Methane Organic Gas Test Procedures" as adopted July 12, 1991 and last amended August 5, 1999, which is incorporated herein by reference.

FNa.Reactivity Adjustment. For TLEVs, LEVs, and ULEVs certified to operate exclusively on any fuel other than conventional gasoline, and for fuel-flexible and dual-fuel TLEVs, LEVs, and ULEVs when certifying on a fuel other than gasoline, manufacturers shall multiply NMOG exhaust certification levels by the applicable reactivity adjustment factor set forth in section 13 of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in sections I.E.5. of the "California Exhaust Emission Standards and Text Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicels" as incorporated by reference in section 1961(d), or established by the Executive Officer pursuant to Appendix VIII or section II.D. respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to TLEV, LEV, or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5. of the above referenced test procedures as applicable. The product of the NMOG exhaust certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

FNb.Fleet Average Requirement. Each manufacturer shall certify PCs or LDTs to meet the exhaust mass emission standards for TLEVs, LEVs, ULEVs, or the exhaust emission standards of sections 1960.1 (e)(1), 1960.1 (f)(1), or 1960.1 (f)(2), Title 13, California Code of Regulations, or as Zero-Emission Vehicles such that the manufacturer's fleet average NMOG values for California-certified PCs and LDTs from 0-3750 lbs. LVW, and LDTs from 3751-5750 lbs. LVW produced and delivered for sale in California are less than or equal to the requirement for the corresponding Model Year, Vehicle Type, and LVW Class in section 1960.1 (g)(2), Title 13, California Code of

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Regulations.

[FN4] NMOG Standards for Fuel-Flexible and Dual-Fuel Vehicles. Fuel-flexible and dual-fuel PCs and LDTs from 0-5750 lbs. LVW shall be certified to exhaust mass emission standards for NMOG established for the operation of the vehicle on any available fuel other than gasoline, and gasoline.

FNa.Reactivity Adjustment. For TLEVs, LEVs, and ULEVs, when certifying for operation on a fuel other than gasoline, manufacturers shall multiply exhaust NMOG certification levels by the applicable reactivity adjustment factor. In addition to multiplying the exhaust NMOG certification levels by the applicable reactivity adjustment factor, exhaust methane certification levels for natural gas vehicles shall be multiplied by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity-adjusted NMOG value. The exhaust NMOG certification levels for fuel-flexible or dual-fuel vehicles when certifying on gasoline shall not be multiplied by a reactivity adjustment factor.

FNb.Standards for Fuel-Flexible and Duel-Fuel Vehicles Operating on Gasoline.For PCs and LDTs from 0-5750 lbs. LVW, the applicable exhaust mass emission standard for NMOG when certifying the vehicle for operation on gasoline shall be:

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Vehicle Type	*Loaded Vehicle Weight (LVW)*	*Emission Category*	*Durability Vehicle Basis (g/mi)*	
			50,000 Mile	*100,000 Mile*
PCS, LDT	All, 0–3750	TLEV	0.25	0.31
		LEV	0.125	0.156
		ULEV	0.075	0.090
LDT	3751–5750	TLEV	0.32	0.40
		LEV	0.160	0.200
		ULEV	0.100	0.130

[5] *Highway NOx.* The maximum projected emissions of "Oxides of Nitrogen" (or "NOx") measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR 600 Subpart B) shall be not greater than 1.33 times the applicable light–duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29–67 to the nearest 0.1 g/mi before being compared.

[6] *Intermediate In–Use Compliance Standards.* The following standards are intermediate in–use compliance standards for 50,000 and 100,000 miles for PCs and LDTs from 0–5750 lbs. LVW, including fuel–flexible and dual–fuel vehicles when operating on any available fuel other than gasoline. Intermediate in–use compliance standards shall apply to TLEVs through the 1995 model year as follows:

	NMOG (g/mi)
PCS and LDTs 0–3750 lbs. LVW	0.188
LDTs 3751–5750 lbs. LVW	0.238

In–use compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs, and through the 1998 model year for LEVs and ULEVs. For LEVs and ULEVs, the following intermediate in–use standards shall apply:

Vehicle Type	*Durability Vehicle Basis*	*LEV (g/mi)*			*ULEV (g/mi)*			
		Model Year	*NMOG*	*NOx*	*Model Year*	*NMOG*	*CO*	*NOx*
PCS, 0–3750 lb. LVW LDTs	50,000	through 1998	0.100	0.3	through 1998	0.058	2.6	0.3
	50,000	1999	0.100	0.3	1999–2002	0.055	2.1	0.3
	100,000	1999	0.125	0.4	1999–2002	0.075	3.4	0.4
3751–5750 lb. LVW LDTs	50,000	through 1998	0.128	0.5	through 1998	0.075	3.3	0.5
	50,000	1999	0.130	0.5	1999–2002	0.070	2.8	0.5
	100,000	1999	0.160	0.7	1999–2002	0.100	4.4	0.7

a. *Reactivity Adjustment.* For TLEVs, LEVs, and ULEVs designed to operate on any fuel other than conventional gasoline, including fuel–flexible and dual–fuel vehicles when operating on any fuel other than gasoline, exhaust NMOG mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in–use compliance standards for NMOG. In addition to multiplying the exhaust NMOG emission results by the applicable reactivity adjustment factor, the exhaust methane emission results for natural gas vehicles shall be multiplied by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity–adjusted NMOG value. Exhaust NMOG mass emissions from fuel–flexible or dual–fuel vehicles when operating on gasoline shall not be multiplied by a reactivity adjustment factor.

b. *Intermediate In–Use Standards for Fuel–Flexible and Dual–Fuel Vehicles Operating on Gasoline.* For fuel–flexible and dual–fuel PCs and LDTs from 0–5750 lbs. LVW intermediate in–use compliance standards for NMOG emissions at 50,000 miles, when the vehicle is operated on gasoline, shall be:

Vehicle Type	*Loaded Vehicle Weight (LVW)*	*Emission Category*	*Durability Vehicle Basis (g/mi) 50,000 mi*
PCS, LDT	All, 0–3750	TLEV	0.32
		LEV	0.188
		ULEV	0.100
LDT	3751–5750	TLEV	0.41
		LEV	0.238
		ULEV	0.128

Intermediate in–use compliance standards shall apply to TLEVs through the 1995 model year, and to LEVs and ULEVs through the 1998 model year. In–use compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs and through the 1998 model year for LEVs and ULEVs.

[7] *Diesel Standards.* Manufacturers of diesel vehicles shall also certify to particulate standards at 100,000 miles. For all PCs and LDTs from 0–3750 lbs. LVW, the particulate standard is 0.08 g/mi, 0.08 g/mi, and 0.04 g/mi for TLEVs, LEVs, and ULEVs, respectively. For LDTs from 3751–5750 lbs. LVW, the particulate standard is 0.10 g/mi, 0.10g/mi, and 0.05 g/mi for TLEVs, LEVs and ULEVs, respectively. For diesel vehicles certifying to the standards set forth in Title 13, section 1960.1(g)(1), "NMOG" shall mean non–methane hydrocarbons.

[8] *50°F Requirement.* Manufacturers shall demonstrate compliance with the above standards for NMOG, CO, and NOx at 50 degrees F according to the procedure specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section II.C. of the "California Exhaust Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light–Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1961(d), as applicable. Hybrid electric, natural gas, and diesel–fueled vehicles shall be exempt from 50 degrees F test requirements.

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Vehicle Type	Loaded Vehicle Weight (LVW)	Emission Durability Vehicle Basis (g/mi) Category	50,000 Mile	100,000 Mile
PCS, LDT	All, 0-3750	TLEV	0.25	0.31
		LEV	0.125	0.156
		ULEV	0.075	0.090
LDT	3751-5750	TLEV	0.32	0.40
		LEV	0.160	0.200
		ULEV	0.100	0.130

[FN5] Highway NOx. The maximum projected emissions of "Oxides of Nitrogen" (or "NOx") measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR 600 Subpart B) shall be not greater than 1.33 times the applicable light-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[FN6] Intermediate In-Use Compliance Standards.The following standards are intermediate in-use compliance standards for 50,000 and 100,000 miles for PCs and LDTs from 0-5750 lbs. LVW, including fuel-flexible and dual-fuel vehicles when operating on any available fuel other than gasoline. Intermediate in-use compliance standards shall apply to TLEVs through the 1995 model year as follows:

	NMOG (g/mi)
PCS and LDTs 0-3750 lbs. LVW	0.188
LDTs 3751-5750 lbs. LVW	0.238

In-use compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs, and through the 1998 model year for LEVs and ULEVs. For LEVs and ULEVs, the following intermediate in-use standards shall apply:

Vehicle Type	Durability Vehicle Basis	Model Year	LEV (g/mi) NMOG	NOx	Model Year	ULEV (g/mi) NMOG	CO	NOx

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PCS, 0-3750 lb. LVW	50.000	through	0.100	0.3	through	0.058	2.6	0.3
LDTs		1998			1998			
	50,000	1999	0.100	0.3	1999-2-002	0.055	2.1	0.3
	100,000	1999	0.125	0.4	1999-2-002	0.075	3.4	0.4
3751-5750 lb. LVW	50,000	through	0.128	0.5	through	0.075	3.3	0.5
LDTs		1998			1998			
	50,000	1999	0.130	0.5	1999-2-002	0.070	2.8	0.5
	100,000	1999	0.160	0.7	1999-2-002	0.100	4.4	0.7

FNa.Reactivity Adjustment.For TLEVs, LEVs, and ULEVs designed to operate on any fuel other than conventional gasoline, including fuel-flexible and dual-fuel vehicles when operating on any fuel other than gasoline, exhaust NMOG mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in-use compliance standards for NMOG. In addition to multiplying the exhaust NMOG emission results by the applicable reactivity adjustment factor, the exhaust methane emission results for natural gas vehicles shall be multipled by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity-adjusted NMOG value. Exhaust NMOG mass emissions from fuel-flexible or dual-fuel vehicles when operating on gasoline shall not be multiplied by a reactivity adjustment factor.

FNb.Intermediate In-Use Standards for Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline. For fuel-flexible and dual-fuel PCs and LDTs from 0-5750 lbs. LVW intermediate in-use compliance standards for NMOG emissions at 50,000 miles, when the vehicle is operated on gasoline, shall be:

Vehicle Type	Loaded Vehicle Weight (LVW) Category	Emission Basis (g/mi) 50,000 mi	Durability Vehicle
PCS, LDT	All. 0-3750	TLEV	0.32
		LEV 0.188	
		ULEV 0.100	
LDT	3751-5750	TLEV	0.41
		LEV 0.238	
		ULEV 0.128	

FNIntermediate in-use compliance standards shall apply to TLEVs through the 1995 model year, and to LEVs and ULEVs through the 1998 model year. In-use

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compliance with standards beyond 50,000 miles shall be waived through the 1995 model year for TLEVs and through the 1998 model year for LEVs and ULEVs.

[FN7] Diesel Standards.Manufacturers of diesel vehicles shall also certify to particulate standards at 100,000 miles. For all PCs and LDTs from 0-3750 lbs. LVW, the particulate standard is 0.08 g/mi, 0.08 g/mi, and 0.04 g/mi for TLEVs, LEVs, and ULEVs, respectively. For LDTs from 3751-5750 lbs. LVW, the particulate standard is 0.10 g/mi, 0.10g/mi, and 0.05 g/mi for TLEVs, LEVs and ULEVs, respectively. For diesel vehicles certifying to the standards set forth in Title 13, section 1960.1(g)(1), "NMOG" shall mean non-methane hydrocarbons.

[FN8] 50^{O}F Requirement.Manufacturers shall demonstrate compliance with the above standards for NMOG, CO, and NOx at 50 degrees F according to the procedure specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section II.C. of the "California Exhaust Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable. Hybrid electric, natural gas, and diesel-fueled vehicles shall be exempt from 50 degrees F test requirements.

[FN9] Limit on In-Use Testing.In-use compliance testing shall be limited to vehicles with fewer than 75,000 miles.

[FN10] HEV Requirements.Deterioration factors for hybrid electric vehicles shall be based on the emissions and mileage accumulation of the auxiliary power unit. For certification purposes only, Type A hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors), and demonstrating compliance with 100,000 mile emission standards shall not be required. For certification purposes only, Type B hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors) and 100,000 mile emission standards (using 75,000 mile deterioration factors). For certification purposes only, Type C hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors) and 100,000 mile emission standards (using 100,000 mile deterioration factors). [FN11] 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, including, but not limited to:

FN(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 SFTP test cycle;

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FN(b) an evaluation of the durability of the device for the full useful life of the vehicle; and
FN(c) a description of the on-board diagnostic strategy for monitoring the performance of the device in-use.
FNUsing 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.

_____
_____

(g)(2) The fleet average non-methane organic gas exhaust emission values from passenger cars and light-duty trucks produced and delivered for sale in California by a manufacturer each model year from 1994 through 2000 shall not exceed:

_____
_____

FLEET AVERAGE NON-METHANE ORGANIC GAS EXHAUST EMISSION REQUIREMENTS FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES [FN7,8,9]

[grams per mile (or "g/mi")]

Vehicle Type [FN1]	Loaded Vehicle Weight (lbs.)	Durability Vehicle Basis (mi)	Fleet Average Model Year	Non-Methane Organic Gases
PC and LDT	All	50,000	1994	0.250
		0-3750	1995	0.231
			1996	0.225
			1997	0.202
			1998	0.157
			1999	0.113
			2000	0.073
LDT	3751-5750	50,000	1994	0.320
			1995	0.295
			1996	0.287
			1997	0.260

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1998	0.205
1999	0.150
2000	0.099

[FN1] "PC" means passenger cars. "LDT" means light-duty trucks. "TLEV" means transitional low-emission vehicle. "LEV" means low-emission vehicle. "ULEV" means ultra-low-emission vehicle. "LVW" means loaded vehicle weight.

[FN2] "Non-Methane Organic Gases" (or "NMOG") means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

[FN3] HEV Categories.For the purpose of calculating fleet average NMOG values, a manufacturer may adjust the certification levels of hybrid electric vehicles (or "HEVs") based on the range of the HEV without the use of the engine. For the purpose of calculating the adjusted NMOG emissions, the following definitions shall apply:

FN "Type A HEV" shall mean an HEV which achieves a minimum range of 60 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

FN "Type B HEV" shall mean an HEV which achieves a range of 40-59 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

FN "Type C HEV" shall mean an HEV which achieves a range of 0-39 miles over the All-Electric Range Test as defined in "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

FNa. For the purpose of calculating fleet average NMOG values, vehicles which have no tailpipe emissions but use fuel-fired heaters and which are not certified as ZEVs shall be treated as "Type A HEV ULEVs."

[FN4] Calculation of Fleet Average NMOG Value (PCS and LDTs 0-3750 lbs. LVW).Each manufacturer's fleet average NMOG value for the total number of PCs and LDTs from 0-3750 lbs. LVW produced and delivered for sale in California

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shall be calculated in units of g/mi NMOG according to the following equation, where the term "Produced" means produced and delivered for sale in California:

FN([(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(e)(1) and Produced) x (0.39)] +
FN[No. of Vehicles Certified to the Phase-In Exhaust Emission Standards in section 1960.1(f)(1) and Produced x (0.25)] +
FN[No. of Vehicles Certified to the Phase-Out Exhaust Emission Standards in section 1960.1(f)(1) and Produced x (0.39)] +
FN[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(f)(2) and Produced) x (0.25)] +
FN[(No. of TLEVs excluding HEVs and Produced) x (0.125)] +
FN[(No. of LEVs excluding HEVs and Produced) x (0.075)] +
FN[(No. of ULEVs excluding HEVs and Produced) x (0.040)] +
FN(HEV contribution factor))P
FN(Total No. of Vehicles Produced, Including Zero-Emission Vehicles and HEVs):

FNa. "HEV contribution factor" shall mean the NMOG emission contribution of HEVs to the fleet average NMOG value. The HEV contribution factor shall be calculated in units of g/mi as follows, where the term "Produced" means produced and delivered for sale in California:

FNHEV contribution factor = ([No. of "Type A HEV" TLEVs Produced] x (0.100) +
FN[No. of "Type B HEV" TLEVs Produced] x (0.113) +
FN[No. of "Type C HEV" TLEVs Produced] x (0.125)) +
FN([No. of "Type A HEV" LEVs Produced] x (0.057) +
FN[No. of "Type B HEV" LEVs Produced] x (0.066) +
FN[No. of "Type C HEV" LEVs Produced] x (0.075)) +
FN([No. of "Type A HEV" ULEVs Produced] x (0.020) +
FN[No. of "Type B HEV" ULEVs Produced] x (0.030) +
FN[No. of "Type C HEV" ULEVs Produced] x (0.040))

FNb. "Zero-Emission Vehicles" (or "ZEVs") classified as LDTs 3751-5750 lbs. LVW which have been counted toward the ZEV requirements for PCs and LDTs 0-3750 lbs. LVW as specified in note (9) shall be included in the equation of note (4).

FNc. Beginning with the 1996 model year, manufacturers that produce and deliver for sale in California PCs and LDTs 0-3750 lbs. LVW that are certified to federal Tier I exhaust emission standards in 40 CFR 86.094-8 and 86.094-9 shall add the following term to the numerator of the fleet average NMOG equation in note (4) and calculate their fleet average NMOG values accordingly:

FN[(No. of Vehicles Certified to federal Tier I exhaust emission standards and Produced) x (0.25)]

[FN5] Calculation of Fleet Average NMOG Value (LDTs 3751-5750 lbs. LVW).Manufacturers that certify LDTs from 3751-5750 lbs. LVW, shall calculate a fleet average NMOG value in units of g/mi NMOG according to the following

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equation, where the term "Produced" means produced and delivered for sale in California:

FN([(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(e)(1), and Produced x (0.50)] +

FN[(No. of Vehicles Certified to the Phase-In Exhaust Emission Standards in section 1960.1(f)(1), and Produced x (0.32)] +

FN[No. of Vehicles Certified to the Phase-Out Exhaust Standards in section 1960.1(f)(1), and Produced x (0.50)] +

FN[(No. of Vehicles Certified to the Exhaust Emission Standards in section 1960.1(f)(2), and Produced x (0.32)] +

FN[(No. of TLEVs Produced excluding HEVs) x (0.160)] +

FN[(No. of LEVs Produced excluding HEVs) x (0.100)] +

FN[(No. of ULEVs Produced excluding HEVs) x (0.050)] + (HEV contribution factor))P

FN(Total No. of Vehicles Produced, Including ZEVs and HEVs).

FNa. "HEV contribution factor" shall mean the NMOG emission contribution of HEVs to the fleet average NMOG. The HEV contribution factor shall be calculated in units of g/mi as follows, where the term "Produced" means produced and delivered for sale in California:

FNHEV contribution factor =

FN([No. of "Type A HEV" TLEVs Produced] x (0.130) +

FN[No. of "Type B HEV" TLEVs Produced] x (0.145) +

FN[No. of "Type C HEV" TLEVs Produced] x (0.160)) +

FN([No. of "Type A HEV" LEVs Produced] x (0.075) +

FN[No. of "Type B HEV" LEVs Produced] x (0.087) +

FN[No. of "Type C HEV" LEVs Produced] x (0.100)) +

FN([No. of "Type A HEV" ULEVs Produced] x (0.025) +

FN[No. of "Type B HEV" ULEVs Produced] x (0.037) +

FN[No. of "Type C HEV" ULEVs Produced] x (0.050))

FNb. Only ZEVs which have been certified as LDTs 3751-5750 lbs. LVW and which have not been counted toward the ZEV requirements for PCs and LDTs 0-3750 lbs. LVW as specified in note (9) shall be included in the equation of note (5).

FNc. In the 2000 model year, small volume manufacturers shall not exceed a fleet average NMOG value of 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with note (5).

FNd. If a manufacturer's average California sales exceeds 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall no longer be treated as a small volume manufacturer and shall comply with the fleet average requirements applicable for larger manufacturers as specified in section 1960.1(g)(2) beginning with the fourth model year after the last of the three consecutive model years.

FNe. If a manufacturer's average California sales falls below 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any

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three consecutive model years, the manufacturer shall be treated as a small volume manufacturer and shall be subject to requirements for small volume manufacturers as specified in section 1960.1(g)(2) beginning with the next model year.

[FN7] Calculation of NMOG Credits/Debits and Procedures for Offsetting Debits.

FNa. In 1992 through 2000 model years, manufacturers that achieve fleet average NMOG values lower than the fleet average NMOG requirement for the corresponding model year shall receive credits in units of g/mi NMOG determined as: ([(Fleet Average NMOG Requirement) - (Manufacturer's Fleet Average NMOG Value)] x (Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs)).

FNManufacturers with fleet average NMOG values greater than the fleet average requirement for the corresponding model year shall receive debits in units of g/mi NMOG equal to the amount of negative credits determined by the aforementioned equation. For any given model year, the total g/mi NMOG credits or debits earned for PCs and LDTs 0-3750 lbs. LVW and for LDTs 3751-5750 lbs. LVW shall be summed together. The resulting amount shall constitute the g/mi NMOG credits or debits accrued by the manufacturer for the model year.

FNb. For the 1994 through 1997 model years, manufacturers shall equalize emission debits within three model years and prior to the end of the 1998 model year by earning g/mi NMOG emission credits in an amount equal to their g/mi NMOG debits, or by submitting a commensurate amount of g/mi NMOG credits to the Executive Officer that were earned previously or acquired from another manufacturer. For 1998 through 2000 model years, manufacturers shall equalize emission debits by the end of the following model year. 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 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 g/mi NMOG emission debits for the model year by the g/mi NMOG fleet average requirement for PCs and LDTs 0-3750 lbs. LVW applicable for the model year in which the debits were first incurred.

FNc. The g/mi NMOG emission credits earned in any given model year shall retain full value through the subsequent model year. The g/mi NMOG value of any credits not used to equalize the previous model-year's debit, shall be discounted by 50% at the beginning of the second model year after being earned, discounted to 25% of its original value if not used by the beginning of the third model year after being earned, and will have no value if not used by the beginning of the fourth model year after being earned.

FNd. In order to verify the status of a manufacturer's compliance with the

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fleet average requirements for a given model year, and in order to confirm the accrual of NMOG credits or debits, each manufacturer shall submit an annual report to the Executive Office which sets forth the production data used to establish compliance, by no later than March 1 of the calendar year following the close of the completed model year.

[FN8] Credits for Pre-1994 Model Year Vehicles.Manufacturers that produce and deliver for sale in California vehicles certified to the phase-in exhaust emission standards in section 1960.1(f)(1), or vehicles certified to the exhaust emission standards in sections 1960.1(f)(2) or 1960.1(g)(1) and/or ZEVs, in the 1992 and 1993 model years, shall receive emission credits as determined by the equations in footnotes (4), (5), and (7).

FNa. For PCs and LDTs from 0-3750 lbs. LVW, the fleet average NMOG requirement for calculating a manufacturer's emission credits shall be 0.390 and 0.334 g/mi NMOG for vehicles certified for the 1992 and 1993 model years, respectively.

FNb. For LDTs from 3751-5750 lbs. LVW, the fleet average NMOG requirement for calculating a manufacturer's emission credits shall be 0.500 and 0.428 g/mi NMOG for vehicles certified for the 1992 and 1993 model years, respectively.

FNc. Emission credits earned prior to the 1994 model year shall be considered as earned in the 1994 model year and discounted in accordance with the schedule specified in footnote (7).

[FN6] Requirements for Small Volume Manufacturers.As used in this subsection, the term "small volume manufacturer" shall mean any vehicle manufacturer with California sales less than or equal to 3000 new PCs, LDTs and MDVs per model year based on the average number of vehicles sold by the manufacturer each model year from 1989 to 1991, except as noted below. For manufacturers certifying for the first time in California, model-year sales shall be based on projected California sales. In 2000 and subsequent model years, small volume manufacturers shall comply with the fleet average NMOG requirements set forth below.

FNa. Prior to the model year 2000, compliance with the specified fleet average NMOG requirements shall be waived.

FNb. In the 2000 model year, small volume manufacturers shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW calculated in accordance with note (4).

FNc. Beginning with the 1996 model year, manufacturers that produce and deliver for sale in California LDTs 3751-5750 lbs. LVW that are certified to the Tier I exhaust emission standards in 40 CFR 86.094-9 shall add the following term to the numerator of the fleet average NMOG equation in note (5) and calculate their fleet average NMOG values accordingly: [(No. of Vehicles Certified to federal Tier I exhaust emission standards and Produced and Delivered for Sale in California) x (0.32)]

(h)(1) "Tier 1" Exhaust Emission Standards for MDVs. The exhaust emissions from new 1995 through 2003

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model Tier 1 medium-duty vehicles shall not exceed:

_____
_____

1995-2003 MODEL-YEAR TIER 1 MEDIUM-DUTY VEHICLE EXHAUST EMISSIONS STANDARDS
[FN1,2,3,7,8] (grams per mile)

Test Weight(lbs.)	Durability Vehicle Basis(mi)	Non-Methane Hydrocarbons [FN4]	Carbon Monoxide	Oxides of Nitrogen [FN5]	Particulates [FN6]
0-3,750	50,000	0.25	3.4	0.4	n/a
0-3,750	120,000	0.36	5.0	0.55	0.08
3,751-5,750	50,000	0.32	4.4	0.7	n/a
3,751-5,750	120,000	0.46	6.4	0.98	0.10
5,751-8,500	50,000	0.39	5.0	1.1	n/a
5,751-8,500	120,000	0.56	7.3	1.53	0.12
8,501-10,000	50,000	0.46	5.5	1.3	n/a
8,501-10,000	120,000	0.66	8.1	1.81	0.12
10,001-14,000	50,000	0.60	7.0	2.0	n/a
10,001-14,000	120,000	0.86	10.3	2.77	0.12

_____
_____

[FN1] "n/a" means not applicable. "Test Weight" shall mean the average of the vehicle's curb weight and gross vehicle weight.

[FN2] Manufacturers have the option of certifying engines used in incomplete and diesel medium-duty vehicles from 8501-14,000 pounds, gross vehicle weight to the heavy-duty engine standards and test procedures set forth in section 1956.8(e), Title 13, California Code of Regulations. Manufacturers certifying incomplete or diesel medium-duty vehicles to the heavy-duty engine 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.

[FN3] For the 1995 model-year only, manufacturers of medium-duty vehicles may certify a maximum of 50 percent of their vehicles to the applicable 1994 model-year standards and test procedures. For the 1995 model year only, small volume manufacturers may certify 100 percent of their vehicles to the applicable 1994 model-year standards and test procedures. The percentage shall be based upon each manufacturer's projected sales of California-certified medium-duty vehicles.

[FN4] For methanol- and ethanol-fueled vehicles certifying to these standards, including flexible-fueled vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent" (or "OMNM-HCE").

[FN5] The maximum projected emissions of oxides of

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nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall be not greater than 2.00 times the applicable medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standards shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[FN6] Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

[FN7] In-use compliance testing shall be limited to vehicles with less than 90,000 miles. For the 1995 through 1997 models, alternative in-use compliance is available for medium-duty vehicle 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. Small volume manufacturers may use alternative in-use compliance for up to 100 percent of their fleets in the 1995 through 1997 model years. The percentages shall be determined from the manufacturers' projected California sales of medium-duty vehicles. For vehicles certified to the standards and test procedures of this subsection, "alternative in-use compliance" shall consist of an in-use allowance of 25 percent over the applicable 1995 model-year non-methane hydrocarbon, carbon monoxide, and oxides of nitrogen 50,000 mile emission standards and a waiver of the emission standards beyond 50,000 miles.

[FN8] All medium-duty vehicles, except diesel-fueled vehicles and those incomplete and diesel vehicles certifying to heavy-duty engine test procedures, are subject to 50,000 mile and 120,000 mile non-methane hydrocarbon, carbon monoxide, and oxides of nitrogen standards. Diesel-fueled vehicles shall be subject to 120,000 mile non-methane hydrocarbon, carbon monoxide, oxides of nitrogen, and particulate standards only.

(h)(2) "LEV I" Exhaust Emission Standards for MDVs.The exhaust emissions from new 1992 through 2006 model-year medium-duty LEV I low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles shall not exceed:

_____
_____

LEV I EXHAUST EMISSION STANDARDS FOR LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES AND SUPER-ULTRA-LOW-EMISSION VEHICLES IN THE MEDIUM-DUTY VEHICLE WEIGHT CLASS [FN8,9,10,11,12,13,14,15,16][gramspermile(or"g/mi")]

Vehicle Test Weight (lbs.) [FN1]	Basis (mi)	Durability Emission Category [FN2]	Non-Methane Organic Gases [FN3,4]	Carbon Monoxide	Vehicle Nitrogen [FN5]	Oxides of Particulates [FN6,7]
0-3750	50,000	LEV	0.125	3.4	0.4	n/a

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		ULEV	0.075	1.7	0.2	n/a	
120,000		LEV	0.180	5.0	0.6	0.08	
		ULEV	0.107	2.5	0.3	0.04	
3751-5750	50,000	LEV	0.160	4.4	0.4	n/a	
		ULEV	0.100	4.4	0.4	n/a	
		SULEV	0.050	2.2	0.2	n/a	
120,000		LEV	0.230	6.4	0.6	0.10	
		ULEV	0.143	6.4	0.6	0.05	
		SULEV	0.072	3.2	0.3	0.05	
5751-8500	50,000	LEV	0.195	5.0	0.6	n/a	
		ULEV	0.117	5.0	0.6	n/a	
		SULEV	0.059	2.5	0.3	n/a	
120,000		LEV	0.280	7.3	0.9	0.12	
		ULEV	0.167	7.3	0.9	0.06	
		SULEV	0.084	3.7	0.45	0.06	
8501-	50,000	LEV	0.230	5.5	0.7	n/a	
10,000		ULEV	0.138	5.5	0.7	n/a	
		SULEV	0.069	2.8	0.35	n/a	
120,000		LEV	0.330	8.1	1.0	0.12	
		ULEV	0.197	8.1	1.0	0.06	
		SULEV	0.100	4.1	0.5	0.06	
10,001-	50,000	LEV	0.300	7.0	1.0	n/a	
14,000		ULEV	0.180	7.0	1.0	n/a	
		SULEV	0.09	3.5	0.5	n/a	
120,000		LEV	0.430	10.3	1.5	0.12	
		ULEV	0.257	10.3	1.5	0.06	
		SULEV	0.130	5.2	0.7	0.06	

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[1] "Test Weight" (or "TW") shall mean the average of the vehicle's curb weight and gross vehicle weight
"Non-Methane Organic Gases" (or "NMOG") means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

[2] "LEV" means low-emission vehicle.
"ULEV" means ultra-low-emission vehicle.
"SULEV" means super-ultra-low-emission vehicle.

[3] *Compliance with NMOG Standards.* To determine compliance with an NMOG standard, NMOG emissions shall be measured in accordance with the "California Non-Methane Organic Gas Test Procedures" adopted July 12, 1991 and last amended July 30, 2002, which is incorporated herein by reference.

a. *Reactivity Adjustment.* For LEVs and ULEVs certified to operate on an available fuel other than conventional gasoline, including fuel-flexible or dual-fuel vehicles when certifying on a fuel other than gasoline, manufacturers shall multiply the exhaust NMOG certification levels by the applicable reactivity adjustment factor set forth in section 13 of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in section I.E.5. of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), or established by the Executive Officer pursuant to Appendix VIII or section II.D. respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to LEV or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5. of the above-referenced test procedures as applicable. The product of the exhaust NMOG certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standard established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

b. *Pre-1998 NOx standards.* Prior to the 1998 model year, the 50,000 mile and 120,000 mile LEV exhaust mass emission standards for NOx shall be: 0.7 and 1.0 g/mi for MDVs from 3751-5750 lbs. TW, 1.1 and 1.5 g/mi MDVs from 5751-8500 lbs. TW, 1.3 and 1.8 g/mi for MDVs from 8501-10,000 lbs. TW, and 2.0 and 2.8 g/mi for MDVs from 10,001-14,000 lbs. TW, respectively.

[4] *NMOG Standards for Fuel-Flexible and Dual-Fuel Vehicles.* Fuel-flexible and dual-fuel medium-duty vehicles (or "MDVs") from 0-14,000 lbs. TW shall be certified to exhaust mass emission standards for NMOG established for the operation of the vehicle on a fuel other than gasoline, and gasoline.

a. *Reactivity Adjustment.* For LEVs and ULEVs when certifying on the fuel other than gasoline, manufactures shall multiply the exhaust NMOG certification levels by the applicable reactivity adjustment factor. In addition to multiplying the exhaust NMOG certification levels by the applicable reactivity adjustment factor, the exhaust methane certification level for natural gas vehicles shall be multiplied by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity-adjusted NMOG value. When certifying on gasoline, the exhaust NMOG certification levels of fuel-flexible and dual-fuel vehicles shall not be multiplied by a reactivity adjustment factor.

b. *Standards for Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline.* For MDVs from 14,000 lbs. TW, the applicable exhaust mass emission standard for NMOG when certifying the vehicle for operation on gasoline shall be:

Test Weight (lbs.)	*Vehicle Emission Category*	*50,000 (g/mi)*	*120,000 (g/mi)*
0-3750	LEV	0.25	0.36
	ULEV	0.125	0.180
3751-5750	LEV	0.32	0.46
	ULEV	0.160	0.230
	SULEV	0.100	0.143
5751-8500	LEV	0.39	0.56
	ULEV	0.195	0.280
	SULEV	0.117	0.167
8501-10,000	LEV	0.46	0.66
	ULEV	0.230	0.330
	SULEV	0.138	0.197
10,001-14,000	LEV	0.60	0.86
	ULEV	0.300	0.430
	SULEV	0.180	0.257

[FN1] "Test Weight" (or "TW") shall mean the average of the vehicle's curb weight and gross vehicle weight. "Non-Methane Organic Gases" (or "NMOG") means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.

[FN2] "LEV" means low-emission vehicle. "ULEV" means ultra-low-emission vehicle. "SULEV" means super-ultra-low-emission vehicle.

[FN3] Compliance with NMOG Standards.To determine compliance with an NMOG standard, NMOG emissions shall be measured in accordance with the "California Non-Methane Organic Gas Test Procedures" adopted July 12, 1991 and last amended July 30, 2002, which is incorporated herein by reference.

a.Reactivity Adjustment.For LEVs and ULEVs certified to operate on an available fuel other than conventional gasoline, including fuel-flexible or dual-fuel vehicles when certifying on a fuel other than gasoline, manufacturers shall multiply the exhaust NMOG certification

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levels by the applicable reactivity adjustment factor set forth in section 13 of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in section I.E.5. of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), or established by the Executive Officer pursuant to Appendix VIII or section II.D. respectively of the foregoing test procedures. In addition, natural gas vehicles certifying to LEV or ULEV standards shall calculate a reactivity-adjusted methane exhaust emission value by multiplying the methane exhaust certification level by the applicable methane reactivity adjustment factor set forth in section 13 or in section I.E.5.of the above-referenced test procedures as applicable. The product of the exhaust NMOG certification levels and the reactivity adjustment factor shall be compared to the exhaust NMOG mass emission standard established for the particular vehicle emission category to determine compliance. For natural gas vehicles, the reactivity-adjusted NMOG value shall be added to the reactivity-adjusted methane value and then compared to the exhaust NMOG mass emission standards established for the particular vehicle emission category to determine compliance.

b.Pre-1998 NOx standards.Prior to the 1998 model year, the 50,000 mile and 120,000 mile LEV exhaust mass emission standards for NOx shall be: 0.7 and 1.0 g/mi for MDVs from 3751-5750 lbs. TW, 1.1 and 1.5 g/mi MDVs from 5751-8500 lbs. TW, 1.3 and 1.8 g/mi for MDVs from 8501-10,000 lbs. TW, and 2.0 and 2.8 g/mi for MDVs from 10,001-14,000 lbs. TW, respectively.

[FN4] NMOG Standards for Fuel-Flexible and Dual-Fuel Vehicles.Fuel-flexible and dual-fuel medium-duty vehicles (or "MDVs") from 0-14,000 lbs. TW shall be certified to exhaust mass emission standards for NMOG established for the operation of the vehicle on a fuel other than gasoline, and gasoline.

a.Reactivity Adjustment.For LEVs and ULEVs when certifying on the fuel other than gasoline, manufactures shall multiply the exhaust NMOG certification levels by the applicable reactivity adjustment factor. In addition to multiplying the exhaust NMOG certification levels by the applicable reactivity adjustment factor, the exhaust methane certification level for natural gas vehicles shall be multipled by the applicable methane reactivity adjustment factor and the resulting value shall be added to the reactivity-adjusted NMOG value. When certifying on gasoline, the exhaust NMOG certification levels of fuel-flexible and dual-fuel vehicles shall not be multiplied by a reactivity adjustment factor.

b.Standards for Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline.For MDVs from 14,000 lbs. TW, the applicable exhaust mass emission standard for NMOG when certifying the vehicle for operation on gasoline shall be:

Test Weight (lbs.)	Vehicle Emission Category	50,000 (g/mi)	120,000 (g/mi)
0-3750	LEV	0.25	0.36
ULEV	0.125	0.180	
3751-5750	LEV	0.32	0.46
ULEV	0.160	0.230	
SULEV	0.100	0.143	
5751-8500	LEV	0.39	0.56
ULEV	0.195	0.280	
SULEV	0.117	0.167	
8501-10,000	LEV	0.46	0.66

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ULEV	0.230	0.330	
SULEV	0.138	0.197	
10,001-14,000	LEV	0.60	0.86
ULEV	0.300	0.430	
SULEV	0.180	0.257	

[5] *Highway NOx.* The maximum projected emissions of "Oxides of Nitrogen" (or "NOx") measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall be not greater than 2.00 times the applicable MDV standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29–67 to the nearest 0.1 g/mi before being compared.

[6] Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

[7] "n/a" means not applicable.

[8] *Certification of Incomplete and Diesel Vehicles.* Manufacturers have the option of certifying engines used in incomplete and diesel MDVs to the heavy-duty engine standards and test procedures set forth in section 1956.8(g) or (h), Title 13, California Code of Regulations. Manufacturers certifying incomplete or diesel MDVs to the heavy-duty engine standards and test procedures shall specify in the application for certification an in-use compliance procedure as provided in section 2139(c), Title 13, California Code of Regulations. For diesel vehicles certifying to the standards set forth in Title 13, section 1960.1(h)(2), "NMOG" shall mean non-methane hydrocarbons.

[9] *Intermediate In-Use Compliance Standards.* The following intermediate in-use compliance standards for 50,000 miles and 120,000 miles for MDVs from 3751-14,000 lbs. TW, including fuel-flexible and dual-fuel vehicles when operating on an available fuel other than gasoline, shall apply for the specified model years only:

*Intermediate In-Use Compliance Standards**
(in grams per mile)

Emission Category	*Model Year*	*Durability Vehicle Basis (mi)*	*3751–5750 lbs.*		*5751–8500 lbs.*		*8501–10,000 lbs.*		*10,001–14,000 lbs.*	
			NMOG	*NOx*	*NMOG*	*NOx*	*NMOG*	*NOx*	*NMOG*	*NOx*
LEV	through 1997	50,000	0.238	0.7	0.293	1.1	0.345	1.3	0.450	2.0
	1998-1999	50,000	0.238	0.6	0.293	0.9	0.345	1.0	0.450	1.5
	2000	50,000	—	0.6	—	0.9	—	1.0	—	1.5
	2000	120,000	—	0.8	—	1.2	—	1.3	—	2.0
ULEV	through 1999	50,000	0.128	0.6	0.156	0.9	0.184	1.0	0.240	1.5
	2000	50,000	0.128	0.6	0.156	0.9	0.184	1.0	0.240	1.5
	2000	120,000	0.160	0.8	0.195	1.2	0.230	1.3	0.300	2.0
	2001-2002	50,000	0.128	—	0.156	—	0.184	—	0.240	—
	2001-2002	120,000	0.160	—	0.195	—	0.230	—	0.300	—
SULEV	through 2002	50,000	0.072	0.3	0.084	0.45	0.100	0.5	0.130	0.7
	2002	120,000	0.100	0.4	0.117	0.6	0.138	0.65	0.180	1.0

In-use compliance with standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs and ULEVs and through the 2001 model year for SULEVs. Dashes mean that the standard in the section (h)92) table applies.
*Dashes mean that the standard in the section (h)(2) table applies.

[FN5] Highway NOx.The maximum projected emissions of "Oxides of Nitrogen" (or "NOx") measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600 Subpart B) shall be not greater than 2.00

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times the applicable MDV standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi before being compared.

[FN6] Particulate standards are only applicable for diesel vehicles and shall be determined on a 120,000 mile basis.

[FN7] "n/a" means not applicable.

[FN8] Certification of Incomplete and Diesel Vehicles.Manufacturers have the option of certifying engines used in incomplete and diesel MDVs to the heavy-duty engine standards and test procedures set forth in section 1956.8(g) or (h), Title 13, California Code of Regulations. Manufacturers certifying incomplete or diesel MDVs to the heavy-duty engine standards and test procedures shall specify in the application for certification an in-use compliance procedure as provided in section 2139(c), Title 13, California Code of Regulations. For diesel vehicles certifying to the standards set forth in Title 13, section 1960.1(h)(2), "NMOG" shall mean non-methane hydrocarbons.

[FN9] Intermediate In-Use Compliance Standards.The following intermediate in-use compliance standards for 50,000 miles and 120,000 miles for MDVs from 3751-14,000 lbs. TW, including fuel-flexible and dual-fuel vehicles when operating on an available fuel other than gasoline, shall apply for the specified model years only:

[Note: The following TABLE/FORM is too wide to be displayed on one screen. You must print it for a meaningful review of its contents. The table has been divided into multiple pieces with each piece containing information to help you assemble a printout of the table. The information for each piece includes: (1) a three line message preceding the tabular data showing by line # and character # the position of the upper left-hand corner of the piece and the position of the piece within the entire table; and (2) a numeric scale following the tabular data displaying the character positions.]

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Emission Category	Model Year	Vehicle Basis (mi)	Durability NMOG	Durability NOx	3751-5750 lbs. NMOG	3751-5750 lbs. NOx
LEV	through	50,000	0.238	0.7	0.293	1.1
1997						
1998-	50,000	0.238	0.6	0.293	0.9	0.345
1999						
2000	50,000	--	0.6	--	0.9	--
2000	120,000	--	0.8	--	1.2	--
ULEV	through	50,000	0.128	0.6	0.156	0.9
1999						
2000	50,000	0.128	0.6	0.156	0.9	0.184
2000	120,000	0.160	0.8	0.195	1.2	0.230
2001-	50,000	0.128	--	0.156	--	0.184

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2002
2001-     120,000  0.160       --          0.195  --              0.230
2002
SULEV     through  50,000      0.072       0.3    0.084           0.45
2002
2002      120,000  0.100       0.4         0.117  0.6             0.138
1...+...10....+...20....+...30....+...40....+...50....+...60....+...70..

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 5751-8500 lbs.         8501-10,000 lbs.  10,001-14,000 lbs.

 NMOG            NOx    NMOG              NOx
 0.345           1.3    0.450             2.0

 1.0             0.450  1.5

 1.0             --     1.5
 1.3             --     2.0
 0.184           1.0    0.240             1.5

 1.0             0.240  1.5
 1.3             0.300  2.0
 --              0.240  --

 --              0.300  --

 0.100           0.5    0.130             0.7

 0.65            0.180  1.0
73....80....+...90....+....0....+...10....+...20....+...30..
```

Intermediate In-Use Compliance Standards [FNa1] (in grams per mile)

In-use compliance with standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs and ULEVs and through the 2001 model year for SULEVs. Dashes mean that the standard in the section (h)92) table applies.

[FNa1] Dashes mean that the standard in the section (h)(2) table applies.

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a. *Reactivity Adjustment.* For LEVs and ULEVs designed to operate on any available fuel other than conventional gasoline, including fuel–flexible and dual–fuel vehicles when operating on any available fuel other than gasoline, NMOG exhaust mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in–use compliance standards for NMOG. In addition to multiplying the exhaust NMOG mass emission results by the applicable reactivity adjustment factor, natural gas vehicles shall multiply the exhaust methane mass emission results by the applicable methane reactivity adjustment factor and add that value to the reactivity–adjusted NMOG value. For fuel–flexible and dual–fuel vehicles when operating on gasoline, NMOG emission results shall not be multiplied by a reactivity adjustment factor.

b. *Gasoline Standards for Fuel–Flexible and Dual–Fuel Vehicles.* For fuel–flexible and dual–fuel MDVs from 0–14,000 lbs. TW, intermediate in–use compliance standards for NMOG emissions at 50,000 miles when the vehicle is operated on gasoline, shall be:

Fuel–Flexible and Dual–Fuel MDVs
Intermediate In–Use Compliance Standards

Test Weight (lbs.)	*Vehicle Emission Category*	*50,000 (g/mi)*
0–3750	LEV	0.32
	ULEV	0.188
3751–5750	LEV	0.41
	ULEV	0.238
	SULEV	0.128
5751–8500	LEV	0.49
	ULEV	0.293
	SULEV	0.156
8501–10,000	LEV	0.58
	ULEV	0.345
	SULEV	0.184
10,001–14,000	LEV	0.75
	ULEV	0.450
	SULEV	0.240

Intermediate in–use compliance standards shall apply to LEVs and ULEVs through the 1999 model year and to SULEVs through the 2001 model year. Compliance with the standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs and ULEVs and through the 2001 model year for SULEVs.

[10] *Medium–Duty Vehicle Phase–In Requirements.* Each manufacturer's MDV fleet shall be defined as the total number of MDVs from 0–14,000 lbs. TW certified and produced and delivered for sale in California.

a. Manufacturers of MDVs shall certify an equivalent percentage of their MDV fleet according to the following phase–in schedule:

Model Year	*Vehicles Certified to Title 13 CCR Section 1960.1(h)(1) or (h)(2) (%)*			*Vehicles Certified to Title 13 CCR Section 1956.8(g) or (h) (%)*		
	Tier 1	*LEV*	*ULEV*	*Tier 1*	*LEV*	*ULEV*
1998	73	25	2	100	0	0
1999	48	50	2	100	0	0
2000	23	75	2	100	0	0

c. The percentages shall be applied to the manufacturer's total production of California–certified medium–duty vehicles delivered for sale in California.

d. These requirements shall not apply to small volume manufacturers. Small volume manufacturers shall comply with the requirements of note (16) below.

[11] *Definition of HEV.* For the purpose of calculating "Vehicle Equivalent Credits" (or "VECs"), the contribution of hybrid electric vehicles (or "HEVs") will be calculated based on the range of the HEV without the use of the engine. For the purpose of calculating the contribution of HEVs to the VECs, the following definitions shall apply:

"*Type A HEV*" shall mean an HEV which achieves a minimum range of 60 miles over the All–Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light–Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light–Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

"*Type B HEV*" shall mean an HEV which achieves a range of 40–59 miles over the All–Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light–Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light–Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

"*Type C HEV*" shall mean an HEV which achieves a range of 0–39 miles over the All–Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light–Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light–Duty Trucks, and Medium–Duty Vehicles" as incorporated by reference in section 1961(d), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

a. For the purpose of calculating VECs, electric vehicles which utilize fuel fired heaters and which are not otherwise certified as ZEVs shall be treated as "Type A HEV ULEVs."

[12] *Calculation of Vehicle Equivalent Credits.* In 1992 through 2000 model years, manufacturers that produce and deliver for sale in California MDVs in excess of the equivalent requirements for LEVs and/or ULEVs certified to the exhaust emission standards set forth in this section (h)(2) or Title 13, CCR Section 1956.8(h), shall receive VECs calculated in accordance with the following equation, where the term "Produced" means produced and delivered for sale in California:

[[(No. of LEVs Produced excluding HEVs) + (No. of "Type C HEV" LEVs Produced)] +
[(No. of "Type A HEV" LEVs Produced) x (1.2)] +
[(No. of "Type B HEV" LEVs Produced) x (1.1)] –
(Equivalent No. of LEVs Required to be Produced)] +
[(1.4) x [(No. of ULEVs Produced excluding HEVs) – (No. of "Type C HEV" ULEVs Produced)] +
[(1.7) x (No. of "Type A HEV" ULEVs Produced)] +
[(1.5) x (No. of "Type B HEV" ULEVs Produced)] +
[(1.4) x (Equivalent No. of ULEVs Required to be Produced)]] –
[[(1.7) x [(No. of SULEVs Produced excluding HEVs) + (No. of "Type C HEV" SULEVs Produced)] +
[(No. of "Type A HEV" SULEVs Produced) x (1.7)] +
[(No. of "Type B HEV" SULEVs) x (1.5)] –
[(1.7) x (Equivalent No. of SULEVs Required to be Produced)]] +
[(2.0) x (No. of ZEVs Certified and Produced as MDVs)].

a. Manufacturers that fail to produce and deliver for sale in California the equivalent quantity of MDVs certified to LEV and/or ULEV exhaust emission standards, shall receive "Vehicle Equivalent Debits" (or "VEDs") equal to the amount of negative VECs determined by the aforementioned equation.

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a.Reactivity Adjustment.For LEVs and ULEVs designed to operate on any available fuel other than conventional gasoline, including fuel-flexible and dual-fuel vehicles when operating on any available fuel other than gasoline, NMOG exhaust mass emission results shall be multiplied by the applicable reactivity adjustment factor to determine compliance with intermediate in-use compliance standards for NMOG. In addition to multiplying the exhaust NMOG mass emission results by the applicable reactivity adjustment factor, natural gas vehicles shall multiply the exhaust methane mass emission results by the applicable methane reactivity adjustment factor and add that value to the reactivity-adjusted NMOG value. For fuel-flexible and dual-fuel vehicles when operating on gasoline, NMOG emission results shall not be multiplied by a reactivity adjustment factor.

b.Gasoline Standards for Fuel-Flexible and Dual-Fuel Vehicles.For fuel-flexible and dual-fuel MDVs from 0-14,000 lbs. TW, intermediate in-use compliance standards for NMOG emissions at 50,000 miles when the vehicle is operated on gasoline, shall be:

Fuel-Flexible and Dual-Fuel MDVs
Intermediate In-Use Compliance Standards

Test Weight (lbs.)	Vehicle Emission Category	50,000 (g/mi)
0-3750	LEV	0.32
ULEV	0.188	
3751-5750	LEV	0.41
ULEV	0.238	
SULEV	0.128	
5751-8500	LEV	0.49
ULEV	0.293	
SULEV	0.156	
8501-10,000	LEV	0.58
ULEV	0.345	
SULEV	0.184	
10,000-14,000	LEV	0.75
ULEV	0.450	
SULEV	0.240	

Intermediate in-use compliance standards shall apply to LEVs and ULEVs through the 1999 model year and to SULEVs through the 2001 model year. Compliance with the standards beyond 50,000 miles shall be waived through the 1999 model year for LEVs and ULEVs and through the 2001 model year for SULEVs.

[FN10] Medium-Duty Vehicle Phase-In Requirements.Each manufacturer's MDV fleet shall be defined as the total number of MDVs from 0-14,000 lbs. TW certified and produced and delivered for sale in California.

a. Manufacturers of MDVs shall certify an equivalent percentage of their MDV fleet according to the following phase-in schedule:

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Model Year	Vehicles Certified to Title 13 CCR Section 1960.1(h)(1) or (h)(2) (%)		Vehicles Certified to Title 13 CCR Section 1956.8(g) or (h) (%)			
Tier 1	LEV	ULEV	Tier 1	LEV	ULEV	
1998	73	25	2	100	0	0
1999	48	50	2	100	0	0
2000	23	75	2	100	0	0

c. The percentages shall be appled to the manufacturer's total production of California-certified medium-duty vehicles delivered for sale in California.

d. These requirements shall not apply to small volume manufacturers. Small volume manufacturers shall comply with the requirements of note (16) below.

[FN11] Definition of HEV.For the purpose of calculating "Vehicle Equivalent Credits" (or "VECs"), the contribution of hybrid electric vehicles (or "HEVs") will be calculated based on the range of the HEV without the use of the engine. For the purpose of calculating the contribution of HEVs to the VECs, the following definitions shall apply:

"Type A HEV" shall mean an HEV which achieves a minimum range of 60 miles over the All-Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

"Type B HEV" shall mean an HEV which achieves a range of 40-59 miles over the All-Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable.

"Type C HEV" shall mean an HEV which achieves a range of 0-39 miles over the All-Electric Range Test as defined in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable, and all other HEVs excluding "Type A" and "Type B" HEVs.

a. For the purpose of calculating VECs, electric vehicles which utilize fuel fired heaters and which are not otherwise certified as ZEVs shall be treated as "Type A HEV ULEVs."

[FN12] Calculation of Vehicle Equivalent Credits. In 1992 through 2000 model years, manufacturers that produce and deliver for sale in California MDVs in excess of the equivalent requirements for LEVs and/or ULEVs certified to the exhaust emission standards set forth in this section (h)(2) or Title 13, CCR Section 1956.8(h), shall receive VECs calculated in accordance with the following equation, where

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the term "Produced" means produced and delivered for sale in California:

([(No. of LEVs Produced excluding HEVs) + (No. of "Type C HEV" LEVs Produced)] +

[(No. of "Type A HEV" LEVs Produced) x (1.2)] +

[(No. of "Type B HEV" LEVs Produced) x (1.1)] -

(Equivalent No. of LEVs Required to be Produced))+

((1.4) x [(No. of ULEVs Produced excluding HEVs) + (No. of "Type C HEV" ULEVs Produced)] +

[(1.7) x (No. of "Type A HEV" ULEVs Produced)] +

[(1.5) x (No. of "Type B HEV" ULEVs Produced)] -

[(1.4) x (Equivalent No. of ULEVs Required to be Produced)]) +

([(1.7) x [(No. of SULEVs Produced excluding HEVs) + (No. of "Type C HEV" SULEVs Produced)] +

[(No. of "Type A HEV" SULEVs Produced) x (1.7)] +

[(No. of "Type B HEV" SULEVs) x (1.5)] -

[(1.7) x [(Equivalent No. of SULEVs Required to be Produced)]) +

[(2.0) x (No. of ZEVs Certified and Produced as MDVs)].

a. Manufacturers that fail to produce and deliver for sale in California the equivalent quantity of MDVs certified to LEV and/or ULEV exhaust emission standards, shall receive "Vehicle-Equivalent Debits" (or "VEDs") equal to the amount of negative VECs determined by the aforementioned equation.

[FN13] 50^{O}F Requirement.Manufacturers shall demonstrate compliance with the above standards for NMOG, carbon monoxide, and oxides of nitrogen at 50 degrees F according to the procedures specified in section 11k of the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), or according to the procedure specified in section II.C. of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1961(d), as applicable. Hybrid electric, natural gas, and diesel-fuel vehicles shall be exempt from 50 degrees F test requirements.

[FN14] In-use compliance testing shall be limited to vehicles with fewer than 90,000 miles.

[FN15] HEV Requirements.Deterioration factors for hybrid electric vehicles shall be based on the emissions and mileage accumulation of the auxiliary power unit. For certification purposes only, Type A hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors), and demonstrating compliance with 120,000 mile emission standards shall not be required. For certification purposes only, Type B hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors). For certification purposes only, Type C hybrid electric vehicles shall demonstrate compliance with 50,000 mile emission standards (using 50,000 mile deterioration factors) and 120,000 mile emission standards (using 120,000 mile deterioration factors).

[FN16] Requirements for Small Volume Manufacturers.As used in Section 1960.1(h)(2), the term "small volume manufacturer" shall mean any vehicle manufacturer with California sales less than or equal to 3000 new PCs, LDTs, and MDVs per model year based on the average number of vehicles sold by the manufacturer each model year from 1992 to 1994, except as otherwise noted below. For manufacturers certifying for the first time in California, model-year sales shall be based on projected California sales.

a. Prior to the model year 2001, small volume manufacturers shall not be required to certify, produce, or deliver LEVs and ULEVs for sale in California.

b. If a manufacturer's average California sales exceeds

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3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall no longer be treated as a small volume manufacturer and shall comply with the LEV and ULEV requirements applicable for larger manufacturers as specified in 1960.1(h)(2) beginning with the fourth model year after the last of the three consecutive model years.

c. If a manufacturer's average California sales falls below 3000 units of new PCs, LDTs, and MDVs based on the average number of vehicles sold for any three consecutive model years, the manufacturer shall be treated as a small volume manufacturer and shall be subject to requirements for small volume manufacturers as specified in 1960.1(h)(2) beginning with the next model year.

d. The value of any VECs not used to equalize the previous model-year's debit, shall be discounted by 50% at the beginning of second model year after being earned, discounted to 25% of its original value if not depleted by the beginning of the third model year after being earned, and will have no value if not used by the beginning of the fourth model year after being earned.

e. Any VECs earned prior to the 1998 model year shall be treated as earned in the 1998 model year and discounted in accordance with the schedule specified in note (12)d.

f. Only ZEVs certified as MDVs shall be included in the calculation of VECs.

g. In order to verify the status of a manufacturer's compliance with the phase-in requirements of this section and in order to confirm the accrual of VECs or VEDs, each manufacturer shall submit an annual report to the Executive Officer which sets forth the production data used to establish compliance by no later than March 1 of the calendar year following the close of the model year.

b. Manufacturers shall equalize emission debits within one model year by earning VECs in an amount equal to their previous model-year's total of VEDs, or by submitting a commensurate amount of VECs to the Executive Officer that were earned previously or acquired from another manufacturer. Any manufacturer which fails to equalize emission debits within the specified time period shall be subject to the Health and Safety Code 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 the purposes of Health and Safety Code section 43211, the number of vehicles not meeting the state board's emission standards shall be equal to the amount of VEDs incurred.

c. The VECs earned in any given model year shall retain full value through the subsequent model year.

(i) The exhaust emissions from new 1981 and subsequent model passenger cars, light-duty trucks, and medium-duty vehicles certified to special standards authorized by sections 1960.2, 1960.3, and 1960.4, subchapter 1, Chapter 3, Title 13, California Code of Regulations, shall not exceed [FN1]:

_____
_____

SPECIAL EXHAUST [FN10]EMISSION STANDARDS (grams per mile)

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[Note: The following TABLE/FORM is too wide to be displayed on one screen. You must print it for a meaningful review of its contents. The table has been divided into multiple pieces with each piece containing information to help you assemble a printout of the table. The information for each piece includes: (1) a three line message preceding the tabular data showing by line # and character # the position of the upper left-hand corner of the piece and the position of the piece within the entire table; and (2) a numeric scale following the tabular data displaying the character positions.]

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******** This is piece 1. -- It begins at character 1 of table line 1. ********

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Vehicle Year	Inertia Weight Type [FN2]	Equivalent Basis (lbs.) [FN3]	Durability Non-Methane (mi)	Carbon Hydrocarbons	Vehicle Oxides of Monoxide
1981.....	PC [FN6]	All	50,000	0.39	(0.41)
LDT, MDV [FN7]	0-3999	50,000	0.39	(0.41)	9.0
1982 [FN8]....	PC	All	50,000	0.39	(0.41)
1983 [FN8]....	PC	All	50,000	0.39	(0.41)
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0
1984 [FN8]....	PC	All	50,000	0.39	(0.41)
LDT, MDV	0-3999	50,000	0.39	(0.41)	9.0
1985 [FN8]....	LDT, MDV	0-3999	50,000	0.39	(0.41)

1...+...10....+...20....+...30....+...40....+...50....+...60....+...70....+....

****

******* This is piece 2. -- It begins at character 80 of table line 1. ********

****

Nitrogen [FN5]
7.0
1.5
7.0
7.0
1.0
7.0
0.7
9.0

80..+...90....+....0....

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[FN1] Subsection (i) shall remain in effect until December 31, 1990, and as of that date is repealed unless a later regulation deletes or extends that date. Notwithstanding the repeal or expiration of this regulation on December 31, 1990, the provisions of the regulation as they existed prior to such repeal or expiration shall continue to be operative and effective for those events occurring prior to the repeal or expiration.

[FN2] "PC" means passenger cars. "LDT" means light-duty trucks. "MDV" means medium-duty vehicles.

[FN3] Equivalent inertia weights are determined under subparagraph 40 CFR 86.129-79(a).

[FN4] Hydrocarbon standards in parentheses apply to total hydrocarbons.

[FN5] The maximum projected emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR Part 600, Subpart B) shall be no greater than 1.33 times the applicable passenger car standards and 2.0 times the applicable light-duty truck and medium-duty vehicle standards shown in the table. Both the projected emissions and the HWFET standard shall be rounded to the nearest 0.1 gm/mi before being compared.

[FN6] For vehicles certified to special standards authorized by section 1960.2, Article 2, Subchapter 1, Chapter 3, Title 13, California Administrative Code.

[FN7] For vehicles certified to special standards authorized by section 1960.3, Article 2, Subchapter 1, Chapter 3, Title 13, California Administrative Code.

[FN8] For vehicles certified to special standards authorized by section 1960.4, Article 2, Subchapter 1, Chapter 3, Title 13, California Administrative Code. Special standards revert to "1983 and subsequent" standards for 1985 and subsequent passenger cars and 1986 and subsequent LDTs and MDVs.

[FN9] The Executive Officer may grant limited relief from the 1983 passenger car and 1984 LDT and MDV special NO_x standard to a manufacturer who exceeds the standard because of unforeseen technical problems.

[FN10] Diesel passenger cars, light-duty trucks, and medium-duty vehicles are subject to the following particulate exhaust emission standards: 0.4 g/mi for the 1985 model year, 0.2 g/mi for the 1986 through 1988 model years, and 0.08 g/mi for the 1989 and subsequent model years. The particulate compliance shall be determined on a 50,000 mile durability vehicle basis.

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(j) For Option 1 in the tables in sections (f)(1) and (f)(2), the hydrocarbon and carbon monoxide compliance shall be determined on a 50,000- mile durability vehicle basis. For Option 2 in the table in section (f)(2), the hydrocarbon and carbon monoxide compliance shall be determined on a 100,000-mile durability basis.

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(k) The test procedures for determining compliance with these standards are set forth in "California Exhaust Emission Standards and Test Procedures for 1981 through 1987 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted by the state board on November 23, 1976, as last amended May 20, 1987, and in "California Exhaust Emission Standards and Test Procedures for 1988 through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," adopted by the state board on May 20, 1987, as last amended August 5, 1999, both of which are incorporated herein by reference, and in "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d). The test procedures for determining the compliance of 2001 through 2006 model-year hybrid electric vehicles with the standards set forth in this section are set forth in "California Exhaust Emission Standards and Test Procedures for 2005 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes, as incorporated by reference in section 1962(h).

(l) With respect to any new vehicle required to comply with the standards set forth in paragraphs (a) through (h), the manufacturer's written maintenance instructions for in-use vehicles shall not require scheduled maintenance more frequently than or beyond the scope of maintenance permitted under the test procedures referenced in paragraph (k) above. Any failure to perform scheduled maintenance shall not excuse an emissions violation unless the failure is related to or causative of the violation.

(m) Any 1982, 1983, and 1984 model year vehicle required to comply with the standards set forth in paragraphs (b), (c), (d), and (f) which is subject to a standard set by federal law or regulation controlling emissions of particulate matter must conform to such standard.

(n) For purposes of section 1960.1(a) through (f), section 1960.1(h)(1), and section 1960.1.5, "small volume manufacturer" for the 2000 and earlier model years is any vehicle manufacturer which was subject to "in lieu" standards pursuant to section 202(b)(1)(B) of the Federal Clean Air Act (42 U.S.C. section 7521(b)(1)(B), as amended November 16, 1977) or a vehicle manufacturer with California sales not exceeding 3,000 new motor vehicles per model year based on previous model-year sales; however, for manufacturers certifying for the first time in California model year sales shall be based on projected California sales.

(o) [Reserved]

(p) The cold temperature exhaust carbon monoxide emission levels from new 1996 through 2000 and subsequent model-year passenger cars, light-duty trucks, and medium-duty vehicles shall not exceed:

1996 AND SUBSEQUENT MODEL-YEAR COLD TEMPERATURE CARBON MONOXIDE EXHAUST EMISSIONS STANDARDS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES [FN1,2] (grams per mile)

Vehicle Type	Loaded Vehicle Weight (lbs.)	Durability Vehicle Basis (mi)	Carbon Monoxide
Passenger Car	All	50,000	10.0
Light-Duty Truck	0-3750	50,000	10.0
Light-Duty Truck	3751-5750	50,000	12.5
Medium-Duty Vehicle	0-3750	50,000	10.0

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Medium-Duty Vehicle	3750-8500 [FN3]	50,000	12.5

(1) These standards are applicable to vehicles tested in accordance with 40 CFR Part 86 Subpart C, at a nominal temperature of 20 [FN0] F (-7 [FN0] C).

(2) Natural gas vehicles, diesel-fueled vehicles, hybrid electric vehicles, and zero-emission vehicles are exempt from these standards.

(3) Medium-duty vehicles with a gross vehicle weight rating greater than 8,500 lbs. are exempt from this standard.

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(q) The Supplemental Federal Test Procedure (SFTP) exhaust emission levels from new 2001 and subsequent model passenger cars and light-duty trucks, other than low-emission vehicles, ultra-low-emission vehicles, and zero-emission vehicles, shall not exceed:

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_____

SFTP EXHAUST EMISSION STANDARDS FOR 2001 AND SUBSEQUENT MODEL-YEAR PASSENGER CARS AND LIGHT-DUTY TRUCKS OTHER THAN LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES, AND ZERO-EMISSION VEHICLES
(grams per mile) %n4,5,6,7,8,9,10

Loaded Vehicle Type	Vehicle Weight (lbs.)	Durability Vehicle Basis (mi)	NMHC Fuel Type	NOx Composite	%n CO A/C Test	US06 Test	Composite Option
PC	All	50,000	Gasoline	0.65	3.0	9.0	3.4
			Diesel	1.48	NA	9.0	3.4
		100,000	Gasoline	0.91	3.7	11.1	4.2
			Diesel	2.07	NA	11.1	4.2
LDT	0-3750	50,000	Gasoline	0.65	3.0	9.0	3.4
			Diesel	1.48	NA	9.0	3.4
		100,000	Gasoline	0.91	3.7	11.1	4.2

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		Diesel	2.07	NA	11.1	4.2	
LDT	3751-5750	50,000	Gasoline	1.02	3.9	11.6	4.4
		Diesel	NA	NA	NA	NA	
	100,000	Gasoline	1.37	4.9	14.6	5.5	
		Diesel	NA	NA	NA	NA	

[FN1] Abbreviations.

"PC" means passenger car.

"LDT" means light-duty truck.

"NMHC+NOx" means non-methane hydrocarbon plus oxides of nitrogen emissions.

"CO" means carbon monoxide emissions.

"A/C" means air-conditioning.

"US06" means the test cycle designed to evaluate emissions during aggressive and microtransient driving.

[FN2] Non-Methane Hydrocarbon Emissions.For PCs and LDTs certified to the FTP exhaust standards in section 1960.1(f)(2), hydrocarbon emissions shall be measured in accordance with the "California Non-Methane Hydrocarbon Test Procedures" as last amended May 15, 1990, which is incorporated herein by reference. For PCs and LDTs certified as transitional low-emission vehicles, hydrocarbon emissions shall be measured in accordance with Part B (Determination of Non-Methane Hydrocarbon Mass Emissions by Flame Ionization Detection) of the "California Non-Methane Organic Gas Test Procedures" as incorporated by reference in section 1960.1(g)(1), note (3). For alcohol-fueled vehicles certifying to these standards, including flexible-fuel vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent."

[FN3] Composite Standards.Compliance with the composite standards shall be demonstrated using the calculations set forth in the section 86.164- 00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, which is incorporated herein by reference.

[FN4] SFTP.SFTP means the additional test procedure designed to measure emissions during aggressive and microtransient driving, as described in section 86.159-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the US06 cycle, and also the test procedure designed to measure urban driving emissions while the vehicle's air conditioning system is operating, as described in section 86.160-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the SC03 cycle. These sections of the Code of Federal Regulations are incorporated herein by reference.

[FN5] Applicability to Alternative Fuel Vehicles.These SFTP standards do not apply to vehicles certified on fuels other than gasoline and diesel fuel, but the standards do apply to the gasoline and diesel fuel operation of flexible-fuel vehicles and dual-fuel vehicles.

[FN6] Air to Fuel Ratio Requirement.With the exception of cold-start conditions, warm-up conditions and rapid-throttle motion conditions ("tip-in" or "tip-out" conditions), the air to fuel ratio shall not be richer at any time than, for a given engine operating condition (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters), the leanest air to fuel mixture required to obtain maximum torque (lean best torque), with a tolerance of six percent of the fuel consumption. The Executive Officer may approve a

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manufacturer's request for approval to use additional enrichment in subsequent testing if the manufacturer demonstrates that additional enrichment is needed to protect the vehicle, occupants, engine, or emission control hardware.

[FN7] A/C-on Specific Calibrations. A/C-on specific calibrations (e.g. air to fuel ratio, spark timing, and exhaust gas recirculation), may be used which differ from A/C-off calibrations for given engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters). Such calibrations must not unnecessarily reduce the NMHC+NOx emission control effectiveness during A/C-on operation when the vehicle is operated under conditions which may reasonably be expected to be encountered during normal operation and use. If reductions in control system NMHC+NOx effectiveness do occur as a result of such calibrations, the manufacturer shall, in the Application for Certification, specify the circumstances under which such reductions do occur, and the reason for the use of such calibrations resulting in such reductions in control system effectiveness.

A/C-on specific "open-loop" or "commanded enrichment" air-fuel enrichment strategies (as defined below), which differ from A/C-off "open-loop" or "commanded enrichment" air-fuel enrichment strategies, may not be used, with the following exceptions: cold-start and warm-up conditions, or, subject to Executive Officer approval, conditions requiring the protection of the vehicle, occupants, engine, or emission control hardware. Other than these exceptions, such strategies which are invoked based on manifold pressure, engine speed, throttle position, or other engine parameters shall use the same engine parameter criteria for the invoking of this air-fuel enrichment strategy and the same degree of enrichment regardless of whether the A/C is on or off.

"Open-loop" or "commanded" air-fuel enrichment strategy is defined as enrichment of the air to fuel ratio beyond stoichiometry for the purposes of increasing engine power output and the protection of engine or emissions control hardware. However, "closed-loop biasing," defined as small changes in the air-fuel ratio for the purposes of optimizing vehicle emissions or driveability, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy. In addition, "transient" air-fuel enrichment strategy (or "tip-in" and "tip-out" enrichment), defined as the temporary use of an air-fuel ratio rich of stoichiometry at the beginning or duration of rapid throttle motion, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy.

[FN8] "Lean-On-Cruise" Calibration Strategies.In the Application for Certification, the manufacturer shall state whether any "lean-on-cruise" strategies are incorporated into the vehicle design. A "lean-on-cruise" air-fuel calibration strategy is defined as the use of an air-fuel ratio significantly greater than stoichiometry, during non-deceleration conditions at speeds above 40 mph. "Lean-on-cruise" air-fuel calibration strategies shall not be employed during vehicle operation in normal driving conditions, including A/C-usage, unless at least one of the following conditions is met:

1. Such strategies are substantially employed during the FTP or SFTP, or

2. Such strategies are demonstrated not to significantly reduce vehicle NMHC+NOx emission control effectiveness over the operating conditions in which they are employed, or

3. Such strategies are demonstrated to be necessary to protect the vehicle, occupants, engine, or emission control hardware.

If the manufacturer proposes to use a "lean-on-cruise" calibration strategy, the manufacturer shall specify the circumstances under which such a calibration would be used, and the reason or reasons for the proposed use of such a calibration.

The above provisions shall not apply to vehicles powered by "lean-burn" engines or Diesel-cycle en-

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gines. A "lean-burn" engine is defined as an Otto-cycle engine designed to run at an air-fuel ratio significantly greater than stoichiometry during the large majority of its operation.

[FN9] Phase-In Requirements.For the purposes of this section 1960.1(q) only, each manufacturer's PC and LDT fleet shall be defined as the total projected number of PCs and LDTs from 0-5750 pounds loaded vehicle weight certified to the FTP exhaust standards of section 1960.1(f)(2) and certified as transitional low-emission vehicles sold in California. As an option, a manufacturer may elect to have its total PC and LDT fleet defined, for the purposes of this section 1960.1(q) only, as the total projected number of the manufacturer's PCs and LDTs, other than zero-emission vehicles, certified and sold in California.

a. Manufacturers of PCs and of LDTs, except small volume manufacturers, shall certify a minimum percentage of their PC and LDT fleet according to the following phase-in schedule.

Model Year	Percentage of PC and LDT Fleet
2001	25
2002	50
2003	85
2004 and subsequent	100

b. Small volume manufacturers of PCs and LDTs shall certify 100% of their PC and LDT fleet in the 2004 and subsequent model years.

[FN10] Single-Roll Electric Dynamometer Requirement.For all vehicles certified to the SFTP standards, a single-roll electric dynamometer or a dynamometer which produces equivalent results, as set forth in the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), must be used for all types of emission testing to determine compliance with the associated emission standards.

_____
_____

(r) The Supplemental Federal Test Procedure (SFTP) standards in this section represent the maximum SFTP exhaust emissions at 4,000 miles + 250 miles or at the mileage determined by the manufacturer for emission-data vehicles in accordance with the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), and with the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d). The SFTP exhaust emission levels from new 2001 and subsequent model low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles in the passenger car and light-duty truck class, and new 2003 and subsequent low-emission vehicles, ultra-low-emission

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vehicles, and super-ultra-low-emission vehicles in the medium-duty class, shall not exceed:

_____
_____

SFTP EXHAUST EMISSION STANDARDS FOR LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES, AND SUPER-ULTRA-LOW-EMISSION VEHICLES IN THE PASSENGER CAR, LIGHT-DUTY TRUCK, AND MEDIUM-DUTY VEHICLE CLASSES (grams per mile) %n6,7,8,9,10,11

Vehicle Type	Loaded Vehicle Weight (lbs.) [FN2]	%n US06 Test NOx [FN1]	NMHC [FN4]+ CO [FN1]	A/C Test [FN1,5] NMHC [FN4] + NOx	CO [FN1]
PC	All	0.14	8.0	0.20	2.7
LDT	0-3750	0.14	8.0	0.20	2.7
LDT	3751-5750	0.25	10.5	0.27	3.5
MDV	3751-5750	0.40	10.5	0.31	3.5
MDV	5751-8500 [FN3]	0.60	11.8	0.44	4.0

_____
_____

[FN1] Abbreviations and Definitions.For the purposes of this SFTP standards table only, the following abbreviations and definitions apply:

"PC" means passenger car.

"LDT" means light-duty truck, defined as any 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.

"MDV" means medium-duty truck, defined as any motor vehicle having a manufacturer's gross vehicle weight rating of greater than 6,000 pounds and less than 14,001 pounds, except passenger cars.

"NMHC+NOx" means non-methane hydrocarbon plus oxides of nitrogen emissions.

"CO" means carbon monoxide emissions.

"US06" means the test cycle designed to evaluate emissions during aggressive and microtransient driving.

"A/C" means air-conditioning.

[FN2] For MDVs, "Loaded Vehicle Weight" shall mean "Test Weight," which is the average of the vehicle's curb weight and gross vehicle weight.

[FN3] Vehicles with a gross vehicle weight rating over 8,500 pounds are exempted from the requirements of this subsection.

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[FN4] Non-Methane Hydrocarbon Emissions.Hydrocarbon emissions shall be measured in accordance with Part B (Determination of Non-Methane Hydrocarbon Mass Emissions by Flame Ionization Detection) of the "California Non-Methane Organic Gas Test Procedures" as incorporated by reference in section 1960.1(g)(1), note (3). For alcohol-fueled vehicles certifying to these standards, including flexible-fuel vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent."

[FN5] A/C-on Specific Calibrations. A/C-on specific calibrations (e.g. air to fuel ratio, spark timing, and exhaust gas recirculation), may be used which differ from A/C-off calibrations for given engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters). Such calibrations must not unnecessarily reduce the NMHC+NOx emission control effectiveness during A/C-on operation when the vehicle is operated under conditions which may reasonably be expected to be encountered during normal operation and use. If reductions in control system NMHC+NOx effectiveness do occur as a result of such calibrations, the manufacturer shall, in the Application for Certification, specify the circumstances under which such reductions do occur, and the reason for the use of such calibrations resulting in such reductions in control system effectiveness.

A/C-on specific "open-loop" or "commanded enrichment" air-fuel enrichment strategies (as defined below), which differ from A/C-off "open-loop" or "commanded enrichment" air-fuel enrichment strategies, may not be used, with the following exceptions: cold-start and warm-up conditions, or, subject to Executive Officer approval, conditions requiring the protection of the vehicle, occupants, engine, or emission control hardware. Other than these exceptions, such strategies which are invoked based on manifold pressure, engine speed, throttle position, or other engine parameters shall use the same engine parameter criteria for the invoking of this air-fuel enrichment strategy and the same degree of enrichment regardless of whether the A/C is on or off.

"Open-loop" or "commanded" air-fuel enrichment strategy is defined as enrichment of the air to fuel ratio beyond stoichiometry for the purposes of increasing engine power output and the protection of engine or emissions control hardware. However, "closed-loop biasing," defined as small changes in the air-fuel ratio for the purposes of optimizing vehicle emissions or driveability, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy. In addition, "transient" air-fuel enrichment strategy (or "tip-in" and "tip-out" enrichment), defined as the temporary use of an air-fuel ratio rich of stoichiometry at the beginning or duration of rapid throttle motion, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy.

[FN6] SFTP.SFTP means the additional test procedure designed to measure emissions during aggressive and microtransient driving, as described in section 86.159-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the US06 cycle, and also the test procedure designed to measure urban driving emissions while the vehicle's air conditioning system is operating, as described in section 86.160-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the SC03 cycle. These sections of the Code of Federal Regulations are incorporated herein by reference.

[FN7] Applicability to Alternative Fuel Vehicles.These SFTP standards do not apply to vehicles certified on fuels other than gasoline and diesel fuel, but the standards do apply to the gasoline and diesel fuel operation of flexible-fuel vehicles and dual-fuel vehicles.

[FN8] Air to Fuel Ratio Requirement.With the exception of cold-start conditions, warm-up conditions and rapid-throttle motion conditions

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("tip-in" or "tip-out" conditions), the air to fuel ratio shall not be richer at any time than, for a given engine operating condition (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters), the leanest air to fuel mixture required to obtain maximum torque (lean best torque), with a tolerance of six percent of the fuel consumption. The Executive Officer may approve a manufacturer's request for approval to use additional enrichment in subsequent testing if the manufacturer demonstrates that additional enrichment is needed to protect the vehicle, occupants, engine, or emission control hardware.

[FN9] "Lean-On-Cruise" Calibration Strategies.In the Application for Certification, the manufacturer shall state whether any "lean-on-cruise" strategies are incorporated into the vehicle design. A "lean-on-cruise" air-fuel calibration strategy is defined as the use of an air-fuel ratio significantly greater than stoichiometry, during non-deceleration conditions at speeds above 40 mph. "Lean-on-cruise" air-fuel calibration strategies shall not be employed during vehicle operation in normal driving conditions, including A/C-usage, unless at least one of the following conditions is met:

1. Such strategies are substantially employed during the FTP or SFTP, or

2. Such strategies are demonstrated not to significantly reduce vehicle NMHC+NOx emission control effectiveness over the operating conditions in which they are employed, or

3. Such strategies are demonstrated to be necessary to protect the vehicle, occupants, engine, or emission control hardware.

If the manufacturer proposes to use a "lean-on-cruise" calibration strategy, the manufacturer shall specify the circumstances under which such a calibration would be used, and the reason or reasons for the proposed use of such a calibration.

The above provisions shall not apply to vehicles powered by "lean-burn" engines or Diesel-cycle engines. A "lean-burn" engine is defined as an Otto-cycle engine designed to run at an air-fuel ratio significantly greater than stoichiometry during the large majority of its operation.

[FN10] Phase-In Requirements.For the purposes of this 1960.1(r) section only, each manufacturer's PC and LDT fleet shall be defined as the total projected number of low-emission and ultra-low-emission PCs and LDTs from 0- 5750 pounds loaded vehicle weight sold in California. Each manufacturer's MDV fleet shall be defined as the total projected number of low-emission, ultra-low-emission, and super-ultra-low-emission MDVs less than 8501 pounds gross vehicle weight rating sold in California.

a. Manufacturers of PCs, LDTs, and MDVs, except small volume manufacturers, shall certify a minimum percentage of their PC and LDT fleet, and a minimum percentage of their MDV fleet, according to the following phase-in schedule.

	Percentage	
Model Year	PC, LDT	MDV
2001	25	NA
2002	50	NA
2003	85	25
2004	100	50
2005 and subsequent	100	100

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b. Manufacturers 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., a four model-year 25/50/85/100 percent phase-in schedule would be calculated as: (25%*4 years) + (50%*3 years) + (85%*2 years) + (100%*1 year) = 520). 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 under the following conditions: 1) all vehicles subject to the phase-in shall comply with the respective requirements in the last model year of the required phase-in schedule and 2) if a manufacturer uses the optional phase-in percentage determination in section 1960.1(q) note (9), the cumulative total of model-year emission reductions as determined only for PCs and LDTs certified to this section 1960.1(r) must also be equal to or larger than the required cumulative total by end of the 2004 model year. Manufacturers 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%*5 years) and added to the cumulative total).

c. Small volume manufacturers of PCs, LDTs, and MDVs shall certify 100% of their PC and LDT fleet in 2004 and subsequent model years, and 100% of their MDV fleet in 2005 and subsequent model years.

[FN11] Single-Roll Electric Dynamometer Requirement.For all vehicles certified to the SFTP standards, a single-roll electric dynamometer or a dynamometer which produces equivalent results, as set forth in the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), must be used for all types of emission testing to determine compliance with the associated emission standards.

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<General Materials (GM) - References, Annotations, or Tables>

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

HISTORY

1. Amendment filed 1-14-83; effective thirtieth day thereafter (Register 83, No. 3).

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2. Amendment of subsection (h) filed 4-20-83; effective upon filing pursuant to Government Code section 11346.2(d) (Register 83, No. 17).

3. Amendment of subsection (h) filed 2-17-84; effective thirtieth day thereafter (Register 84, No. 7).

4. Editorial correction of subsection (i) filed 5-8-84; effective thirtieth day thereafter (Register 84, No. 19).

5. Amendment of subsection (h) filed 11-15-85; effective thirtieth day thereafter (Register 85, No. 46).

6. Amendment of subsections (d)-(k) filed 4-21-87; operative 5-21-87 (Register 87, No. 17).

7. Amendment of subsections (d), (e) and (h) filed 7-1-87; operative 7-31-87 (Register 87, No. 28).

8. Amendment filed 2-21-90; operative 3-23-90 (Register 90, No. 8).

9. Amendment of subsections (e) and (i), new subsections (f)(1) and (f)(2) and renumbering of subsections (f)-(k) to subsections (g)-(l) filed 5-22-90; operative 6-21-90 (Register 90, No. 28).

10. Amendment of subsections (e), (f), (g), (h), (i), (j), (k), (l) and (m) filed 8-2-91; operative 9-2-91 (Register 91, No. 49).

11. New subsection (g) and subsection renumbering filed 8-30-91; operative 9-30-91 (Register 92, No. 14).

12. New subsections (e)(3), (h)(2) and (o) filed 8-30-91; operative 9-30-91 (Register 92, No. 14).

13. New subsections (e)(1), (e)(2), (f)(1), (f)(2) and (h)(1) filed 8-30-91; operative 9-30-91 (Register 92, No. 14).

14. Editorial correction of printing error restoring inadvertently omitted subsections (g)(2) and (h)(1)(4) (Register 92, No. 25).

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15. Amendment of footnotes 4 and 6 in subsection (e)(3)'s Table, footnotes 3, 4 and 8 in subsection (g)(1)'s Table, footnotes 3, 4a, 9a, and 13 in subsection (h)(2)'s Table, and subsection (k) filed 11-9-92; operative 12-9-92 (Register 92, No. 46).

16. Amendment of subsection (k) filed 12-9-92; operative 1-1-93 (Register 92, No. 50).

17. Amendment of subsection (k) and Note filed 7-20-93; operative 8-19-93 (Register 93, No. 30).

18. Amendment of subsection (k) filed 11-2-93; operative 12-2-93 (Register 93, No. 45).

19. Amendment of subsection (e)(3) table (6), (f)(1) table (2) and (7), (f)(2) table, (g)(1) table, (g)(2) and table, (h)(1) table and (h)(2) table filed 11-8-93; operative 12-8-93 (Register 93, No. 46).

20. Editorial correction of printing errors in subsections (e)(3), (f)(2) table (3), (g)(1) table (1), (3) and (6), (g)(2) table (4), (5) and (9), (h)(1) table (2), (3) and (5), and (h)(2) table (2)-(5), (8)-(10) and (12)-(13) (Register 93, No. 46).

21. Editorial correction of printing errors in subsection (g)(1), table 1 and subsection (h)(1), table 2 (Register 94, No. 2).

22. Change without regulatory effect amending subsection (h)(2) filed 3-30-94 pursuant to title 1, section 100, California Code of Regulations (Register 94, No. 13).

23. Amendment of subsection (k) filed 4-13-95; operative 4-13-95 pursuant to Government Code section 11343.4(d) (Register 95, No. 15).

24. Editorial correction of subsection (l) (Register 95, No. 38).

25. Change without regulatory effect amending subsection (l) filed 9-20-95 pursuant to section 100, title 1, California Code of Regulations (Register 95, No. 38).

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26. Amendment of section and Note filed 9-23-96; operative 10-23-96 (Register 96, No. 39).

27. Amendment of subsections (g)(1), (g)(2), (h)(2) and (k) filed 1-3-97; operative 1-3-97 pursuant to Government Code section 11343.4(d) (Register 97, No. 1).

28. Amendment of subsection (k) filed 7-25-97; operative 8-24-97 (Register 97, No. 30).

29. Amendment of subsection (k) and new subsections (q)-(r)(11) filed 7-17-98; operative 8-16-98 (Register 98, No. 29).

30. Editorial correction of subsections (d)(2), (e)(1), (g)(1), (g)(2), (h)(2) and reformatting of subsections (q) and (r) (Register 99, No. 26).

31. Amendment of section heading and subsections (e)(2), (e)(3), (f)(2), (g)(1), (g)(2), (h)(1), (h)(2), (j), (k), (n), (p) and (r) and repealer of subsection (o) filed 10-28-99; operative 11-27-99 (Register 99, No. 44).

32. Amendment of subsection (k) filed 5-24-2002; operative 6-23-2002 (Register 2002, No. 21).

33. Amendment of subsections (e)(3) and (h)(2) filed 9-16-2002; operative 10-16-2002 (Register 2002, No. 38).

34. Amendment of subsection (k) filed 2-25-2004; operative 3-26-2004 (Register 2004, No. 9).

13 CCR § **1960**.1, **13** CA ADC § **1960**.1

13 CA ADC § **1960**.1
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§ 1960.1. Exhaust Emission Standards and Test Procedures - 1981 through 2006 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

* * * *

(r) *4000-Mile Supplemental FTP Emission Standards.* The Supplemental Federal Test Procedure (SFTP) standards in this section are ~~represent~~ the maximum SFTP exhaust emissions at 4,000 miles + 250 miles or at the mileage determined by the manufacturer for emission-data vehicles in accordance with the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1960.1(k), and with the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001~~ 2009 through 2016 ~~and Subsequent~~ Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d). The SFTP exhaust emission levels from new 2001 through 2020 ~~and subsequent~~ model low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles in the passenger car and light-duty truck class certifying to the LEV II exhaust emission standards in section 1961, and new 2003 through 2020 model ~~and subsequent~~ low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles in the medium-duty class certifying to the LEV II exhaust emission standards in section 1961, shall not exceed:

SFTP EXHAUST EMISSION STANDARDS FOR LOW-EMISSION VEHICLES, ULTRA-LOW-EMISSION VEHICLES, AND SUPER-ULTRA-LOW-EMISSION VEHICLES IN THE PASSENGER CAR, LIGHT-DUTY TRUCK, AND MEDIUM-DUTY VEHICLE CLASSES

(grams per mile) 5,6,7,8,9,10,~~11~~

Vehicle Type[1]	Gross Vehicle Weight Rating (lbs.)	~~Loaded Vehicle~~ Test Weight (lbs.)[2]	US06 Test[1]		A/C Test[1,~~4~~5]	
			NMHC[3,4] + NOx[1]	CO[1]	NMHC[3,4] + NOx[1]	CO[1]
PC	All	All Vehicles in this category are tested at their loaded vehicle weight (curb weight plus 300 lbs.)	0.14	8.0	0.20	2.7
LDT ~~LDT~~	< 6,000 lbs.	0-3750 Vehicles in this category are tested at their loaded vehicle weight (curb weight plus 300 lbs.)	0.14	8.0	0.20	2.7
		3751-5750 Vehicles in this category are tested at their loaded vehicle weight (curb weight plus 300 lbs.)	0.25	10.5	0.27	3.5
MDV ~~MDV~~	6,001-8,500 lbs.[2]	3751-5750 Vehicles in this category are tested at their adjusted loaded vehicle weight (average of curb weight and GVWR)	0.40	10.5	0.31	3.5
		5751-8500[3] Vehicles in this category are tested at their adjusted loaded vehicle weight (average of curb weight and GVWR)	0.60	11.8	0.44	4.0

[1] *Abbreviations and Definitions.* For the purposes of this SFTP standards table only, the following abbreviations and definitions apply:
"PC" means passenger car.
"LDT" means light-duty truck, defined as any 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.
"MDV" means medium-duty truck, defined as any motor vehicle having a manufacturer's gross vehicle weight rating of greater than 6,000 pounds and less than 14,001 pounds, except passenger cars.
"NMHC+NOx" means non-methane hydrocarbon plus oxides of nitrogen emissions.
"CO" means carbon monoxide emissions.
"US06" means the test cycle designed to evaluate emissions during aggressive and microtransient driving.
"A/C" means air-conditioning.

~~2~~ ~~For MDVs, "Loaded Vehicle Weight" shall mean "Test Weight," which is the average of the vehicle's curb weight and gross vehicle weight.~~

23 Vehicles with a gross vehicle weight rating over 8,500 pounds are exempted from the requirements of this subsection.

34 *Non-Methane Hydrocarbon Emissions.* Hydrocarbon emissions shall be measured in accordance with Part B (Determination of Non-Methane Hydrocarbon Mass Emissions by Flame Ionization Detection) of the "California Non-Methane Organic Gas Test Procedures" as incorporated by reference in section 1960.1(g)(1), note (3). For alcohol-fueled vehicles certifying to these standards, including flexible-fuel vehicles when certifying on methanol or ethanol, "Non-Methane Hydrocarbons" shall mean "Organic Material Non-Methane Hydrocarbon Equivalent."

45 *A/C-on Specific Calibrations.* A/C-on specific calibrations (e.g. air to fuel ratio, spark timing, and exhaust gas recirculation), may be used which differ from A/C-off calibrations for given engine operating conditions (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters). Such calibrations must not unnecessarily reduce the NMHC+NOx emission control effectiveness during A/C-on operation when the vehicle is operated under conditions which may reasonably be expected to be encountered during normal operation and use. If reductions in control system NMHC+NOx effectiveness do occur as a result of such calibrations, the manufacturer shall, in the Application for Certification, specify the circumstances under which such reductions do occur, and the reason for the use of such calibrations resulting in such reductions in control system effectiveness.

A/C-on specific "open-loop" or "commanded enrichment" air-fuel enrichment strategies (as defined below), which differ from A/C-off "open-loop" or "commanded enrichment" air-fuel enrichment strategies, may not be used, with the following exceptions: cold-start and warm-up conditions, or, subject to Executive Officer approval, conditions requiring the protection of the vehicle, occupants, engine, or emission control hardware. Other than these exceptions, such strategies which are invoked based on manifold pressure, engine speed, throttle position, or other engine parameters shall use the same engine parameter criteria for the invoking of this air-fuel enrichment strategy and the same degree of enrichment regardless of whether the A/C is on or off.

"Open-loop" or "commanded" air-fuel enrichment strategy is defined as enrichment of the air to fuel ratio beyond stoichiometry for the purposes of increasing engine power output and the protection of engine or emissions control hardware. However, "closed-loop biasing," defined as small changes in the air-fuel ratio for the purposes of optimizing vehicle emissions or driveability, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy. In addition, "transient" air-fuel enrichment strategy (or "tip-in" and "tip-out" enrichment), defined as the temporary use of an air-fuel ratio rich of stoichiometry at the beginning or duration of rapid throttle motion, shall not be considered an "open-loop" or "commanded" air-fuel enrichment strategy.

56 *SFTP.* SFTP means the additional test procedure designed to measure emissions during aggressive and microtransient driving, as described in section 86.159-00, Title 40, Code of

Federal Regulations, as adopted October 22, 1996, over the US06 cycle, and also the test procedure designed to measure urban driving emissions while the vehicle's air conditioning system is operating, as described in section 86.160-00, Title 40, Code of Federal Regulations, as adopted October 22, 1996, over the SC03 cycle, except the test weight shall be that specified in this subsection 1960.1(r), regardless of what may be specified in the Code of Federal Regulations. These sections of the Code of Federal Regulations are incorporated herein by reference.

~~6~~7 *Applicability to Alternative Fuel Vehicles.* These SFTP standards do not apply to vehicles certified on fuels other than gasoline and diesel fuel, but the standards do apply to the gasoline and diesel fuel operation of flexible-fuel vehicles and dual-fuel vehicles.

~~7~~8 *Air to Fuel Ratio Requirement.* With the exception of cold-start conditions, warm-up conditions and rapid-throttle motion conditions ("tip-in" or "tip-out" conditions), the air to fuel ratio shall not be richer at any time than, for a given engine operating condition (e.g., engine speed, manifold pressure, coolant temperature, air charge temperature, and any other parameters), the leanest air to fuel mixture required to obtain maximum torque (lean best torque), with a tolerance of six percent of the fuel consumption. The Executive Officer may approve a manufacturer's request for approval to use additional enrichment in subsequent testing if the manufacturer demonstrates that additional enrichment is needed to protect the vehicle, occupants, engine, or emission control hardware.

~~8~~9 *"Lean-On-Cruise" Calibration Strategies.* In the Application for Certification, the manufacturer shall state whether any "lean-on-cruise" strategies are incorporated into the vehicle design. A "lean-on-cruise" air-fuel calibration strategy is defined as the use of an air-fuel ratio significantly greater than stoichiometry, during non-deceleration conditions at speeds above 40 mph. "Lean-on-cruise" air-fuel calibration strategies shall not be employed during vehicle operation in normal driving conditions, including A/C-usage, unless at least one of the following conditions is met:

1. Such strategies are substantially employed during the FTP or SFTP, or

2. Such strategies are demonstrated not to significantly reduce vehicle NMHC+NOx emission control effectiveness over the operating conditions in which they are employed, or

3. Such strategies are demonstrated to be necessary to protect the vehicle, occupants, engine, or emission control hardware.

If the manufacturer proposes to use a "lean-on-cruise" calibration strategy, the manufacturer shall specify the circumstances under which such a calibration would be used, and the reason or reasons for the proposed use of such a calibration.

The above provisions shall not apply to vehicles powered by "lean-burn" engines or Diesel-cycle engines. A "lean-burn" engine is defined as an Otto-cycle engine designed to run at an air-fuel ratio significantly greater than stoichiometry during the large majority of its operation.

~~9~~10 *Phase-In Requirements.* For the purposes of this 1960.1(r) section only, each manufacturer's PC and LDT fleet shall be defined as the total projected number of low-emission and ultra-low-emission PCs and LDTs from 0-5750 pounds loaded vehicle weight sold in California. Each manufacturer's MDV fleet shall be defined as the total projected number of low-emission, ultra-low-emission, and super-ultra-low-emission MDVs less than 8501 pounds gross vehicle weight rating sold in California.

a. For the 2001 through 2014 model years, mManufacturers of PCs, LDTs, and MDVs, except small volume manufacturers, shall certify a minimum percentage of their PC and LDT fleet, and a minimum percentage of their MDV fleet, according to the following phase-in schedule.

	Percentage	
Model Year	PC, LDT	MDV
2001	25	NA
2002	50	NA
2003	85	25
2004	100	50
2005 through 2014 ~~and subsequent~~	100	100

b. Manufacturers 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., a four model-year 25/50/85/100 percent phase-in schedule would be calculated as: (25%*4 years) + (50%*3 years) + (85%*2 years) + (100%*1 year) = 520). 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 under the following conditions: 1) all vehicles subject to the phase-in shall comply with the respective requirements in the last model year of the required phase-in schedule and 2) if a manufacturer uses the optional phase-in percentage determination in section 1960.1(q) note (9), the cumulative total of model-year emission reductions as determined only for PCs and LDTs certified to this section 1960.1(r) must also be equal to or larger than the required cumulative total by end of the 2004 model year. Manufacturers 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%*5 years) and added to the cumulative total).

c. Small volume manufacturers of PCs, LDTs, and MDVs shall certify 100% of their PC and LDT fleet in the 2004 through 2014 ~~and subsequent~~ model years, and 100% of their MDV fleet in the 2005 through 2014 ~~and subsequent~~ model years.

10~~4~~ *Single-Roll Electric Dynamometer Requirement.* For all vehicles certified to the SFTP standards, a single-roll electric dynamometer or a dynamometer which produces equivalent results, as set forth in the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 ~~and Subsequent~~ Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k) or 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," as incorporated by reference in section 1961(d), as applicable, must be used for all types of emission testing to determine compliance with the associated emission standards.

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 1960.1. Exhaust Emission Standards and Test Procedures - 1981 through 2006 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

* * * *

(r) *4000-Mile Supplemental FTP Emission Standards.* The Supplemental Federal Test Procedure (SFTP) standards in this section are the maximum SFTP exhaust emissions at 4,000 miles + 250 miles or at the mileage determined by the manufacturer for emission-data vehicles in accordance with the "California Exhaust Emission Standards and Test Procedures for 1988 Through 2000 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1960.1(k), and with 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," as incorporated by reference in section 1961(d). The SFTP exhaust emission levels from new 2001 through ~~2020~~2021 model low-emission vehicles, ultra-low-emission vehicles and super-ultra-low-emission vehicles in the passenger car and light-duty truck class certifying to the LEV II exhaust emission standards in section 1961, and new 2003 through ~~2020~~ 2021 model low-emission vehicles, ultra-low-emission vehicles, and super-ultra-low-emission vehicles in the medium-duty class certifying to the LEV II exhaust emission standards in section 1961, shall not exceed:

* * * *

NOTE: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43103, 43104, 43105, 43106, 43107 and 43204-43205.5, Health and Safety Code.

§ 1961. Exhaust Emission Standards and Test Procedures - 2004 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

Introduction. This section 1961 contains the California "LEV II" exhaust emission standards for 2004 and subsequent model passenger cars, light-duty trucks and medium-duty vehicles. A manufacturer must demonstrate compliance with the exhaust standards in section 1961(a) applicable to specific test groups, and with the composite phase-in requirements in section 1961(b) applicable to the manufacturer's entire fleet. Section 1961(b) also includes the manufacturer's fleet-wide composite phase-in requirements for the 2001 - 2003 model years.

Prior to the 2004 model year, a manufacturer that produces vehicles that meet the standards in section 1961(a) has the option of certifying the vehicles to those standards, in which case the vehicles will be treated as LEV II vehicles for purposes of the fleet-wide phase-in requirements. Similarly, 2004 - 2006 model-year vehicles may be certified to the "LEV I" exhaust emission standards in section 1960.1(g)(1) and (h)(2), in which case the vehicles will be treated as LEV I 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 8,500 lbs. to the heavy-duty engine standards and test procedures set forth in title 13, CCR, sections 1956.8(c), (g) and (h).

(a) *Exhaust Emission Standards.*

Subsection (a)(1) through (3). [No change.]

(a)(4) *50° F Exhaust Emissions Standards.* All light- and medium-duty LEVs, ULEVs and SULEVs must demonstrate compliance with the following exhaust emission standards for NMOG 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 C of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" incorporated by reference in section 1961(d). The NMOG mass emission result shall be multiplied by the applicable reactivity adjustment factor, if any, prior to comparing to the applicable adjusted 50,000 mile certification standards set forth below. A manufacturer may demonstrate compliance with the NMOG 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.1, subparagraph (p) and Section G.3.1.2, respectively, of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty

Vehicles" incorporated by reference in section 1961(d). Emissions of CO and NOx measured at 50°F shall not exceed the standards set forth in §1961(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. Natural gas and diesel-fueled vehicles are exempt from the 50°F test requirements.

Vehicle Weight Class	Vehicle Emission Category (g/mi)					
	LEV		ULEV		SULEV	
	NMOG	HCHO	NMOG	HCHO	NMOG	HCHO
PCs; LDTs 0-8500 lbs. GVW	0.150	0.030	0.080	0.016	0.020	0.008
MDVs 8501-10,000 lbs. GVW	0.390	0.064	0.286	0.032	0.200	0.016
MDVs 10,001-14,000 lbs. GVW	0.460	0.080	0.334	0.042	0.234	0.020

Subsection (a)(5) through (7). [No change.]

(8) *Requirements for Vehicles Certified to the Optional 150,000 Mile Standards.*

(A) *Requirement to Generate Additional Fleet Average NMOG Credit.* (A) Requirement to Generate Additional Fleet Average NMOG Credit. A vehicle that is certified to the 150,000 mile standards in section 1961(a) shall generate additional NMOG fleet average credit as set forth in 1961(b)(1) or additional vehicle equivalent credits as set forth in 1961(b)(2) provided that the manufacturer extends the warranty on high cost parts to 8 years or 100,000 miles, whichever occurs first, and agrees to extend the limit on high mileage in-use testing to ~~105,000~~ 112,500 miles.

(B) *Requirement to Generate a Partial ZEV Allowance.* A vehicle that is certified to the 150,000 mile SULEV standards shall 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 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962."

Subsections (9) through (11). [No change.]

(12) *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, 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 ~~SFTP test cycle~~ Unified Cycle Driving Schedule.

(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.

Subsections (13) and (14). [No change.]

(15) *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 LEV II ULEV standards for passenger cars and light-duty trucks less than 8,500 pounds GVW as set forth in section 1961(a)(1). On-board fuel-fired heaters may not be operable at ambient temperatures above 40°F.

(b) *Emission Standards Phase-In Requirements for Manufacturers.*

Subsections (b)(1) through (b)(2). [No change.]

(3) *Medium-Duty Vehicle Phase-In Requirements.*

(A) [No change.]

(B) *Phase-In Requirements for LEV II MDVs.* For the 2004 through 2006 model years, a manufacturer, other than a small volume manufacturer must phase-in at least one test group per model year to the MDV LEV II standards. All 2007 and subsequent model year MDVs, including those produced by a small volume manufacturer, are subject to the LEV II MDV standards. Beginning in the 2005 model year, all medium-duty engines certified to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), including those produced by a small volume manufacturer, must meet the standards set forth in title 13, CCR §1956.8(c) or (h), as applicable. A manufacturer that elects to certify to the Option 1 or Option 2 federal standards as set forth in 40 CFR §86.005-10(f) is not subject to these phase-in requirements.

(C) *Identifying a Manufacturer's MDV Fleet.* For the 2001 and subsequent model years, 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 manufacturers' total production of California-certified medium-duty vehicles delivered for sale in California. For the 2005 and subsequent model years, a manufacturer that elects to certify to the optional medium-duty engine standards in title 13, CCR, §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.

(D) *Requirements for Small Volume Manufacturers.* In 2001 through 2003 model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV Tier 1 standards in a quantity equivalent to 100% of its MDV fleet. In 2004 through 2006 ~~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 I standards in a quantity equivalent to 100% of its MDV fleet. Engines certified to these MDV LEV I standards are not be eligible for emissions averaging.

(E) For a manufacturer that elects to certify to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), all such 2005 and subsequent model year 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 §1956.8(b) or (d), as applicable.

(c) *Calculation of NMOG Credits/Debits.* [No change.]

(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 Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as amended ~~July 30, 2002~~ September 5, 2003, and the "California Non-Methane Organic Gas Test Procedures," as amended July 30, 2002, which are 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 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962.

(e) *Abbreviations.* The following abbreviations are used in this section 1961:

"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 "LEV II" light-duty truck with a loaded vehicle weight of 3751 pounds to a gross vehicle weight of 8500 pounds or a "LEV I" light-duty truck with a loaded vehicle weight of 3751-5750 pounds.
"LEV" means low-emission vehicle.
"LPG" means liquefied petroleum gas.
"LVW" means loaded vehicle weight.
"MDV" means medium-duty vehicle.
"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.
"TLEV" means transitional 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.

Note: Authority cited: Sections 39600, 39601, 43013, 43018, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43107, 43204, and 43205.5, Health and Safety Code.

FINAL REGULATION ORDER

Amend the following sections of Title13, California Code of Regulations, to read as set forth in the following pages:

§1961 :	Exhaust Emission Standards and Test Procedures – 2004 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.
§1976 :	Standards and Test Procedures for Motor Vehicle Fuel Evaporative Emissions.
§1978 :	Standards and Test Procedures for Vehicle Refueling Emissions.

Note: The amendments are shown in underlined to indicate additions to the existing language, and in ~~strikeouts~~ to indicate deletions.

Existing sections that are not amended are indicated by "[No Change]."

SECTION 1961, TITLE 13, CCR

Amend section 1961 to read as follows:

1961. Exhaust Emission Standards and Test Procedures – 2004 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

Introduction. [No Change]

(a) [No Change]

(b) [No Change]

(c) [No Change]

(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 Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as amended ~~August 5, 2005~~ June 22, 2006, and the "California Non-Methane Organic Gas Test Procedures," as amended July 30, 2002, which are 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 2005 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes," incorporated by reference in section 1962.

(e) [No Change]

Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43101, 43104 and 43105, 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.

BARCLAYS OFFICIAL CALIFORNIA CODE OF REGULATIONS
TITLE 13. MOTOR VEHICLES
DIVISION 3. AIR RESOURCES BOARD
CHAPTER 1. MOTOR VEHICLE POLLUTION CONTROL DEVICES
ARTICLE 1. GENERAL PROVISIONS

This database is current through 12/26/08, Register 2008, No. 52

§ 1961. Exhaust Emission Standards and Test Procedures - 2004 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

Introduction. This section 1961 contains the California "LEV II" exhaust emission standards for 2004 and subsequent model passenger cars, light-duty trucks and medium-duty vehicles. A manufacturer must demonstrate compliance with the exhaust standards in section 1961(a) applicable to specific test groups, and with the composite phase-in requirements in section 1961(b) applicable to the manufacturer's entire fleet. Section 1961(b) also includes the manufacturer's fleet-wide composite phase-in requirements for the 2001 - 2003 model years.

Prior to the 2004 model year, a manufacturer that produces vehicles that meet the standards in section 1961(a) has the option of certifying the vehicles to those standards, in which case the vehicles will be treated as LEV II vehicles for purposes of the fleet-wide phase-in requirements. Similarly, 2004 - 2006 model-year vehicles may be certified to the "LEV I" exhaust emission standards in section 1960.1(g)(1) and (h)(2), in which case the vehicles will be treated as LEV I 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 8,500 lbs. to the heavy-duty engine standards and test procedures set forth in title 13, CCR, sections 1956.8(c), (g) and (h).

(a) Exhaust Emission Standards.

(1) "LEV II" Exhaust Standards.The following standards represent the maximum exhaust emissions for the intermediate and full useful life from new 2004 and subsequent model-year "LEV II" LEVs, ULEVs, and SULEVs, including fuel-flexible, bi-fuel and dual fuel vehicles when operating on the gaseous or alcohol fuel they are designed to use:

LEV II Exhaust Mass Emission Standards for New 2004 and Subsequent Model LEVs,
ULEVs, and SULEVs in the Passenger Car, Light-Duty Truck and Medium-Duty
Vehicle Classes

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Vehicle Type	*Durability Vehicle Basis (mi)*	*Vehicle Emission Category*	*NMOG (g/mi)*	*Carbon Monoxide (g/mi)*	*Oxides of Nitrogen (g/mi)*	*Formaldehyde (mg/mi)*	*Particulates (g/mi)*
All PCs; LDTs 8500 lbs. GVW or less	50,000	LEV	0.075	3.4	0.05	15	n/a
		LEV, Option 1	0.075	3.4	0.07	15	n/a
Vehicles in this category are tested at their loaded vehicle weight		ULEV	0.040	1.7	0.05	8	n/a
	120,000	LEV	0.090	4.2	0.07	18	0.01
		LEV, Option 1	0.090	4.2	0.10	18	0.01
		ULEV	0.055	2.1	0.07	11	0.01
		SULEV	0.010	1.0	0.02	4	0.01
	150,000 (Optional)	LEV	0.090	4.2	0.07	18	0.01
		LEV, Option 1	0.090	4.2	0.10	18	0.01
		ULEV	0.055	2.1	0.07	11	0.01
		SULEV	0.010	1.0	0.02	4	0.01
MDVs 8501 – 10,000 lbs. GVW	120,000	LEV	0.195	6.4	0.2	32	0.12
		ULEV	0.143	6.4	0.2	16	0.06
Vehicles in this category are tested at their adjusted loaded vehicle weight		SULEV	0.100	3.2	0.1	8	0.06
	150,000 (Optional)	LEV	0.195	6.4	0.2	32	0.12
		ULEV	0.143	6.4	0.2	16	0.06
		SULEV	0.100	3.2	0.1	8	0.06
MDVs 10,001–14,000 lbs. GVW	120,000	LEV	0.230	7.3	0.4	40	0.12
		ULEV	0.167	7.3	0.4	21	0.06
		SULEV	0.117	3.7	0.2	10	0.06
Vehicles in this category are tested at their adjusted loaded vehicle weight	150,000 (Optional)	LEV	0.230	7.3	0.4	40	0.12
		ULEV	0.167	7.3	0.4	21	0.06
		SULEV	0.117	3.7	0.2	10	0.06

(2) Reactivity Adjustment in Determining Compliance with the NMOG Standard

(A) The NMOG emission results from all TLEVs, LEVs, ULEVs and SULEVs certifying on a fuel other than conventional gasoline shall be numerically adjusted to establish an NMOG exhaust mass emission value equivalent. The manufacturer shall multiply measured NMOG exhaust emission results by the appropriate reactivity adjustment factor set forth in section 1961(a)(2)(B) or established in accordance with the test procedures incorporated by reference in section 1961(d). The reactivity adjustment factor represents the ratio of the NMOG specific reactivity of a low-emission vehicle designed to operate on a fuel other than conventional gasoline compared to the NMOG baseline specific reactivity of vehicles in the same vehicle emission category operated on conventional gasoline.

(B) The following reactivity adjustment factors apply:

	Light-Duty Vehicles 0-6000 lbs. GVW		Medium-Duty Vehicles 6001 lbs. - 14,000 lbs. GVW		
	TLEV	LEV	ULEV	LEV	ULEV
Fuel					
Baseline Specific Reactivity (grams ozone / gram NMOG)					

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Conventional Gasoline	3.42	3.13	3.13	3.13	3.13
	Reactivity Adjustment Factors				
RFG (through the 2003 model year)	0.98	0.94	0.94	0.94	0.94
M85	0.41	0.41	0.41	0.41	0.41
Natural Gas	1.0	0.43	0.43	0.43	0.43
LPG	1.0	0.50	0.50	0.50	0.50
	Methane Reactivity Adjustment Factors				
Natural Gas	0.0043	0.0047	0.0047	0.0047	0.0047

(3) NMOG Standards for Bi-Fuel, Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline.For fuel-flexible, bi-fuel, and dual-fuel PCs, LDTs and MDVs, compliance with the NMOG exhaust mass emission standards shall 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, CO, NOx and formaldehyde set forth in the table in section 1961(a)(1) when certifying the vehicle for operation on the gaseous or alcohol fuel.

The following standards represent the maximum NMOG emissions when the vehicle is operating on gasoline. A manufacturer shall not apply a reactivity adjustment factor to the exhaust NMOG mass emission result when operating on gasoline. 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 test procedures incorporated by reference in section 1961(d). Testing at 50^{0}F is not required for fuel-flexible, bi-fuel and dual-fuel vehicles when operating on gasoline. The applicable CO, NOx and formaldehyde standards are set forth in section 1961(a)(1).

LEV II NMOG Standards for Bi-Fuel, Fuel-Flexible and Dual-Fuel Vehicles
Operating on Gasoline (g/mi)

	Vehicle Emission	Durability Vehicle Basis	
Vehicle Type	Category	50,000 mi	120,000 mi
All PCs; LDTs, 0-8500 lbs. GVW	LEV	0.125	0.156
	ULEV	0.075	0.090
	SULEV	0.010	0.040
MDVs, 8501-10,000 lbs. GVW	LEV	n/a	0.230
	ULEV	n/a	0.167
	SULEV	n/a	0.117
MDVs, 10,001-14,000 lbs. GVW	LEV	n/a	0.280
	ULEV	n/a	0.195
	SULEV	n/a	0.143

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(4) 50^{O}F Exhaust Emission Standards. All light- and medium-duty LEVs, ULEVs and SULEVs must demonstrate compliance with the following exhaust emission standards for NMOG and formaldehyde (HCHO) measured on the FTP (40 CFR, Part 86, Subpart B) conducted at a nominal test temperature of 50^{O}F, as modified by Part II, Section C of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" incorporated by reference in section 1961(d). The NMOG mass emission result shall be multiplied by the applicable reactivity adjustment factor, if any, prior to comparing to the applicable adjusted 50,000 mile certification standards set forth below. A manufacturer may demonstrate compliance with the NMOG 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.1, subparagraph (p) and Section G.3.1.2, respectively, of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" incorporated by reference in section 1961(d). Emissions of CO and NOx measured at 50^{O}F shall not exceed the standards set forth in §1961(a)(1) applicable to vehicles of the same emission category and vehicle type subject to a cold soak and emission test at 68^{O} to 86^{O}F. Natural gas and diesel-fueled vehicles are exempt from the 50^{O}F test requirements.

Vehicle Weight Class	Vehicle Emission Category (g/mi)					
	LEV	ULEV	SULEV			
	NMOG	HCHO	NMOG	HCHO	NMOG	HCHO
PCs; LDTs 0-8500 lbs. GVW	0.150	0.030	0.080	0.016	0.020	0.008
MDVs 8501-10,000 lbs. GVW	0.390	0.064	0.286	0.032	0.200	0.016
MDVs 10,001-14,000 lbs. GVW	0.460	0.080	0.334	0.042	0.234	0.020

(5) Cold CO Standard. The following standards represent the 50,000 mile cold temperature exhaust carbon monoxide emission levels from new 2001 and subsequent model-year passenger cars, light-duty trucks, and medium-duty vehicles:

TEMPERATURE CARBON MONOXIDE EXHAUST EMISSIONS STANDARDS FOR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES (grams per mile)

2001 AND SUBSEQUENT MODEL-YEAR COLD

Vehicle Type	Carbon Monoxide
All PCs, LDTs 0-3750 lbs. LVW	10.0
LDTs, 3751 lbs. LVW - 8500 lbs. GVW; LEV I and Tier 1 MDVs 8500 lbs. GVW and less	12.5

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These standards are applicable to vehicles tested at a nominal temperature of 20^{O}F (-7^{O}C) in accordance with 40 CFR Part 86 Subpart C, as amended by the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" incorporated by reference in section 1961(d). Natural gas, diesel-fueled and zero-emission vehicles are exempt from these standards.

(6) Highway NOx Standard.The maximum emissions of oxides of nitrogen measured on the federal Highway Fuel Economy Test (HWFET; 40 CFR 600 Subpart B, which is incorporated herein by reference) shall not be greater than 1.33 times the applicable PC and LDT standards or 2.0 times the applicable MDV standards set forth in section 1961(a)(1). Both the projected emissions and the HWFET standard shall be rounded in accordance with ASTM E29-67 to the nearest 0.1 g/mi (or 0.01 g/mi for vehicles certified to the 0.05 or 0.02 g/mi NOx standards) before being compared.

(7) Supplemental Federal Test Procedure (SFTP) Off-Cycle Emission Standards.The SFTP exhaust emission levels from new 2004 and subsequent model LEVs, ULEVs, and SULEVs shall not exceed the standards set forth in section 1960.1(r).

(8) Requirements for Vehicles Certified to the Optional 150,000 Mile Standards.

(A) Requirement to Generate Additional Fleet Average NMOG Credit.A vehicle that is certified to the 150,000 mile standards in section 1961(a) shall generate additional NMOG fleet average credit as set forth in 1961(b)(1) or additional vehicle equivalent credits as set forth in 1961(b)(2) provided that the manufacturer extends the warranty on high cost parts to 8 years or 100,000 miles, whichever occurs first, and agrees to extend the limit on high mileage in-use testing to 112,500 miles.

(B) Requirement to Generate a Partial ZEV Allowance. A vehicle that is certified to the 150,000 mile SULEV standards shall 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 2005 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962.

(9) Optional LEV II NOx Standard.A manufacturer may certify up to 4% of its light-duty truck fleet from 3751 lbs. LVW - 8500 lbs. GVW with a maximum base payload of 2500 lbs. or more to the LEV, option 1, standard set forth in 1961(a)(1) based on projected sales of trucks in the LDT2 category. Passenger cars and light-duty trucks 0-3750 lbs. LVW are not eligible for this option.

(10) Intermediate In-Use Compliance Standards.For test groups certified prior to the 2007 model year, the following intermediate in-use compliance standards shall apply for the first two model years the test group is certified to the new standard. For SULEVs certified prior to the 2004 model year, the following intermediate in-use compliance SULEV standards shall apply through the 2006 model year.

Emission Category	Durability Vehicle Basis	LEV II PCs and LDTs		LEV II MDVs 8500 - 10,000 lbs. GVW
		NMOG	NOx	NOx
LEV/ULEV	50,000	n/a	0.07	n/a
	120,000	n/a	0.10	0.3
	150,000	n/a	0.10	0.3
LEV, Option 1	50,000	n/a	0.10	n/a

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	120,000	n/a	0.14	n/a
	150,000	n/a	0.14	n/a
SULEV	120,000	0.020	0.03	0.15
	150,000	0.020	0.03	0.15

(11) NMOG Credit for Vehicles with Zero-Evaporative Emissions.In determining compliance of a vehicle with the applicable exhaust NMOG standard, a gram per mile NMOG factor, to be determined by the Executive Officer based on available data, shall be subtracted from the reactivity-adjusted NMOG exhaust emission results for any vehicle that has been certified to the "zero" evaporative emission standard set forth in title 13, CCR, section 1976(b)(1)(E). This credit shall not apply to a SULEV that generates a partial ZEV allowance.

(12) 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, 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.

(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.

(13) NOx Credits for Pre-2004 MDVs Certified to the LEV I LEV or ULEV Standards.Prior to the 2004 model year, a manufacturer may earn a 0.02 g/mi per vehicle NOx credit for MDVs between 6,000-8500 lbs. GVW certified to the LEV I LEV or ULEV standards for PCs and LDTs set forth in section 1960.1(g)(1). The manufacturer may apply the credit on a per vehicle basis to the NOx emissions of LDTs between 6,000-8500 lbs. GVW certified to the PC/LDT LEV or ULEV standards in section 1961(a)(1) for the 2004 through 2008 model years.

(14) When a Federally-Certified Vehicle Model is Required in California.

(A) General Requirement.Whenever a manufacturer federally-certifies a 2004 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. The criteria for applying this requirement are set forth in Part I. Section H.1 of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles," as incorporated by reference in section 1961(d).

(B) Exception for clean fuel fleet vehicles.Section

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1961(a)(14)(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.

(C) Opt-in for 2003 or prior model year vehicles.A manufacturer may certify a passenger car, light-duty truck or medium-duty vehicle to federal exhaust emission standards pursuant to section 1961(a)(14)(A) prior to the 2004 model year.

(15) 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 LEV II ULEV standards for passenger cars and light-duty trucks less than 8,500 pounds GVW as set forth in section 1961(a)(1). On-board fuel-fired heaters may not be operable at ambient temperatures above 40^{O}F.

(b) Emission Standards Phase-In Requirements for Manufacturers.

(1) Fleet Average NMOG Requirements for Passenger Cars and Light-Duty Trucks.

(A) The fleet average non-methane organic gas exhaust mass emission values from the passenger cars and light-duty trucks certified to the Tier 1, LEV I and LEV II standards that are produced and delivered for sale in California each model year by a manufacturer other than a small volume manufacturer or an independent low volume manufacturer shall not exceed:

FLEET AVERAGE NON-METHANE ORGANIC GAS EXHAUST MASS EMISSION REQUIREMENTS FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES (50,000 mile Durability Vehicle Basis)

Model Year	Fleet Average NMOG (grams per mile)	
	All PCs; LDTs 0-3750 lbs. LVW	LDTs 3751 lbs. LVW - 8500 lbs. GVW
2001	0.070	0.098
2002	0.068	0.095
2003	0.062	0.093
2004	0.053	0.085
2005	0.049	0.076
2006	0.046	0.062
2007	0.043	0.055
2008	0.040	0.050
2009	0.038	0.047
2010+	0.035	0.043

(B) Calculation of Fleet Average NMOG Value.

1.Basic Calculation.

a. Each manufacturer's PC and LDT1 fleet average NMOG value for the total number of PCs and LDT1s produced and delivered for sale in California shall be

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calculated as follows:

(<<sigma>> [Number of vehicles in a test group x applicable emission standard] +

<<sigma>> [Number of hybrid electric vehicles in a test group x HEV NMOG factor]) /

Total Number of Vehicles Produced, Including ZEVs and HEVs

b. Each manufacturer's LDT2 fleet average NMOG value for the total number of LDT2s produced and delivered for sale in California shall be calculated as follows:

<<sigma>> [Number of vehicles in a test group x applicable emission standard] +

<<sigma>> [Number of hybrid electric vehicles in a test group x HEV NMOG factor]) /

Total Number of Vehicles Produced, 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	
		All PCs; LDTs 0-3750 lbs. LVW	LDTs 3751-5750 lbs. LVW
2001 and subsequent (§1960.5 "AB 965" vehicles only)	All	Federal Emission Standard to which Vehicle is Certified	Federal Emission Standard to which Vehicle is Certified
2001 - 2003 (§1960.1(f)(2))	Tier 1	0.25	0.32
2001 - 2006 model year vehicles certified to the "LEV I" standards in §1960.1(g)(1) (For TLEVs, 2001 - 2003 model years only)	TLEVs	0.125	0.160
	LEVs	0.075	0.100
	ULEVs	0.040	0.050

Model Year	Emission Category	All PCs; LDTs 0-3750 lbs. LVW	LDTs 3751 lbs. LVW-8500 lbs. GVW
2004 and subsequent model year vehicles certified to the "LEV II" standards in §1961(a)(1) 2004 and subsequent model year	LEVs	0.075	0.075
	ULEVs	0.040	0.040
	SULEVs	0.01	0.01
	LEVs	0.06	0.06

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vehicles certified to the optional 150,000 mile "LEV II" standards for PCs and LDTs in 1961(a)(1)	ULEVs	0.03	0.03
	SULEVs	0.0085	0.0085

2.HEV NMOG Factor.The HEV NMOG factor for light-duty vehicles is calculated as follows:

LEV HEV Contribution Factor = 0.075 - [(Zero-emission VMT Factor) x 0.035]

ULEV HEV Contribution Factor = 0.040 - [(Zero-emission VMT Factor) x 0.030]

where Zero-emission VMT Factor for HEVs is determined in accordance with section 1962.

3. Federally-Certified Vehicles. A vehicle certified to the federal standards for a federal exhaust emissions bin in accordance with Section H.1 of the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d), shall use the corresponding intermediate useful life NMOG standard to which the vehicle is deemed certified in the fleet average calculation.

(C) Requirements for Small Volume Manufacturers.

1. In 2001 through 2006 model years, a small volume manufacturer shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with section 1961(b)(1)(B). In 2007 and subsequent model years, a small volume manufacturer shall not exceed a fleet average NMOG value of 0.075 for PCs and LDTs from 0-3750 lbs. LVW or 0.075 for LDTs from 3751 lbs. LVW - 8500 lbs. GVW calculated in accordance with section 1961(b)(1)(B).

2. If a manufacturer's average California sales exceed 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 no longer be treated as a small volume manufacturer and shall comply with the fleet average requirements applicable to larger manufacturers as specified in section 1961(b)(1) beginning with the fourth 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) Phase-in Requirements for Independent Low Volume Manufacturers.In 2001 through 2006 model years, an independent low volume manufacturer shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with section 1961(b)(1)(B). In 2007 and subsequent model years, an independent low volume manufacturer shall not exceed a fleet average NMOG value of 0.060 for PCs and LDTs from 0-3750 lbs. LVW or 0.065 g/mi for LDTs from 3751 lbs. LVW - 8500 lbs. GVW calculated in accordance with section 1961(b)(1)(B).

(E) 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 section 1962 shall be included as LDT1s in the calculation of a fleet average NMOG value.

(2) LEV II Phase-In Requirement for PCs and LDTs. Beginning in the 2004 model year, a manufacturer, ex-

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cept a small volume manufacturer or an independent low volume manufacturer, shall certify a percentage of its PC and LDT fleet to the LEV II standards in section 1961(a) according to the following phase in schedule:

Model Year	PC/LDT1 (%)	LDT2 (%)
2004	25	25
2005	50	50
2006	75	75
2007	100	100

In determining compliance with the phase-in schedule, the fleet shall consist of LEV I and LEV II PCs and LDT1s for the PC/LDT1 calculation, and LEV I and LEV II LDT2s for the LDT2 calculation. LEV I MDVs are not counted in the calculation until they are certified as LEV II LDT2s.

A manufacturer may use an alternative phase-in schedule to comply with these phase-in requirements as long as equivalent NOx emission reductions are achieved by the 2007 model year from each of the two categories - PC/LDT1 and LDT2. Model year emission reductions shall be calculated by multiplying the percent of either PC/LDT1 or LDT2 vehicles meeting the LEV II standards in a given model year (based on a manufacturer's projected sales volume of vehicles in each category) by 4 for the 2004 model year, 3 for the 2005 model year, 2 for the 2006 model year and 1 for the 2007 model year. The yearly results for PCs/LDT1s shall be summed together to determine a separate cumulative total for PCs/LDT1s and the yearly results for LDT2s shall be summed together to determine a cumulative total for LDT2s. The cumulative total for each category must be equal to or exceed 500 to be considered equivalent. A manufacturer may add vehicles introduced before the 2004 model year (e.g., the percent of vehicles introduced in 2003 would be multiplied by 5) to the cumulative total.

(3) Medium-Duty Vehicle Phase-In Requirements.

(A) A manufacturer of MDVs, other than a small volume manufacturer, shall certify an equivalent percentage of its MDV fleet according to the following phase-in schedule:

	Vehicles Certified to §1960.1(h)(1), (h)(2), and §1961(a)(1) (%)		Vehicles Certified to §1956.8(g) or (h) (%)		
Model Year	LEV	ULEV	Tier 1	LEV	ULEV
2001	80	20	100	0	0
2002	70	30	0	100	0
2003	60	40	0	100	0
2004 +	40	60	0	0	100

(B) Phase-In Requirements for LEV II MDVs. For the 2004 through 2006 model years, a manufacturer, other than a small volume manufacturer must phase-in at least one test group per model year to the MDV LEV

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II standards. All 2007 and subsequent model year MDVs, including those produced by a small volume manufacturer, are subject to the LEV II MDV standards. Beginning in the 2005 model year, all medium-duty engines certified to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), including those produced by a small volume manufacturer, must meet the standards set forth in title 13, CCR §1956.8(c) or (h), as applicable. A manufacturer that elects to certify to the Option 1 or Option 2 federal standards as set forth in 40 CFR §86.005-10(f) is not subject to these phase-in requirements.

(C) Identifying a Manufacturer's MDV Fleet. For the 2001 and subsequent model years, 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 manufacturers' total production of California-certified medium-duty vehicles delivered for sale in California. For the 2005 and subsequent model years, a manufacturer that elects to the optional medium-duty engine standards in title 13, CCR, §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.

(D) Requirements for Small Volume Manufacturers. In 2001 through 2003 model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV Tier 1 standards in a quantity equivalent to 100% of its MDV fleet. In 2004 through 2006 model years, a small volume manufacturer shall certify, produce, and deliver for sale in California vehicles or engines certified to the MDV LEV I standard in a quantity equivalent to 100% of its MDV fleet. Engines certified to these MDV LEV I standards are not be eligible for emissions averaging.

(E) For a manufacturer that elects to certify to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), all such 2005 and subsequent model year 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 Emissions Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines, incorporated by reference in §1956.8(b) or (d), as applicable.

(c) Calculation of NMOG Credits/Debits

(1) Calculation of NMOG Credits for Passenger Cars and Light-Duty Trucks. In 2001 and subsequent model years, a manufacturer that achieves fleet average NMOG values lower than the fleet average NMOG requirement for the corresponding model year shall receive credits in units of g/mi NMOG determined as:

[(Fleet Average NMOG Requirement) - (Manufacturer's Fleet Average NMOG Value)] x (Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs).

A manufacturer with 2001 and subsequent model year fleet average NMOG values greater than the fleet average requirement for the corresponding model year shall receive debits in units of g/mi NMOG equal to the amount of negative credits determined by the aforementioned equation. For the 2001 and subsequent model years, the total g/mi NMOG credits or debits earned for PCs and LDTs 0- 3750 lbs. LVW, for LDTs 3751-5750 lbs. LVW and for LDTs 3751 lbs. LVW - 8500 lbs. GVW shall be summed together. The resulting amount shall constitute the g/mi NMOG credits or debits accrued by the manufacturer for the model year.

(2) Calculation of Vehicle Equivalent NMOG Credits for Medium-Duty Vehicles.

(A) In 2001 and subsequent model years, a manufacturer that produces and delivers for sale in California MDVs in excess of the equivalent requirements for LEVs, ULEVs and/or SULEVs certified to the exhaust emission standards set forth in section 1961(a)(1) or to the exhaust emission standards set forth in Title 13, CCR, Section 1956.8(h) shall receive "Vehicle-Equivalent Credits" (or "VECs") calculated in accordance with the following equation, where the term "produced"

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means produced and delivered for sale in California:

([(No. of LEVs Produced excluding HEVs) +

(No. of LEV HEVs x HEV VEC factor for LEVs)] +

(1.20 x No. of LEVs certified to the 150,000 mile standards)) -

(Equivalent No. of LEVs Required to be Produced)) +

([(1.4) x (No. of ULEVs Produced excluding HEVs) +

(No. of ULEV HEVs x HEV VEC factor for ULEVs)] +

(1.50 x No. of ULEVs certified to the 150,000 mile standards)) - [(1.4) x (Equivalent No. of ULEVs Required to be Produced)]) +

([(1.7) x (No. of SULEVs Produced excluding HEVs) +

(No. of SULEV HEVs x HEV VEC factor for SULEVs)] +

(1.75 x No. of SULEVs certified to the 150,000 mile standards)) - [(1.7) x [(Equivalent No. of SULEVs Required to be Produced)]) +

[(2.0) x (No. of ZEVs Certified and Produced as MDVs)].

MDVs certified prior to the 2004 model year to the LEV I LEV or ULEV standards for PCs and LDTs 0-3750 lbs. LVW set forth in section E.1 of these test procedures shall receive VECs calculated in accordance with the following equation, where the term "produced" means produced and delivered for sale in California: [(1.6) x (No. of MDVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW excluding HEVs) + (No. of HEVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW x HEV VEC factor for MDVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW)]+ [(1.65 x No. of MDVs certified to the 150,000 mile LEV I LEV standards for PCs and LDTs 0-3750 lbs.)] + [(1.8) x (No. of MDVs meeting the LEV I ULEV standards for PCs and LDTs 0-3750 lbs. LVW excluding HEVs) + (No. of HEVs meeting the LEV I ULEV standards for PCs and LDTs 0-3750 lbs. LVW x HEV VEC factor for MDVs meeting the LEV I ULEV standards for PCs and LDTs 0-3750 lbs. LVW)]+ [(1.85 x No. of MDVs certified to the 150,000 mile LEV I ULEV standards for PCs and LDTs 0-3750 lbs.)].

(B)MDV HEV VEC factor. The MDV HEV VEC factor is calculated as follows:

1 + [(LEV standard - ULEV standard) x (Zero-emission VMT Factor) BLEV standard] for LEVs;

1 + [(ULEV standard - SULEV standard) x (Zero-emission VMT Factor) BULEV standard] for ULEVs;

1 + [(SULEV standard - ZEV standard) x (Zero-emission VMT Factor) BSULEV standard] for SULEVs;

where "Zero-emission VMT Factor" for an HEV is determined in accordance with section 1962.

The HEV VEC factor for MDVs prior to model year 2004 meeting the LEV I LEV and ULEV standards for PCs and LDTs 0-3750 lbs. LVW is calculated as follows:

1 + [(MDV SULEV standard - PC LEV I LEV standard) x (Zero-emission VMT Factor) BPC LEV I LEV standard] for MDVs meeting the LEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW;

1 + [(MDV SULEV standard - PC ULEV standard) x (Zero-emission VMT Factor) BPC LEV I ULEV standard] for MDVs meeting the ULEV I LEV standards for PCs and LDTs 0-3750 lbs. LVW.

(C) A manufacturer that fails to produce and deliver for sale in California the equivalent quantity of MDVs certified to LEV, ULEV and/or SULEV exhaust emission standards, shall receive "Vehicle-Equivalent Debits" (or "VEDs") equal to the amount of negative VECs determined by the equation in section 1961(c)(2)(A).

(D) Only ZEVs certified as MDVs and not used to meet the ZEV requirement shall be included in the calcula-

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tion of VECs.

(3) Procedure for Offsetting Debits.

(A) A manufacturer shall equalize emission debits by earning g/mi NMOG emission credits or VECs in an amount equal to the g/mi NMOG debits or VEDs, or by submitting a commensurate amount of g/mi NMOG credits or VECs to the Executive Officer that were earned previously or acquired from another manufacturer. For 2001 through 2003 and for 2007 and subsequent model years, manufacturers shall equalize emission debits by the end of the following model year. For 2004 through 2006 model years, a manufacturer shall equalize NMOG debits for PCs and LDTs and LEV II MDVs within three model years and prior to the end of the 2007 model year. 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 the purposes of Health and Safety Code section 43211, the number of passenger cars and light-duty trucks not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi NMOG emission debits for the model year by the g/mi NMOG fleet average requirement for PCs and LDTs 0-3750 lbs. LVW 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.

(B) The emission credits earned in any given model year shall retain full value through the subsequent model year. The value of any credits not used to equalize the previous model-year's debit shall be discounted by 50% at the beginning of second model year after being earned, shall be discounted to 25% of its original value if not used by the beginning of the third model year after being earned, and will have no value if not used by the beginning of the fourth model year after being earned.

(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 Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as amended May 2, 2008 and the "California Non-Methane Organic Gas Test Procedures," as amended July 30, 2002, which are 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 2005 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," incorporated by reference in section 1962.

(e) Abbreviations.The following abbreviations are used in this section 1961:

"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 "LEV II" light-duty truck with a loaded vehicle weight of 3751 pounds to a gross vehicle weight of 8500 pounds or a "LEV I" light-duty truck

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with a loaded vehicle weight of 3751-5750 pounds.

"LEV" means low-emission vehicle.

"LPG" means liquefied petroleum gas.

"LVW" means loaded vehicle weight.

"MDV" means medium-duty vehicle.

"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.

"TLEV" means transitional 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.

<General Materials (GM) - References, Annotations, or Tables>

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.

HISTORY

1. New section filed 10-28-99; operative 11-27-99 (Register 99, No. 44).

2. Amendmentfiled 4-30-2001; operative 5-30-2001 (Register 2001, No. 18).

3. Amendment of subsections (a)(8)(B) and (d) filed 5-24-2002; operative 6-23-2002 (Register 2002, No. 21).

4. Amendment filed 9-16-2002; operative 10-16-2002 (Register 2002, No. 38).

5. Amendment of third paragraph, subsections (a)(4), (a)(8)(A) and (a)(12)(A), new subsection (a)(15), amendment of subsections (b)(3)(B)-(D), new subsection (b)(3)(E) and amendment of subsections (d) and (e) filed 11-4-2003; operative 12-4-2003 (Register 2003, No. 45).

6. Amendment of subsections (a)(8)(B) and (d) filed 2-25-2004; operative 3-26-2004 (Register 2004, No. 9).

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7. Amendment of subsection (d) filed 7-15-2004; operative 8-14-2004 (Register 2004, No. 29).

8. Amendment of subsection (d) and Notefiled 9-15-2005; operative 1-1-2006 (Register 2005, No. 37).

9. Change without regulatory effect amending incorporated document California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles filed 9-15-2005 pursuant to section 100, title 1, California Code of Regulations (Register 2005, No. 37).

10. Amendment of incorporated document California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and amendment of subsection (d) filed 1-18-2007; operative 2-17-2007 (Register 2007, No. 3).

11. Amendment of subsection (d) and amendment of Note filed 12-5-2007; operative 1-4-2008 (Register 2007, No. 49).

12. Amendment of incorporated document California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and amendment of subsection (d) filed 6-16-2008; operative 6-16-2008 pursuant to Government Code section 11343.4 (Register 2008, No. 25).

13 CCR § **1961, 13** CA ADC § **1961**

13 CA ADC § **1961**
END OF DOCUMENT

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§ 1961. Exhaust Emission Standards and Test Procedures - 2004 through 2019 ~~and Subsequent~~ Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

Introduction. This section 1961 contains the California "LEV II" exhaust emission standards for 2004 through 2019 ~~and subsequent~~ model passenger cars, light-duty trucks and medium-duty vehicles. A manufacturer must demonstrate compliance with the exhaust standards in section 1961(a) applicable to specific test groups, and with the composite phase-in requirements in section 1961(b) applicable to the manufacturer's entire fleet. Section 1961(b) also includes the manufacturer's fleet-wide composite phase-in requirements for the 2001 - 2003 model years.

* * * *

(a) *Exhaust Emission Standards.*

(1) *"LEV II" Exhaust Standards.* The following standards are ~~represent~~ the maximum exhaust emissions for the intermediate and full useful life from new 2004 through 2019 ~~and subsequent~~ model-year "LEV II" LEVs, ULEVs, and SULEVs, 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 NMOG+NOx numerical values for LEV160, LEV395, or LEV630, as applicable, in subsection 1961.2(a)(1) and the corresponding NMOG+NOx numerical values in subsection 1961.2(a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in this subsection (a)(1) and subsection (a)(4); LEV II ULEV vehicles may be certified to the NMOG+NOx numerical values for ULEV125, ULEV340, or ULEV570, as applicable, in subsection 1961.2(a)(1) and the corresponding NMOG+NOx numerical values in subsection 1961.2(a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in this subsection (a)(1) and the corresponding NMOG+NOx numerical values in subsection (a)(4); and LEV II SULEV vehicles may be certified to the NMOG+NOx numerical values for SULEV30, SULEV170, or SULEV230, as applicable, in subsection 1961.2(a)(1) and the corresponding NMOG+NOx numerical values in subsection 1961.2(a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in this subsection (a)(1) and the corresponding NMOG+NOx numerical values in subsection (a)(4).

LEV II Exhaust Mass Emission Standards for New 2004 through 2019 ~~and Subsequent~~ Model LEVs, ULEVs, and SULEVs in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes							
Vehicle Type	*Durability Vehicle Basis (mi)*	*Vehicle Emission Category*	*NMOG (g/mi)*	*Carbon Monoxide (g/mi)*	*Oxides of Nitrogen (g/mi)*	*Formaldehyde (mg/mi)*	*Particulates (g/mi)*
All PCs; LDTs 8500 lbs. GVWR or less Vehicles in this category are tested at their loaded vehicle weight	50,000	LEV	0.075	3.4	0.05	15	n/a
		LEV, Option 1	0.075	3.4	0.07	15	n/a
		ULEV	0.040	1.7	0.05	8	n/a
	120,000	LEV	0.090	4.2	0.07	18	0.01
		LEV, Option 1	0.090	4.2	0.10	18	0.01
		ULEV	0.055	2.1	0.07	11	0.01
		SULEV	0.010	1.0	0.02	4	0.01
	150,000 (Optional)	LEV	0.090	4.2	0.07	18	0.01
		LEV, Option 1	0.090	4.2	0.10	18	0.01
		ULEV	0.055	2.1	0.07	11	0.01
		SULEV	0.010	1.0	0.02	4	0.01
MDVs 8501 - 10,000 lbs. GVWR Vehicles in this category are tested at their adjusted loaded vehicle weight	120,000	LEV	0.195	6.4	0.2	32	0.12
		ULEV	0.143	6.4	0.2	16	0.06
		SULEV	0.100	3.2	0.1	8	0.06
	150,000 (Optional)	LEV	0.195	6.4	0.2	32	0.12
		ULEV	0.143	6.4	0.2	16	0.06
		SULEV	0.100	3.2	0.1	8	0.06
MDVs 10,001-14,000 lbs. GVWR Vehicles in this category are tested at their adjusted loaded vehicle weight	120,000	LEV	0.230	7.3	0.4	40	0.12
		ULEV	0.167	7.3	0.4	21	0.06
		SULEV	0.117	3.7	0.2	10	0.06
	150,000 (Optional)	LEV	0.230	7.3	0.4	40	0.12
		ULEV	0.167	7.3	0.4	21	0.06
		SULEV	0.117	3.7	0.2	10	0.06

* * * *

(3) *LEV II NMOG Standards for Bi-Fuel, Fuel-Flexible and Dual-Fuel Vehicles Operating on Gasoline*. For fuel-flexible, bi-fuel, and dual-fuel PCs, LDTs and MDVs, compliance with the NMOG exhaust mass emission standards shall 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, CO, NOx, and formaldehyde set forth in the table in section 1961(a)(1) when certifying the vehicle for operation on the gaseous or alcohol fuel.

The following standards are ~~represent~~ the maximum NMOG emissions when the vehicle is operating on gasoline. A manufacturer shall not apply a reactivity adjustment factor to the exhaust NMOG mass emission result when operating on gasoline. 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 test procedures incorporated by reference in section 1961(d). Testing at 50°F is not required for fuel-flexible, bi-fuel, and dual-fuel vehicles when operating on gasoline. The applicable CO, NOx, and formaldehyde standards are set forth in section 1961(a)(1).

LEV II NMOG Standards for Bi-Fuel, Fuel-Flexible, and Dual-Fuel Vehicles Operating on Gasoline (g/mi)

Vehicle Type	*Vehicle Emission Category*	*Durability Vehicle Basis*	
		50,000 mi	*120,000 mi*
All PCs; LDTs, 0-8500 lbs. GVWR	LEV	0.125	0.156
	ULEV	0.075	0.090
	SULEV	0.010	0.040
MDVs, 8501-10,000 lbs. GVWR	LEV	n/a	0.230
	ULEV	n/a	0.167
	SULEV	n/a	0.117
MDVs, 10,001-14,000 lbs. GVWR	LEV	n/a	0.280
	ULEV	n/a	0.195
	SULEV	n/a	0.143

(4) *LEV II 50°F Exhaust Emission Standards.* All LEV II light- and medium-duty LEVs, ULEVs, and SULEVs must demonstrate compliance with the following exhaust emission standards for NMOG 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 C of the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001~~ 2009 through 2016 ~~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(d). The NMOG mass emission result shall be multiplied by the applicable reactivity adjustment factor, if any, prior to comparing to the applicable adjusted 50,000 mile certification standards set forth below. A manufacturer may demonstrate compliance with the NMOG 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.1, subparagraph (p) and Section G.3.1.2, respectively, of the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001~~ 2009 through 2016 ~~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(d). Emissions of CO and NOx measured at 50°F shall not exceed the standards set forth in §1961(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. Natural gas and diesel-fueled vehicles are exempt from the 50°F test requirements.

Vehicle Weight Class	*Vehicle Emission Category (g/mi)*					
	LEV		*ULEV*		*SULEV*	
	NMOG	*HCHO*	*NMOG*	*HCHO*	*NMOG*	*HCHO*
PCs; LDTs 0-8500 lbs. GVWR	0.150	0.030	0.080	0.016	0.020	0.008
MDVs 8501-10,000 lbs. GVWR	0.390	0.064	0.286	0.032	0.200	0.016
MDVs 10,001-14,000 lbs. GVWR	0.460	0.080	0.334	0.042	0.234	0.020

(5) *LEV II Cold CO Standard.* The following standards are ~~represent~~ the 50,000 mile cold temperature exhaust carbon monoxide emission levels from new 2001 through 2019 ~~and subsequent~~ model-year LEV II passenger cars, light-duty trucks, and medium-duty vehicles:

2001 THROUGH 2019 ~~AND SUBSEQUENT~~ MODEL-YEAR COLD TEMPERATURE CARBON MONOXIDE EXHAUST EMISSIONS STANDARDS FOR LEV II PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES

(grams per mile)

Vehicle Type	*Carbon Monoxide*
All PCs, LDTs 0-3750 lbs. LVW;	10.0
LDTs, 3751 lbs. LVW - 8500 lbs. GVWR; LEV I and Tier 1 MDVs 8500 lbs. GVWR and less	12.5

These standards are applicable 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 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001~~ 2009 through 2016 ~~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(d). Natural gas, diesel-fueled, and zero-emission vehicles are exempt from these standards.

* * * *

(7) *Supplemental Federal Test Procedure (SFTP) Off-Cycle Emission Standards.* The SFTP exhaust emission levels from new 2004 through 2019 ~~and subsequent~~ model LEV II LEVs, ULEVs, and SULEVs shall not exceed the standards set forth in section 1960.1(r).

(8) *Requirements for Vehicles Certified to the Optional 150,000 Mile Standards.*

* * * *

(B) *Requirement to Generate a Partial ZEV Allowance.* A vehicle that is certified to the 150,000 mile SULEV standards shall 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 2005 through 2008 ~~and~~

~~Subsequent~~ Model Zero-Emission Vehicles, and 2001 through 2008 ~~and Subsequent~~ Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes," incorporated by reference in section 1962, 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.

* * * *

(14) *When a Federally-Certified Vehicle Model is Required in California.*

(A) *General Requirement.* Whenever a manufacturer federally-certifies a 2004 through 2014 ~~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. The criteria for applying this requirement are set forth in Part I. Section H.1 of the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001~~ 2009 through 2016 ~~and Subsequent~~ Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d).

* * * *

(b) *Emission Standards Phase-In Requirements for Manufacturers.*

(1) *Fleet Average NMOG Requirements for Passenger Cars and Light-Duty Trucks.*

(A) The fleet average non-methane organic gas exhaust mass emission values from the passenger cars and light-duty trucks certified to the Tier 1, LEV I, and LEV II standards that are produced and delivered for sale in California each model year from 2001 through 2014 by a manufacturer other than a small volume manufacturer or an independent low volume manufacturer shall not exceed:

FLEET AVERAGE NON-METHANE ORGANIC GAS EXHAUST MASS EMISSION REQUIREMENTS FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES (50,000 mile Durability Vehicle Basis)		
Model Year	*Fleet Average NMOG (grams per mile)*	
	All PCs; LDTs 0-3750 lbs. LVW	*LDTs 3751 lbs. LVW - 8500 lbs. GVW*
2001	0.070	0.098
2002	0.068	0.095
2003	0.062	0.093
2004	0.053	0.085
2005	0.049	0.076
2006	0.046	0.062
2007	0.043	0.055
2008	0.040	0.050
2009	0.038	0.047
2010 through 2014[1] ~~*~~	0.035	0.043

[1] For the 2014 model year only, a manufacturer may comply with the fleet average NMOG+NOx values in subsection 1961.2(b)(1)(A) in lieu of complying with the NMOG fleet average values in this table. 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/MDPV fleet. A manufacturer must calculate its fleet average NMOG+NOx values using the applicable full useful life standards.

(B) *Calculation of Fleet Average NMOG Value.*

1. *Basic Calculation.*

* * * *

c. The applicable emission standards to be used in the above equations are as follows:

Model Year	*Emission Category*	*Emission Standard Value*	
		All PCs; LDTs 0-3750 lbs. LVW	*LDTs 3751-5750 lbs. LVW*
2001 through 2014 ~~and subsequent~~ (§1960.5 "AB 965" vehicles only)	All	Federal Emission Standard to which Vehicle is Certified	Federal Emission Standard to which Vehicle is Certified
2001 - 2003 (§1960.1(f)(2))	Tier 1	0.25	0.32
2001 - 2006 model year vehicles certified to the "LEV I" standards in §1960.1(g)(1) (For TLEVs, 2001 - 2003 model years only)	TLEVs	0.125	0.160
	LEVs	0.075	0.100
	ULEVs	0.040	0.050
Model Year	Emission Category	All PCs; LDTs 0-3750 lbs. LVW	LDTs 3751 lbs. LVW - 8500 lbs. GVW
2004 through 2014 ~~and subsequent~~ model year vehicles certified to the "LEV II" standards in §1961(a)(1)	LEVs	0.075	0.075
	ULEVs	0.040	0.040
	SULEVs	0.01	0.01
2004 through 2014 ~~and subsequent~~ model year vehicles certified to the optional 150,000 mile "LEV II" standards for PCs and LDTs in 1961(a)(1)	LEVs	0.064	0.064
	ULEVs	0.034	0.034
	SULEVs	0.0085	0.0085

* * * *

3. *Federally-Certified Vehicles.* A vehicle certified to the federal standards for a federal exhaust emissions bin in accordance with Section H.1 of the "California 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001~~ 2009 through 2016 ~~and Subsequent~~ Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as incorporated by reference in section 1961(d), shall use the corresponding

intermediate useful life NMOG standard to which the vehicle is deemed certified in the fleet average calculation.

(C) *Requirements for Small Volume Manufacturers.*

1. In 2001 through 2006 model years, a small volume manufacturer shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with section 1961(b)(1)(B). In 2007 through 2014 ~~and subsequent~~ model years, a small volume manufacturer shall not exceed a fleet average NMOG value of 0.075 for PCs and LDTs from 0-3750 lbs. LVW or 0.075 for LDTs from 3751 lbs. LVW - 8500 lbs. GVW calculated in accordance with section 1961(b)(1)(B).

* * * *

(D) *Phase-in Requirements for Independent Low Volume Manufacturers.* In 2001 through 2006 model years, an independent low volume manufacturer shall not exceed a fleet average NMOG value of 0.075 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.100 g/mi for LDTs from 3751-5750 lbs. LVW calculated in accordance with section 1961(b)(1)(B). In 2007 through 2014 ~~and subsequent~~ model years, an independent low volume manufacturer shall not exceed a fleet average NMOG value of 0.060 for PCs and LDTs from 0-3750 lbs. LVW or 0.065 g/mi for LDTs from 3751 lbs. LVW - 8500 lbs. GVW calculated in accordance with section 1961(b)(1)(B).

* * * *

(3) *Medium-Duty Vehicle Phase-In Requirements.*

(A) A manufacturer of MDVs, other than a small volume manufacturer, shall certify an equivalent percentage of its MDV fleet according to the following phase-in schedule:

Model Year	*Vehicles Certified to §1960.1(h)(1), (h)(2), and §1961(a)(1) (%)*		*Vehicles Certified to §1956.8(g) or (h) (%)*		
	LEV	*ULEV*	*Tier 1*	*LEV*	*ULEV*
2001	80	20	100	0	0
2002	70	30	0	100	0
2003	60	40	0	100	0
2004 <u>through 2014</u> ~~+~~	40	60	0	0	100

(B) *Phase-In Requirements for LEV II MDVs.* For the 2004 through 2006 model years, a manufacturer, other than a small volume manufacturer must phase-in at least one test group per model year to the MDV LEV II standards. All 2007 <u>through 2014</u> ~~and subsequent~~ model year MDVs, including those produced by a small volume manufacturer, are subject to the LEV II MDV standards. Beginning in the 2005 model year, all medium-duty engines certified to the optional medium-duty engine standards in title 13, CCR §1956.8(c) or (h), including those produced by a small volume manufacturer, must meet the standards set forth in title 13, CCR §1956.8(c) or (h), as applicable. A manufacturer that elects to certify to the Option 1 or Option 2 federal standards as set forth in 40 CFR §86.005-10(f) is not subject to these phase-in requirements.

(C) *Identifying a Manufacturer's MDV Fleet.* For the 2001 <u>through 2014</u> ~~and subsequent~~ model years, 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 manufacturers' total production of California-certified medium-duty vehicles delivered for sale in California. For the 2005 <u>through 2014</u> ~~and subsequent~~ model years, a manufacturer that elects to certify to the optional medium-duty engine standards in title 13, CCR, §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 §1956.8(c) or (h), all such 2005 <u>through 2014</u> ~~and subsequent~~ model year 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 §1956.8(b) or (d), as applicable.

(c) *Calculation of NMOG Credits/Debits*

(1) *Calculation of NMOG Credits for Passenger Cars and Light-Duty Trucks.* In 2001 through 2014 ~~and subsequent~~ model years, a manufacturer that achieves fleet average NMOG values lower than the fleet average NMOG requirement for the corresponding model year shall receive credits in units of g/mi NMOG determined as:

> [(Fleet Average NMOG Requirement) - (Manufacturer's Fleet Average NMOG Value)] x
> (Total No. of Vehicles Produced and Delivered for Sale in California, Including ZEVs and HEVs).

A manufacturer with 2001 through 2014 ~~and subsequent~~ model year fleet average NMOG values greater than the fleet average requirement for the corresponding model year shall receive debits in units of g/mi NMOG equal to the amount of negative credits determined by the aforementioned equation. For the 2001 through 2014 ~~and subsequent~~ model years, the total g/mi NMOG credits or debits earned for PCs and LDTs 0-3750 lbs. LVW, for LDTs 3751-5750 lbs. LVW and for LDTs 3751 lbs. LVW - 8500 lbs. GVW shall be summed together. The resulting amount shall constitute the g/mi NMOG credits or debits accrued by the manufacturer for the model year.

(2) *Calculation of Vehicle Equivalent NMOG Credits for Medium-Duty Vehicles.*

(A) In 2001 through 2014 ~~and subsequent~~ model years, a manufacturer that produces and delivers for sale in California MDVs in excess of the equivalent requirements for LEVs, ULEVs and/or SULEVs certified to the exhaust emission standards set forth in section 1961(a)(1) or to the exhaust emission standards set forth in Title 13, CCR, Section 1956.8(h) 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:

* * * *

(3) *Procedure for Offsetting Debits.*

(A) A manufacturer shall equalize emission debits by earning g/mi NMOG emission credits or VECs in an amount equal to the g/mi NMOG debits or

VEDs, or by submitting a commensurate amount of g/mi NMOG credits or VECs to the Executive Officer that were earned previously or acquired from another manufacturer. For 2001 through 2003 and for 2007 through 2014 ~~and subsequent~~ model years, manufacturers shall equalize emission debits by the end of the following model year. For 2004 through 2006 model years, a manufacturer shall equalize NMOG debits for PCs and LDTs and LEV II MDVs within three model years and prior to the end of the 2007 model year. 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 the purposes of Health and Safety Code section 43211, the number of passenger cars and light-duty trucks not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi NMOG emission debits for the model year by the g/mi NMOG fleet average requirement for PCs and LDTs 0-3750 lbs. LVW 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.

* * * *

(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 2001 through 2014 Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and ~~for 2001~~ 2009 through 2016 ~~and Subsequent~~ Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," as amended ~~September 27, 2010~~ March 22, 2012, ~~and~~ the "California Non-Methane Organic Gas Test Procedures," as amended ~~July 30, 2002~~ March 22, 2012, which are 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 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," incorporated by reference in section 1962, ~~and~~ the "California Exhaust Emission Standards and Test Procedures for 2009 through 2017 ~~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 1962.1, 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.

* * * *

NOTE: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43101, 43104, ~~and~~ 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.

§ 1961. Exhaust Emission Standards and Test Procedures - 2004 through 2019 Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

Introduction. This section 1961 contains the California "LEV II" exhaust emission standards for 2004 through 2019 model passenger cars, light-duty trucks and medium-duty vehicles. A manufacturer must demonstrate compliance with the exhaust standards in section 1961(a) applicable to specific test groups, and with the composite phase-in requirements in section 1961(b) applicable to the manufacturer's entire fleet. Section 1961(b) also includes the manufacturer's fleet-wide composite phase-in requirements for the 2001 - 2003 model years.

* * * *

(a) *Exhaust Emission Standards.*

(1) *"LEV II" Exhaust Standards.* The following standards are the maximum exhaust emissions for the intermediate and full useful life from new 2004 through 2019 model-year "LEV II" LEVs, ULEVs, and SULEVs, 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 ~~numerical values~~ for LEV160, LEV395, or LEV630, as applicable, in subsection 1961.2(a)(1) and the corresponding NMOG+NOx numerical values in subsection 1961.2(a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in this subsection (a)(1) and subsection (a)(4)~~;~~ and LEV II ULEV vehicles may be certified to the 150,000 mile NMOG+NOx emission standards ~~numerical values~~ for ULEV125, ULEV340, or ULEV570, as applicable, in subsection 1961.2(a)(1) and the corresponding NMOG+NOx numerical values in subsection 1961.2(a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in this subsection (a)(1) and the corresponding NMOG~~+NOx~~ numerical values in subsection (a)(4).~~; and LEV II SULEV vehicles may be certified to the NMOG+NOx numerical values for SULEV30, SULEV170, or SULEV230, as applicable, in subsection 1961.2(a)(1) and the corresponding NMOG+NOx numerical values in subsection 1961.2(a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in this subsection (a)(1) and the corresponding NMOG+NOx numerical values in subsection (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 1961.2(b)(2) may be certified to the 150,000 mile NMOG+NOx emission standards for SULEV30, SULEV170, or SULEV230, as applicable, in subsection 1961.2(a)(1) and the corresponding NMOG+NOx numerical values in subsection

1961.2(a)(4), in lieu of the separate NMOG and NOx exhaust emission standards in this subsection (a)(1) and the corresponding NMOG numerical values in subsection (a)(4). LEV II SULEV vehicles that do not either (1) 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.

* * * *

(b) *Emission Standards Phase-In Requirements for Manufacturers.*

(1) *Fleet Average NMOG Requirements for Passenger Cars and Light-Duty Trucks.*

(A) The fleet average non-methane organic gas exhaust mass emission values from the passenger cars and light-duty trucks certified to the Tier 1, LEV I, and LEV II standards that are produced and delivered for sale in California each model year from 2001 through 2014 by a manufacturer other than a small volume manufacturer or an independent low volume manufacturer shall not exceed:

FLEET AVERAGE NON-METHANE ORGANIC GAS EXHAUST MASS EMISSION REQUIREMENTS FOR LIGHT-DUTY VEHICLE WEIGHT CLASSES (50,000 mile Durability Vehicle Basis)		
Model Year	*Fleet Average NMOG (grams per mile)*	
	All PCs; LDTs 0-3750 lbs. LVW	*LDTs 3751 lbs. LVW - 8500 lbs. GVW*
2001	0.070	0.098
2002	0.068	0.095
2003	0.062	0.093
2004	0.053	0.085
2005	0.049	0.076
2006	0.046	0.062
2007	0.043	0.055
2008	0.040	0.050
2009	0.038	0.047
2010 through 2014[1]	0.035	0.043

[1] For the 2014 model year only, a manufacturer may comply with the fleet average NMOG+NOx values in subsection 1961.2(b)(1)(A) in lieu of complying with the NMOG fleet average values in this table. 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/~~MDPV~~ fleet. A manufacturer must calculate its fleet average NMOG+NOx values using the applicable full useful life standards.

* * * *

(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 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," as amended ~~March 22, 2012~~December 6, 2012, the "California Non-Methane Organic Gas Test Procedures," as amended ~~March 22, 2012~~December 6, 2012, which are 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 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," incorporated by reference in section 1962, 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.

* * * *

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.

Note: The entire text of section 1961.2 set forth below is new language and is shown in "normal type" proposed to be added to the California Code of Regulations.

Adopt new Sections 1961.2, Title 13, California Code of Regulations to read as follows:

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

Introduction. This section 1961.2 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 1961.2.

Pooling Provision.

For each model year, a manufacturer must demonstrate compliance with this section 1961.2 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 1961.2 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 1961.2 means California, the District of Columbia, and all states that have adopted California's criteria pollutant emission standards set forth in this section 1961.2 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 NMOG+NOx numerical values 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 subsections 1961(a)(1) and 1961(a)(4); LEV II ULEV vehicles may be certified to the NMOG+NOx numerical values 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 subsections 1961(a)(1) and 1961(a)(4); and LEV II SULEV vehicles may be certified to the NMOG+NOx numerical values for SULEV30, SULEV170, or SULEV230, as applicable, in 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 subsections 1961(a)(1) and 1961(a)(4). Such vehicles 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

Vehicle Type	*Durability Vehicle Basis (mi)*	*Vehicle Emission Category*[2]	*NMOG + Oxides of Nitrogen (g/mi)*	*Carbon Monoxide (g/mi)*	*Formaldehyde (mg/mi)*	*Particulates*[1] *(g/mi)*
All PCs; LDTs 8500 lbs. GVWR or less; 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 Vehicles in this category are tested at their adjusted loaded vehicle weight	150,000	LEV395	0.395	6.4	6	0.12
		ULEV340	0.340	3.2	6	0.06
		ULEV250	0.250	2.6	6	0.06
		ULEV200	0.200	2.6	6	0.06
		SULEV170	0.170	1.5	6	0.06
		SULEV150	0.150	1.5	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	0.630	7.3	6	0.12
		ULEV570	0.570	3.7	6	0.06
		ULEV400	0.400	3.0	6	0.06
		ULEV270	0.270	3.0	6	0.06
		SULEV230	0.230	1.7	6	0.06
		SULEV200	0.200	1.7	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.

(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 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 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. The cumulative total must be equal to or greater than 490 in the 2021 model year 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. The cumulative total must be equal to or greater than 500 in the 2028 model year 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. The cumulative total must be equal to or greater than 490 in the 2021 model year 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 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 C 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.1, subparagraph (p) 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 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 600 Subpart B), 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. In the case of fuel-flexible vehicles, 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."

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 (g/mi)*	
			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. In the case of fuel-flexible vehicles, 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."

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).	***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.* For test groups certified to LEV II FTP emission standards, SFTP emission values shall be converted to NMOG+NOx and projected out to 120,000 miles or 150,000 miles (depending on LEV II FTP certification) using deterioration factors or aged components. 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. In lieu of deriving a deterioration factor specific to SFTP test cycles, carry-over 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 SFTP 4k standards, that value may be used in the sales-weighted fleet-average without applying an additional deterioration factor.

[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] 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 its sales-weighted fleet-average NMOG+NOx composite emission value as follows.

$$\frac{\left[\sum_{i=1}^{n}\left(number\ of\ vehicles\ in\ the\ test\ group\right)_i \times \left(composite\ value\ of\ bin\right)_i\right]}{\sum_{i=1}^{n}\left(number\ of\ vehicles\ in\ the\ test\ group\right)_i} \qquad \text{[Eq. 2]}$$

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 7 of this table, for carry-over LEV II test groups.

[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 would not be able to meet the proposed 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 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, 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." 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 (mg/mi)*
All PCs; LDTs 0-6,000 lbs GVWR	Loaded vehicle weight	150,000	US06	10
LDTs 6,001-8,500 lbs GVWR; MDPVs	Loaded vehicle weight	150,000	US06	20

[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.

(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, 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."

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.

[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) 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, for each model year, the percentage of MDVs certified to an SFTP emission category set forth in this section 1961.2 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 1961.2 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.

(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, 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." 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]	*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) 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.

(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 the LEV III standards.

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. Test groups certified prior to the 2020 model year may use an in-use compliance standard for NMOG+NOx for the first two model years that they are certified to new standards.

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. Test groups certified prior to the 2021 model year will be allowed an in-use compliance standard for PM for the first five model years that they are certified to the SFTP PM standard.

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 5.0 mg/mi higher than the applicable certification standard.

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.

(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," as adopted March 22, 2012;

(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.

(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. 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 1961(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/MDPV 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.

(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; All MDPVs**
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:

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 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" 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," as applicable, except that 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. This subsection (b)(1)(B)2 shall only apply to off-vehicle charge capable HEVs certified to the LEV III standards set forth in subsection (a)(1).

(C) Phase-In *Requirements for Small Volume Manufacturers.*

1. In the 2015 through 2021 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 2022 through 2024 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 2025 and subsequent model years, a small volume manufacturer shall not exceed a fleet average NMOG+NOx value of 0.070 g/mi for PCs and LDTs from 0-3750 lbs. LVW or 0.070 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 1961.2.

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 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) 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(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
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

(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.* 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.

1. 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.

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
2016-2017	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

2. A manufacturer that produces and delivers for sale in California three medium-duty test groups 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	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

3. A manufacturer that produces and delivers for sale in California two medium-duty test groups 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

4. A manufacturer that produces and delivers for sale in California one medium-duty test groups 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
2016-2018	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 manufacturers' total production of California-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.

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 does not exceed the composite emission standard in effect for that model year. During the 150,000-mile durability phase-in, the sales-weighted fleet-average NMOG+NOx composite emission value shall be calculated using a combination of carry-over values and new-certification values. Carry-over test groups shall convert values to NMOG+NOx and may use the applicable deterioration factor from the FTP cycle in lieu of deriving a deterioration factor specific to SFTP test cycles. Any vehicle certified to SFTP requirements on a 150,000-mile durability basis shall be subject to the applicable emission standards for the full useful life of that vehicle. Compliance with the CO composite emission standard cannot be demonstrated through fleet averaging.

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, for each model year, the percentage of MDVs certified to an SFTP emission category set forth in this section 1961.2 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 1961.2 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.

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 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 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, for LDTs 3751-5750 lbs. LVW and for LDTs 3751 lbs. LVW - 8500 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.

(2) *Calculation of Vehicle-Equivalent NMOG + NOx Credits for Medium-Duty Vehicles Other than MDPVs.*

(A) 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)].

(B) *MDV HEV VEC factor.* The MDV HEV VEC factor is calculated as follows:

For LEV395s:

$$1+\left[\frac{(LEV395\ standard-ULEV340\ standard)\times Zero-emission\ VMT\ Allowance}{LEV395\ standard}\right];$$

For ULEV340s:

$$1+\left[\frac{(ULEV340\ standard-ULEV250\ standard)\times Zero-emission\ VMT\ Allowance}{ULEV340\ standard}\right];$$

For ULEV250s:

$$1+\left[\frac{(ULEV250\ standard-ULEV200\ standard)\times Zero-emission\ VMT\ Allowance}{ULEV250\ standard}\right];$$

For ULEV200s:

$$1+\left[\frac{(ULEV200\ standard-SULEV170\ standard)\times Zero-emission\ VMT\ Allowance}{ULEV3200\ standard}\right];$$

For SULEV170s:

$$1+\left[\frac{(SULEV170\ standard-SULEV150\ standard)\times Zero-emission\ VMT\ Allowance}{SULEV170\ standard}\right];$$

For SULEV150s: $1+\left[\frac{(SULEV150\ standard-ZEV\ standard)\times Zero-emission\ VMT\ Allowance}{SULEV150\ standard}\right];$

For LEV630s:

$$1+\left[\frac{(LEV630\ standard-ULEV570\ standard)\times Zero-emission\ VMT\ Allowance}{LEV630\ standard}\right];$$

For ULEV570s:

$$1+\left[\frac{(ULEV570\ standard-ULEV400\ standard)\times Zero-emission\ VMT\ Allowance}{ULEV570\ standard}\right];$$

For ULEV400s:

$$1+\left[\frac{(ULEV400\ standard-ULEV270\ standard)\times Zero-emission\ VMT\ Allowance}{ULEV400\ standard}\right];$$

For ULEV270s:

$$1+\left[\frac{(ULEV270\ standard-SULEV230\ standard)\times Zero-emission\ VMT\ Allowance}{ULEV270\ standard}\right];$$

For SULEV230s:

$$1+\left[\frac{(SULEV230\ standard-SULEV200\ standard)\times Zero-emission\ VMT\ Allowance}{SULEV230\ standard}\right]$$

For SULEV200s: $1+\left[\frac{(SULEV200\ standard-ZEV\ standard)\times Zero-emission\ VMT\ Allowance}{SULEV200\ standard}\right]$

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.

(C) 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).

(D) Only ZEVs certified as MDVs and not used to meet the ZEV requirement shall be included in the calculation of VECs.

(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 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.

(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).

(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 adopted March 22, 2012, the "California Non-Methane Organic Gas Test Procedures," as amended March 22, 2012, which are 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 1961.2:

"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.

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

Introduction. This section 1961.2 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 1961.2 in 2020 and subsequent model years.

* * * *

(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 ~~numerical values~~ 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 subsections 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 ~~numerical~~

~~values~~ 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 subsections 1961(a)(1) and the corresponding NMOG numerical values in subsection 1961(a)(4).~~; and LEV II SULEV vehicles may be certified to the NMOG+NOx numerical values for SULEV30, SULEV170, or SULEV230, as applicable, in 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 subsections 1961(a)(1) and 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 (1) 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. ~~Such~~ 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						
Vehicle Type	*Durability Vehicle Basis (mi)*	*Vehicle Emission Category*[2]	*NMOG + Oxides of Nitrogen (g/mi)*	*Carbon Monoxide (g/mi)*	*Formaldehyde (mg/mi)*	*Particulates*[1] *(g/mi)*
All PCs; LDTs 8500 lbs. GVWR or less; 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 Vehicles in this category are tested at their adjusted loaded vehicle weight	150,000	LEV395	0.395	6.4	6	0.12
		ULEV340	0.340	~~3.2~~6.4	6	0.06
		ULEV250	0.250	~~2.~~6.4	6	0.06
		ULEV200	0.200	~~2.6~~4.2	6	0.06
		SULEV170	0.170	~~1.5~~4.2	6	0.06
		SULEV150	0.150	~~1.5~~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	0.630	7.3	6	0.12
		ULEV570	0.570	~~3.~~7.3	6	0.06
		ULEV400	0.400	~~3.0~~7.3	6	0.06
		ULEV270	0.270	~~3.0~~4.2	6	0.06
		SULEV230	0.230	~~1.7~~4.2	6	0.06
		SULEV200	0.200	~~1.7~~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.

(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).

* * * *

(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 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, t~~T~~he 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, ~~in the 2021 model year~~ 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, t~~T~~he 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, ~~in the 2028 model year~~ 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, t~~T~~he 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, ~~in the 2021 model year~~ 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.

* * * *

(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).

* * * *

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. In the case of fuel-flexible vehicles, 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."

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 120,000 miles or 150,000 miles (depending on LEV II FTP certification) using deterioration factors or aged components. ~~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.~~ 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. In all cases, 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.

[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 ~~T~~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 its sales-weighted fleet-average NMOG+NOx composite emission value as follows.

$$\frac{\left[\sum_{i=1}^{n}\left(number\ of\ vehicles\ in\ the\ test\ group\right)_i \times \left(composite\ value\ of\ bin\right)_i\right]}{\sum_{i=1}^{n}\left(number\ of\ vehicles\ in\ the\ test\ group\right)_i} \qquad \text{[Eq. 2]}$$

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 ~~7~~ 2 of this table, for carry-over LEV II test groups.

* * * *

(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).

* * * *

(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/~~MDPV~~ fleet. A manufacturer must

calculate its fleet average NMOG+NOx values using the applicable full useful life standards.

* * * *

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.

* * * *

(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.

* * * *

(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.

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. ~~During the 150,000-mile durability phase-in, the sales-weighted fleet-average NMOG+NOx composite emission value shall be calculated using a combination of carry-over values and new-certification values. Carry-over test groups shall convert values to NMOG+NOx and may use the applicable deterioration factor from the FTP cycle in lieu of deriving a deterioration factor specific to SFTP test cycles. Any vehicle certified to SFTP requirements on a 150,000-mile durability basis shall be subject to the applicable emission standards for the full useful life of that vehicle. Compliance with the CO composite emission standard cannot be demonstrated through fleet averaging.~~

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).

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(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.*

* * * *

(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, ~~for LDTs 3751-5750 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.

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(3) *Procedure for Offsetting Debits.*

* * * *

(B) For the 2015 and subsequent model years, t~~T~~he 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.

* * * *

(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 ~~adopted March 22, 2012~~ amended December 6, 2012, the "California Non-Methane Organic Gas Test Procedures," as amended ~~March 22, 2012~~December 6, 2012, which are 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.

* * * *

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.

Final Regulation Order – Part 1

ZERO-EMISSION VEHICLE STANDARDS FOR 2009 THROUGH 2017 MODEL YEAR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES.

Note: Set forth below are the 2012 amendments to the California zero emission vehicle (ZEV) regulation. The text of the amendments is shown in underline to indicate additions and ~~strikeout~~ to indicate deletions, compared to the preexisting regulatory language.

Amend Title 13, Motor Vehicles, Division 3, Air Resources Board, Chapter 1, Motor Vehicle Pollution Control Devices, Article 2, Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1962.1, Zero-Emission Vehicle Standards for 2009 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles to read:

§ 1962.1 Zero-Emission Vehicle Standards for 2009 ~~and Subsequent~~through 2017 Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

(a) ***ZEV Emission Standard.*** The Executive Officer shall certify new 2009 ~~and subsequent~~through 2017 model year passenger cars, light-duty trucks and medium-duty vehicles as ZEVs if the vehicles produce zero exhaust emissions of any criteria pollutant (or precursor pollutant) under any and all possible operational modes and conditions.

(b) ***Percentage ZEV Requirements.***

(1) ***General Percentage ZEV Requirement.***

(A) ***Basic Requirement.*** The minimum percentage ZEV requirement for each manufacturer is listed in the table below as the percentage of the PCs and LDT1s, and LDT2s to the extent required by ~~section~~subdivision (b)(1)(C), produced by the manufacturer and delivered for sale in California that must be ZEVs, subject to the conditions in this ~~section~~subdivision 1962.1(b). The ZEV requirement will be based on the annual NMOG production report for the appropriate model year.

Model Years	*Minimum ZEV Requirement*
2009 through 2011	11 %
2012 through 2014	12 %
2015 through 2017	14 %
~~2018 and subsequent~~	~~16 %~~

(B) ***Calculating the Number of Vehicles to Which the Percentage ZEV Requirement is Applied.*** For purposes of calculating a manufacturer's requirement in subdivision 1962.1(b)(1) for model years 2009 through 2017, a manufacturer may use a

three year average method or same model year method, as described below in sections 1. and 2. A manufacturer may switch methods on an annual basis. This production averaging is used to determine ZEV requirements specified in subdivision 1962.1 (b)(1)(A) only, and has no effect on a manufacturer's size determination, specified in section 1900. In applying the ZEV requirement, a PC, LDT1, or LDT2, that is produced by one manufacturer (e.g., Manufacturer A), but is marketed in California by another manufacturer (e.g., Manufacturer B) under the other manufacturer's (Manufacturer B) nameplate, shall be treated as having been produced by the marketing manufacturer (Manufacturer B).

1. For the 2009 through 2011 model years, a manufacturer's production volume of PCs and LDT1s, and LDT2s as applicable, produced and delivered for sale in California will be based on the three-year average of the manufacturer's volume of PCs and LDT1s, and LDT2s as applicable, produced and delivered for sale in California in the 2003 through 2005 model years. As an alternative to the three-year averaging of prior year production described above, a manufacturer may elect to base its ZEV obligation on the number of PCs and LDT1s, and LDT2s, as applicable, produced by the manufacturer and delivered for sale in California that same model year.

2. For 2012 ~~and subsequent~~through 2017 model years, a manufacturer's production volume for the given model year will be based on the three-year average of the manufacturer's volume of PCs and LDT~~1~~s, ~~and LDT2s, as applicable,~~ produced and delivered for sale in California in the prior fourth, fifth and sixth model year [for example, 2013 model year ZEV requirements will be based on California production volume of PCs and LDT~~1~~s, ~~and LDT2s as applicable,~~ for the 2007 to 2009 model years, and 2014 model year ZEV requirements will be based on California production volume of PCs and LDTs, for the 2008 to 2010 model years]. ~~This production averaging is used to determine ZEV requirements only, and has no effect on a manufacturer's size determination.~~ As an alternative to the three-year averaging of prior year production described above, a manufacturer may elect to base its ZEV obligation on the number of PCs and LDT~~1~~s, ~~and LDT2s, as applicable,~~ produced by the manufacturer and delivered for sale in California that same model year. ~~For 2012 and subsequent model years, a manufacturer may, on an annual basis, select either the three-year average or the same model-year calculation method. In applying the ZEV requirement, a PC, LDT1, or LDT2 as applicable, that is produced by one manufacturer (e.g., Manufacturer A), but is marketed in California by another manufacturer (e.g., Manufacturer B) under the other manufacturer's (Manufacturer B) nameplate, shall be treated as having been produced by the marketing manufacturer (Manufacturer B).~~

(C) ***Phase-in of ZEV Requirements for LDT2s.*** Beginning with the ZEV requirements for the 2009 model year, a manufacturer's LDT2 production shall be included in determining the manufacturer's overall ZEV requirement under ~~section~~subdivision (b)(1)(A) in the increasing percentages shown in the table below.

2009	*2010*	*2011*	*2012+*
51%	68%	85%	100%

(D) ***Exclusion of ZEVs in Determining a Manufacturer's Sales Volume.*** In calculating, for purposes of ~~sections~~subdivisions 1962.1(b)(1)(B) and 1962.1(b)(1)(C), the volume of PCs, LDT1s, and LDT2s that a manufacturer has produced and delivered for sale in California, the manufacturer shall exclude the number of ZEVs produced by the manufacturer, or by a subsidiary in which ~~the~~that manufacturer has a greater than 50 percent ownership interest, and delivered for sale in California.

(2) ***Requirements for Large Volume Manufacturers.***

(A) ***Primary Requirements for Large Volume Manufacturers through Model Year 2011.***

In the 2009 through 2011 model years, a manufacturer must meet at least 22.5 percent of its ZEV requirement with ZEVs or ZEV credits generated by such vehicles, and at least another 22.5 percent with ZEVs, AT PZEVs, or credits generated by such vehicles. The remainder of the manufacturer's ZEV requirement may be met using PZEVs or credits generated by such vehicles.

(B) ***Alternative Requirements for Large Volume Manufacturers through Model Year 2011.***

1. ***Minimum Floor for Production of Type III ZEVs.***

a. ***[Reserved].***

b. ***Requirement for the 2009-2011 Model Years.*** A manufacturer electing the alternative compliance requirements during model years 2009 through 2011 must produce ZEV credits equal to 0.82 percent of the manufacturer's average annual California sales of PCs and LDT1s, and LDT2s, as applicable, over the three year period from model years 2003 through 2005, ~~though~~through production, delivery for sale, and placement in service of ZEVs, other than NEVs and Type 0 ZEVs, using the credit substitution ratios for each ZEV Type compared to a Type III prescribed in the table below, or submit an equivalent number of credits generated by such vehicles.

ZEV Types	Credit Substitution Ratio Compared To A Type III ZEV
Type I	2
Type I.5	1.6
Type II	1.33
Type IV	0.8
Type V	0.57

i. Manufacturers may use credits generated by 1997-2003 model year ZEVs that qualify for an extended service multiplier under ~~section~~subdivision 1962.1(f) for a year during calendar years 2009-2011, provided that 33 years of such a multiplier will equal 4 ZEV credits.

c. ***[Reserved].***

d. ***[Reserved].***

e. ***[Reserved].***

f. ***Exclusion of Additional Credits for Transportation Systems.*** Any additional credits for transportation systems generated in accordance with ~~section~~subdivision 1962.1(g)(5) shall not be counted towards compliance with this ~~section~~subdivision 1962.1(b)(2)(B)1.b.

g. ***Carry-over of Excess Credits.*** ZEV credits generated from excess production in model years 2005 through 2008 may be carried forward and applied to the 2009 through 2011 minimum floor requirement specified in ~~section~~subdivision 1962.1(b)(2)(B)1.b. provided that the value of these carryover credits shall be based on the model year in which the credits are used. Beginning with the 2012 model year, these credits may no longer be used to meet the ZEV requirement specified in subdivision 1962.1(b)(2)(B)1.b.; they may be used as ~~Enhanced AT PZEV~~TZEV, AT PZEV, or PZEV credits. ZEV credits earned in model year 2009~~ and subsequent~~through 2011 would be allowed to be carried forward for two years for application to the ZEV requirement. For example, ZEV credit earned in the 2010 model year would retain full flexibility through the 2012 model year. Starting 2013 model year, ~~at which time~~ that credit could only be used as ~~Enhanced AT PZEV~~TZEV, AT PZEV, or PZEV credits, and could not be used to satisfy the ZEV credit obligation, which may only be satisfied with credit generated from ZEVs.

h. ***Failure to Meet Requirement for Production of ZEVs.*** A manufacturer that, after electing the alternative requirements in ~~section~~subdivision 1962.1(b)(2)(B) for any model year from 2009 through 2011, fails to meet the requirement in ~~section~~subdivision 1962.1(b)(2)(B)1.b. by the end of the 2011 model year, shall be treated as subject to the primary requirements in ~~section~~subdivision 1962.1(b)(2)(A) for the 2009 through 2011 model years.

i. ***Rounding Convention.*** The number of ZEVs needed for a manufacturer under ~~section~~subdivision 1962.1(b)(2)(B)1.b. shall be rounded to the nearest whole number.

2. ***Compliance with Percentage ZEV Requirements.*** In the 2009 through 2011 model years, a manufacturer electing the alternative compliance requirements in a given model year must meet at least 45 percent of its ZEV

requirement for that model year with ZEVs, AT PZEVs, or ~~Enhanced AT PZEVs~~TZEVs, or credits generated from such vehicles. ZEV credits generated for compliance with the alternative requirements during any given model year will be applied to the 45 percent which may be met with ZEVs, AT PZEVs, ~~Enhanced AT PZEVs~~TZEVs, or credits generated from such vehicles, but not PZEVs. The remainder of the manufacturer's ZEV requirement may be met using PZEVs or credits generated from such vehicles.

3. *Sunset of Alternative Requirements after the 2011 Model Year.* The alternative requirements in ~~section~~subdivision 1962.1(b)(2)(B) are not available after the 2011 model year.

(C) *Election of the Primary or Alternative Requirements for Large Volume Manufacturers for the 2009 through 2011 Model Years.* A manufacturer shall be subject to the primary ZEV requirements for the 2009 model year unless it notifies the Executive Officer in writing prior to the start of the 2009 model year that it is electing to be subject to the alternative compliance requirements for that model year. Thereafter, a manufacturer shall be subject to the same compliance option as applied in the previous model year unless it notifies the Executive Officer in writing prior to the start of a new model year that it is electing to switch to the other compliance option for that new model year. However, a manufacturer that has previously elected the primary ZEV requirements for one or more of the 2009 through 2011 model years may prior to the end of the 2011 model year elect the alternative compliance requirements for the 2009 through 2011 model years upon a demonstration that it has complied with all of the applicable requirements for that period in ~~section~~subdivision 1962.1(b)(2)(B)1.b.

(D) *Requirements for Large Volume Manufacturers in Model Years 2012 through 2017.*

1. *2012 through 2014 Requirements.* On an annual basis, a~~A~~ manufacturer must meet the total ZEV obligation with ~~ZEVs or~~ ZEV credits generated by such vehicles, excluding credits generated by NEV~~s~~ and Type 0 ZEV~~s~~ equal to at least 0.79% of its annual sales, using either production volume determination method described in ~~section~~subdivision 1962.1(b)(1)(B). No more than 50% of the total obligation may be met with credits generated from PZEVs. No more than 75% of the total obligation may be met with credits generated from AT PZEVs. No more than 93.4% may be met with ~~Enhanced AT PZEVs~~credits generated from TZEVs, Type 0 ZEVs, and NEVs, as limited in ~~section~~subdivision 1962.1(g)(6). The entire ~~requirement~~obligation may be met solely with credits generated from ZEVs.

2. *2015 through 2017 Requirements.* On an annual basis, a~~A~~ manufacturer must meet its ZEV obligation with ~~ZEVs or~~ ZEV credits generated by such vehicles, excluding credits generated by NEV~~s~~ and Type 0 ZEV~~s~~, equal to at least 3% of its annual sales, using either production volume determination method described in ~~section~~subdivision 1962.1(b)(1)(B). No more than 42.8% of the total obligation may be met with credits generated from PZEVs. No more than 57.1% of the total obligation may be met with credits generated from AT PZEVs. No more than 78.5% may be met

with ~~Enhanced AT PZEVs~~ credits generated from TZEVs, Type 0 ZEVs, and NEVs, as limited in ~~section~~subdivision 1962.1(g)(6). The entire ~~requirement~~obligation may be met solely with credits generated from ZEVs.

3. The following table enumerates a manufacturer's annual percentage obligation for the 2012 though 2017 model years if the manufacturer produces the minimum number of credits required to meet its ZEV obligation and the maximum percentage for the ~~Enhanced AT PZEV~~TZEV, AT PZEV, and PZEV categories.

Model Years	*Total ZEV Percent Requirement*	*Minimum ZEV floor*	*~~Enhanced AT PZEVs~~ TZEVs, Type 0s, or NEVs*	*AT PZEVs*	*PZEVs*
2012 – 2014	12	0.79	2.21	3.0	6.0
2015 – 2017	14	3.0	3.0	2.0	6.0

4. ***Use of Additional Credits for Transportation Systems.*** Any additional credits for transportation systems generated from ZEVs in accordance with ~~section~~subdivision 1962.1(g)(5) may be used to meet up to one tenth of the portion of the ZEV obligation which must be met with ZEVs, specified in ~~section~~subdivision 1962.1(b)(2)(D).

(E) ***[Reserved]. ~~Requirements for Large Volume Manufacturers in Model Year 2018 and Subsequent.~~***

~~In the 2018 and subsequent model years, a manufacturer must meet a ZEV total percent requirement of 16 percent. The maximum portion of a manufacturer's percentage ZEV requirement that may be satisfied by PZEVs that are not Enhanced AT PZEVs or AT PZEVs, or credits generated by such vehicles, is limited to 6 percent of the manufacturer's applicable California PC, LDT1, and LDT2 production volume; Enhanced AT PZEVs and AT PZEVs or credits generated by such vehicles may be used either alone or in combination, to meet up to one-half of the manufacturer's remaining ZEV requirement.~~

(3) ***Requirements for Intermediate Volume Manufacturers.*** ~~In~~ For 2009 ~~and~~ through 2017~~subsequent~~ model years, an intermediate volume manufacturer may meet its ZEV requirement with up to 100 percent PZEVs or credits generated by such vehicles. For 2015 through 2017 model years, the overall credit percentage requirement for an intermediate volume manufacturer will be 12%.

(4) ***Requirements for Small Volume Manufacturers and Independent Low Volume Manufacturers.*** A small volume manufacturer or an independent low volume manufacturer is not required to meet the percentage ZEV requirements. However, a small volume manufacturer or an independent low volume manufacturer may earn and

market credits for the ZEVs, TZEVs, AT PZEVs, or PZEVs it produces and delivers for sale in California.

(5) ~~***Counting ZEVs and PZEVs in Fleet Average NMOG Calculations.*** For the purposes of calculating a manufacturer's fleet average NMOG value and NMOG credits under sections 1961(b) and (c), a vehicle certified as a ZEV is counted as one ZEV, and a PZEV is counted as one SULEV certified to the 150,000 mile standards regardless of any ZEV or PZEV multipliers.~~ ***[Reserved].***

(6) ***[Reserved].***

(7) ***Changes in Small Volume, Independent Low Volume, and Intermediate Volume Manufacturer Status.***

(A) ***Increases in California Production Volume.*** In 2009 ~~and subsequent~~ through 2017 model years, if a small volume manufacturer's average California production volume exceeds 4,500 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, or if an independent low volume manufacturer's average California production volume exceeds 10,000 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, the manufacturer shall no longer be treated as a small volume, or independent low volume manufacturer, as applicable, and shall comply with the ZEV requirements for intermediate volume manufacturers, as applicable, beginning with the sixth model year after the last of the three consecutive model years.

If an intermediate volume manufacturer's average California production volume exceeds 60,000 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years (i.e., total production volume exceeds 180,000 vehicles in a three-year period), the manufacturer shall no longer be treated as an intermediate volume manufacturer and shall, beginning with the sixth model year after the last of the three consecutive model-years, or in model year 2018 (whichever occurs first), comply with all ZEV requirements for LVMs.

~~Requirements will begin in the fourth model year rather than the sixth model year when a manufacturer ceases to be a small or intermediate volume manufacturer in 2003 or subsequent years due to the aggregation requirements in majority ownership situations, except that if the majority ownership in the manufacturer was acquired prior to the 2001 model year, the manufacturer must comply with the stepped-up ZEV requirements starting in the 2010 model year.~~ Requirements will begin in the sixth model year, or in model year 2018 (whichever occurs first) when a manufacturer ceases to be an intermediate volume manufacturer in 2003 through 2017 due to the aggregation requirements in majority ownership situation.

(B) ***Decreases in California Production Volume.*** If a manufacturer's average California production volume falls below 4,500, 10,000, or 60,000 units of new PCs, LDTs, and MDVs, ~~as applicable,~~ based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, the manufacturer shall be treated as a small volume, independent low volume, or intermediate volume manufacturer, as applicable, and shall be subject to the requirements for a small volume, independent low volume, or intermediate volume manufacturer beginning with the next model year.

(C) ***Calculating California Production Volume in Change of Ownership Situations.*** Where a manufacturer experiences a change in ownership in a particular model year, the change will affect application of the aggregation requirements on the manufacturer starting with the next model year. When a manufacturer is simultaneously producing two model years of vehicles at the time of a change of ownership, the basis of determining next model year must be the earlier model year. The manufacturer's small, independent low, or intermediate volume manufacturer status for the next model year shall be based on the average California production volume in the three previous consecutive model years of those manufacturers whose production volumes must be aggregated for that next model year. For example, where a change of ownership during the 2010 calendar year occurs and the manufacturer is producing both 2010 and 2011 model year vehicles resulting ~~results~~ in a requirement that the production volume of Manufacturer A be aggregated with the production volume of Manufacturer B, Manufacturer A's status for the 2011 model year will be based on the production volumes of Manufacturers A and B in the 2008-2010 model years. Where the production volume of Manufacturer A must be aggregated with the production volumes of Manufacturers B and C for the 2010 model year, and during that model year a change in ownership eliminates the requirement that Manufacturer B's production volume be aggregated with Manufacturer A's, Manufacturer A's status for the 2011 model year will be based on the production volumes of Manufacturers A and C in the 2008-2010 model years. In either case, the lead time provisions in ~~section~~subdivisions 1962.1(b)(7)(A) and (B) will apply.

(c) ***Partial ZEV Allowance Vehicles (PZEVs).***

(1) ***Introduction.*** This ~~section~~subdivision 1962.1(c) sets forth the criteria for identifying vehicles delivered for sale in California as PZEVs. The PZEV is a vehicle that cannot be certified as a ZEV but qualifies for a PZEV allowance of at least 0.2.

(2) ***Baseline PZEV Allowance.*** In order for a vehicle to be eligible to receive a PZEV allowance, the manufacturer must demonstrate compliance with all of the following requirements. A qualifying vehicle will receive a baseline PZEV allowance of 0.2.

(A) ***SULEV Standards.*** For 2009 through 2013 model years, ~~C~~certify the vehicle to the 150,000-mile SULEV exhaust emission standards for PCs and LDTs

in ~~section~~subdivision 1961(a)(1). Bi-fuel, fuel-flexible and dual-fuel vehicles must certify to the applicable 150,000-mile SULEV exhaust emission standards when operating on both fuels. For 2014 through 2017 model years, certify the vehicle to the 150,000-mile SULEV 20 or 30 exhaust emission standards for PCs and LDTs in subdivision 1961.2(a)(1) , or to the 150,000-mile SULEV exhaust emission standards for PCs and LDTs in subdivision 1961(a)(1). Bi-fuel, fuel flexible and dual-fuel vehicles must certify to the applicable 150,000-mile SULEV exhaust emission standards when operating on both fuels;

(B) ***Evaporative Emissions.*** For 2009 through 2013 model years, ~~C~~certify the vehicle to the evaporative emission standards in ~~section~~subdivision 1976(b)(1)(E) (zero-fuel evaporative emissions standards). For 2014 through 2017 model years, certify the vehicle to the evaporative emission standards in subdivision 1976(b)(1)(G) or subdivision 1976(b)(1)(E);

(C) ***OBD.*** Certify that the vehicle will meet the applicable on-board diagnostic requirements in sections 1968.1 or 1968.2, as applicable, for 150,000 miles; and

(D) ***Extended Warranty***. Extend the performance and defects warranty period set forth in ~~section~~subdivision 2037(b)(2) and 2038(b)(2) 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 used for traction power (such as a battery, ultracapacitor, or other electric storage device).

(3) ***Zero-Emission VMT PZEV Allowance.***

(A) ***Calculation of Zero--Emission VMT Allowance.*** A vehicle that meets the requirements of ~~section~~subdivision 1962.1(c)(2) and has zero-emission vehicle miles traveled ("VMT") capability will generate an additional zero-emission VMT PZEV allowance calculated as follows:

Range	*Zero-emission VMT Allowance*
$EAER_u$ < 10 miles	0.0
$EAER_u$ ≥10 ~~miles~~ to 40 miles ~~and~~ ~~R_{cda} = 10 miles to 40 miles~~	$EAER_u \times (1 - UF_{Rcda})/11.028$
~~R_{cda}~~ $EAER_u$ > 40 miles	~~$EAER_{u40}$/ 29.63~~ $(EAER_{u40}) \times [1 - (UF_{40}*R_{cda}/EAER_u)]/ 11.028$ Where, UF_{40}= utility factor at 40 miles $EAER_{u40}$= 40 miles

A vehicle cannot generate more than 1.39 zero-emission VMT PZEV allowances.

The urban equivalent all-electric range ($EAER_u$) and urban charge ~~depleting~~ depletion ~~actual~~ range actual ~~(urban cycle)~~ (R_{cda}) shall be determined in accordance with section ~~F.11~~G.5.4 and ~~F.5.5~~G.11.9, respectively, of the "California Exhaust Emission Standards and Test Procedures for 2009 ~~and Subsequent~~through 2017 Model Zero-Emission Vehicles, and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium Duty Vehicle Classes," adopted December 17, 2008, and last amended March 22, 2012, incorporated by reference in section 1962.1(h). The utility factor (UF) based on the ~~charge depleting actual range (urban cycle) (R_{cda})~~ shall be determined according to Section 4.5.2 Equation 6 and the "Fleet UF" Utility Factor Equation Coefficients in Section 4.5.2, Table 3 of SAE J2841 March 2009, which is hereby incorporated by reference.

(B) ***Alternative Procedures.*** As an alternative to determining the zero-emission VMT allowance in accordance with the preceding section 1962.1(c)(3)(A), a manufacturer may submit for Executive Officer approval an alternative procedure for determining the zero-emission VMT potential of the vehicle as a percent of total VMT, along with an engineering evaluation that adequately substantiates the zero-emission VMT determination. For example, an alternative procedure may provide that a vehicle with zero-emissions of one regulated pollutant (e.g., NOx) and not another (e.g., NMOG) will qualify for a zero-emission VMT allowance of 1.5.

~~**(C)** ***[Reserved].***~~

(4) ***PZEV Allowance for Advanced ZEV Componentry.*** A vehicle that meets the requirements of ~~section~~subdivision 1962.1(c)(2) may qualify for an advanced componentry PZEV allowance as provided in this section 1962.1(c)(4).

(A) ***Use of High Pressure Gaseous Fuel or Hydrogen Storage System.*** A vehicle equipped with a high pressure gaseous fuel storage system capable of refueling at 3600 pounds per square inch or more and operating exclusively on this gaseous fuel shall qualify for an advanced componentry PZEV allowance of 0.2. A vehicle capable of operating exclusively on hydrogen stored in a high pressure system capable of refueling at 5000 pounds per square inch or more, stored in nongaseous form, or at cryogenic temperatures, shall instead qualify for an advanced componentry PZEV allowance of 0.3.

(B) ***Use of a Qualifying HEV Electric Drive System.***

1. ***Classification of HEVs.*** HEVs qualifying for additional advanced componentry PZEV allowance or allowances that may be used in the AT PZEV category are classified in one of ~~five~~four types of HEVs based on the criteria in the following table.

Characteristics	~~*Type C*~~	*Type D*	*Type E*	*Type F*	*Type G*
Electric Drive System Peak Power Output	~~≥ 10 kW~~	≥ 10 kW	≥ 50 kW	Zero-Emission VMT allowance; ≥ 10 mile all-electric ~~range (~~UDDS ~~drive cycle)~~range	Zero-Emission VMT allowance; ≥ 10 mile all-electric ~~range (~~US06 ~~drive cycle)~~ range
Traction Drive System Voltage	~~< 60 Volts~~	≥ 60 Volts	≥ 60 volts	≥ 60 volts	≥ 60 volts
Traction Drive Boost	~~Yes~~	Yes	Yes	Yes	Yes
Regenerative Braking	~~Yes~~	Yes	Yes	Yes	Yes
Idle Start/Stop	~~Yes~~	Yes	Yes	Yes	Yes

2. ***[Reserved]***

3. ***[Reserved]***

4. ***[Reserved]~~Type C HEVs.~~*** ~~A PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type C HEV, and that is equipped with an advanced traction energy storage system – such as lithium ion batteries, nickel metal-hydride batteries,~~

~~ultracapacitors, or other similar systems – with a design lifetime of at least 10 years, qualifies for an additional advanced componentry allowance of 0.2 in the 2009 through 2011 model years, 0.15 in the 2012 through 2014 model years, and 0.1 in the 2015 and subsequent model years.~~

5. *Type D HEVs.* A PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type D HEV qualifies for an additional advanced componentry allowance of 0.4 in the 2009 through 2011 model years, 0.35 in the 2012 through 2014 model years, and 0.25 in the 2015 ~~and subsequent model years~~through 2017 model years.

6. *Type E HEVs.* A PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type E HEV qualifies for an additional advanced componentry allowance of 0.5 in the 2009 through 2011 model years, 0.45 in the 2012 through 2014 model years, and 0.35 in the 2015 ~~and subsequent~~through 2017 model years.

7. *Type F HEVs.* A PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type F HEV, including achieving 10 miles or more of all-electric UDDS range, qualifies for an additional advanced componentry allowance of 0.72 in the 2009 through 2011 model years, 0.67 in the 2012 through 2014 model years, and 0.57 in the 2015 ~~and subsequent~~through 2017 model years.

8. *Type G HEVs.* A PZEV that the manufacturer demonstrates to the reasonable satisfaction of the Executive Officer meets all of the criteria for a Type G HEV, including achieving 10 miles or more of all-electric US06 range, qualifies for an additional advanced componentry allowance of 0.95 in the 2009 through 2011 model years, 0.9 in the 2012 through 2014 model years, and 0.8 in the 2015 ~~and subsequent~~through 2017 model years.

9. *Severability.* In the event that all or part of ~~section~~subdivision 1962.1(c)(4)(B)1. - 8. is found invalid, the remainder of section 1962.1~~, including the remainder of section 1962.1(c)(4)(B)1.- 8. if any,~~ remains in full force and effect.

(5) *PZEV Allowance for Low Fuel-Cycle Emissions.* A vehicle that makes exclusive use of fuel(s) with very low fuel-cycle emissions shall receive a PZEV allowance of 0.3. In order to receive the PZEV low fuel-cycle emissions allowance, a manufacturer must demonstrate to the Executive Officer, using peer-reviewed studies or other relevant information, that NMOG emissions associated with the fuel(s) used by the vehicle (on a grams/mile basis) are lower than or equal to 0.01 grams/mile. Fuel-cycle emissions must be calculated based on near-term production methods and infrastructure assumptions, and the uncertainty in the results must be quantified.

(6) *Calculation of PZEV Allowance.*

(A) ***Calculation of Combined PZEV Allowance for a Vehicle.*** The combined PZEV allowance for a qualifying vehicle in a particular model year is the sum of the PZEV allowances listed in this ~~section~~subdivision 1962.1(c)(6), multiplied by any PZEV introduction phase-in multiplier listed in ~~section~~subdivision 1962.1(c)(7), subject to the caps in ~~section~~subdivision 1962.1(c)(6)(B).

1. ***Baseline PZEV Allowance.*** The baseline PZEV allowance of 0.2 for vehicles meeting the criteria in ~~section~~subdivision 1962.1(c)(2);

2. ***Zero-Emission VMT PZEV Allowance.*** The zero-emission VMT PZEV allowance, if any, determined in accordance with ~~section~~subdivision 1962.1(c)(3);

3. ***Advanced Componentry PZEV Allowance.*** The advanced ZEV componentry PZEV allowance, if any, determined in accordance with ~~section~~subdivision 1962.1(c)(4); and

4. ***Fuel-Cycle Emissions PZEV Allowance.*** The fuel-cycle emissions PZEV allowance, if any, determined in accordance with ~~section~~subdivision 1962.1(c)(5).

(B) ***Caps on the Value of an AT PZEV Allowance.***

1. ***Cap for 2009 ~~and Subsequent~~through 2017 Model Year Vehicles.*** The maximum value an AT PZEV may earn before phase-in multipliers, including the baseline PZEV allowance, is 3.0.

2. ***[Reserved].***

(7) ***PZEV Multipliers.***

(A) ***[Reserved].***

(B) ***Introduction Phase-In Multiplier for PZEVs That Earn a Zero-Emission VMT Allowance.*** Each 2009 through 2011 model year PZEV that earns a zero-emission VMT allowance under section 1962.1(c)(3) and is sold to a California motorist or is leased for three or more years to a California motorist who is given the option to purchase or re-lease the vehicle for two years or more at the end of the first lease term, qualifies for a phase-in multiplier of 1.25. This subdivision 1962.1 (c)(7)(B) multiplier will no longer be available after model year 2011.

(d) ***Qualification for ZEV Multipliers and Credits.***

(1) ***[Reserved].***

(2) ***[Reserved].***

(3) ***[Reserved].***

(4) ***[Reserved].***

(5) ***~~ZEV~~ Credits for 2009 ~~and Subsequent~~through 2017 Model Years ZEVs.***

(A) ***ZEV Tiers for Credit Calculations.*** ~~ZEV c~~Credits from a particular ZEV are based on the assignment of a given ZEV into one of the following eight ZEV tiers:

ZEV Tier	*UDDS ZEV Range (miles)*	*Fast Refueling Capability*
NEV	No minimum	N/A
Type 0	< 50	N/A
Type I	≥ 50, <75	N/A
Type I.5	≥ 75, <100	N/A
Type II	≥ 100	N/A
Type III	≥ 100	Must be capable of replacing 95 miles (UDDS ZEV range) in ≤ 10 minutes per section 1962.1(d)(5)(B)
	≥ 200	N/A
Type IV	≥ 200	Must be capable of replacing 190 miles (UDDS ZEV range) in ≤ 15 minutes per section 1962.1(d)(5)(B)
Type V	≥ 300	Must be capable of replacing 285 miles (UDDS ZEV range) in ≤ 15 minutes per section 1962.1(d)(5)(B)

Type I.5x and Type IIx vehicles are defined in subdivision 1962.1(d)(5)(G) and (i)(10).

(B) ***Fast Refueling.*** The "fast refueling capability" requirement for a 2009 ~~and subsequent~~through 2017 model year Type III, IV, or V ZEV in ~~section~~subdivision 1962(d)(5)(A) will be considered met if the Type III ZEV has the capability to accumulate at least 95 miles of UDDS range in 10 minutes or less and the Type IV or V ZEV has the capability to accumulate at least 190 or 285 miles, respectively, in 15 minutes or less. For ZEVs that utilize more than one ZEV fuel, such as plug-in fuel cell vehicles, the Executive Officer may choose to waive these

~~section~~subdivision 1962.1(d)(5)(B) fast refueling requirements and base the amount of credit earned on UDDS ZEV range, as specified in ~~section~~subdivision 1962.1(d)(5)(A).

(C) *~~ZEV~~ Credits for 2009 ~~and Subsequent~~through 2017 Model Year ZEVs.* A 2009 ~~and subsequent~~through 2017 model-year ZEV, including a Type I.5x and Type IIx, other than a NEV or Type 0, earns 1 ZEV credit when it is produced and delivered for sale in California. A 2009 ~~and subsequent~~through 2017 model-year ZEV earns additional credits based on the earliest year in which the ZEV is placed in service in California (not earlier than the ZEV's model year). The vehicle must be delivered for sale and placed in service in a Section 177 state or in California in order to earn the total credit amount. The total credit amount will be earned in the state (i.e. California or a Section 177 state) in which the vehicle was delivered for sale. The following table identifies the total credits that a ZEV in each of the eight ZEV tiers will earn, including the credit not contingent on placement in service, if it is placed in service in the specified calendar year or by June 30 after the end of the specified calendar year. A vehicle is not eligible to receive credits if it is placed in service after December 31, five calendar years after the model year. For example, if a vehicle is produced in 2012, but does not get placed until January 1, 2018, the vehicle would no longer be eligible for ZEV credits.

Total Credit Earned by ZEV Type and Model Year for Production and Delivery for Sale and for Placement		
Tier	*Calendar Year in Which ZEV is Placed in Service*	
	2009-2017~~1~~	2012 - 2017~~2018+~~
NEV	0.30	0.30
Type 0	1	1
Type I	2	2
Type I.5	2.5	2.5
Type I.5x	n/a	2.5
Type II	3	3
Type IIx	n/a	3
Type III	4	~~3~~4
Type IV	5	~~3~~5
Type V	7	~~3~~2012-2014: 7 2015-2017: 9

(D) ***Multiplier for Certain ZEVs.*** 2009 through 2011 model-year ZEVs, excluding NEVs or Type 0 ZEVs, shall qualify for a multiplier of 1.25 if it is either sold to a motorist or is leased for three or more years to a motorist who is given the option to purchase or re-lease the vehicle for two years or more at the end of the first lease term. This subdivision 1962.1 (d)(5)(D) multiplier will no longer be available after model year 2011.

(E) ***Counting Specified ZEVs Placed in a Section 177 State and in California.***

1. Provisions for 2009 Model Year.

a. Large volume manufacturers and intermediate volume manufacturers with credits earned from ZEVs, excluding NEVs and Type 0 ZEVs, that are either certified to the California ZEV standards or approved as part of an advanced technology demonstration program and are placed in service in a section 177 state, may be counted towards compliance with the California percentage ZEV requirements in ~~section~~subdivision 1962.1(b), including the requirements in

~~section~~subdivision 1962.1(b)(2)(B), as if they were delivered for sale and placed in service in California.

b. Large volume manufacturers and intermediate volume manufacturers with credits earned from ZEVs, excluding NEVs and Type 0 ZEVs, that are certified to the California ZEV standards or approved as part of an advanced technology demonstration program and are placed in service in California may be counted towards the percentage ZEV requirements of ~~any~~all section 177 states, including requirements based on ~~section~~subdivision 1962.1(b)(2)(B).

2. *Provisions for 2010 ~~and Subsequent~~through 2017 Model Years.* Large volume manufacturers and intermediate volume manufacturers with credits earned from ~~Specified model year~~ ZEVs, including Type I.5x and Type IIx vehicles, and excluding NEVs and Type 0 ZEVs, that are either certified to the California ZEV standards applicable for the ZEV's model year or approved as part of an advanced technology demonstration program and are placed in service in California or in a section 177 state may be counted towards compliance in California and in all section 177 states, with the percentage ZEV requirements in ~~section~~subdivision 1962.1(b), provided that the credits are multiplied by the ratio of ~~an LVM's~~manufacturer's applicable production volume for a model year, as specified in ~~section~~subdivision 1962.1(b)(1)(B), in the state receiving credit to the ~~LVM's~~manufacturer's applicable production volume (hereafter, "proportional value"), as specified in section 1962.1(b)(1)(B), for the same model year in California. Credits generated in a section 177 state will be earned at the proportional value in the section 177 state, and earned in California at the full value specified in ~~section~~subdivision 1962.1(d)(5)(C). However, credits generated by 2010 and 2011 model-year vehicles produced, delivered for sale, and placed in service or as part of an advanced technology demonstration program in California to meet any section 177 state's requirements that implement ~~section~~subdivision 1962.1(b)(2)(B) are exempt from proportional value, with the number of credits exempted from proportional value allowed being limited to the number of credits needed to satisfy a manufacturer's section 177 state's requirements that implement ~~section~~subdivision 1962.1(b)(2)(B)1.b. The table below specifies the qualifying model years for each ZEV type that may be counted towards compliance in all section 177 states.

Vehicle Type	***Model Years:***
Type I, I.5, or II ZEV	2009 – ~~2014~~2017
Type III, IV, or V ZEV	2009 – 2017
Type I.5x or Type IIx	2012 – 2017

3. *Optional Section 177 State Compliance Path.* Large volume manufacturers and intermediate volume manufacturers that choose to elect the optional section 177 state compliance path must notify the Executive Officer and each section 177 state in writing no later than September 1, 2014.

a. ***Additional 2016 and 2017 Model Year ZEV Requirements.*** Large volume manufacturers and intermediate volume manufacturers that elect the optional section 177 state compliance path must generate additional 2012 through 2017 model year ZEV credits, including no more than 50% Type 1.5x and Type IIx vehicle credits and excluding all NEV and Type 0 ZEV credits, in each section 177 state equal to the following percentages of their sales volume determined under subdivision 1962.1(b)(1)(B):

Model Years	Additional Section 177 State ZEV Requirements
2016	0.75%
2017	1.50%

Subdivision 1962.1(d)(5)(E)2. shall not apply to any ZEV credits used to meet a manufacturer's additional 2016 and 2017 model year ZEV requirements under this subdivision 1962.1(d)(5)(E)3.a. ZEVs produced to meet a manufacturer's additional 2016 and 2017 model year ZEV requirements under this subdivision 1962.1(d)(5)(E)3.a. must be placed in service in the section 177 states no later than June 30, 2018.

i. **Trading and Transferring ZEV Credits within the West Region Pool and East Region Pool.** Manufacturers may trade or transfer specified model year ZEV credits, used to meet the same model year requirements in subdivision 1962.1(d)(5)(E)3.c, within the West Region pool, and will incur no premium on their credit values. For example, for a manufacturer to make up a 2016 model year shortfall of 100 credits in State X, the manufacturer may transfer 100 (2016 model year) ZEV credits from State Y, within the West Region pool. Manufacturers may trade or transfer specific model year ZEV credits, used to meet the same model year requirements in subdivision 1962.1(d)(5)(E)3.c., within the East Region pool, and will incur no premium on their credit values. For example, for a manufacturer to make up a 2016 model year shortfall of 100 credits in State W, the manufacturer may transfer 100 (2016 model year) ZEV credits from State Z, within the East Region pool.

ii. **Trading and Transferring ZEV Credits between the West Region Pool and East Region Pool.** Manufacturers may trade or transfer specified model year ZEV credits used to meet the same model year requirements in subdivision 1962.1(d)(5)(E)3.c. between the West Region pool and the East Region pool; however, any credits traded or transferred will incur a premium of 30% of their value. For example, in order for a manufacturer to make up a 2016 model year shortfall of 100 credits in the West Region Pool,

the manufacturer may transfer 130 (2016 model year) ZEV credits from the East Region Pool. No credits may be traded or transferred to the East Region pool or West Region pool from a manufacturer's California ZEV bank, or from the East Region pool or West Region pool to a manufacturer's California ZEV bank.

b. *Reduced TZEV Percentages.* Large volume manufacturers and intermediate volume manufacturers that elect the optional section 177 state compliance path and that fully comply with the additional 2016 and 2017 model year ZEV requirements in this subdivision 1962.1(d)(5)(E)3.a. are allowed to meet TZEV percentages reduced from the allowed TZEV percentages in subdivision 1962.1(b)(2)(D)2. and 3. in 2015 through 2017 model year in each section 177 state as enumerated below:

Model Year	2015	2016	2017
Existing TZEV Percentage	3.00%	3.00%	3.00%
Section 177 State Adjustment for Optional Compliance Path for TZEVs	75.00%	80.00%	85.00%
New Section 177 State Optional Compliance Path TZEV Percentage	2.25%	2.40%	2.55%

Manufacturers may meet the reduced TZEV percentages above with credits from ZEVs or credits from TZEVs. These reduced TZEV percentages also reduce the total ZEV percent requirement, as illustrated in subdivision 1962.1(d)(5)(E)3.c.

i. Trading and Transferring TZEV Credits within the West Region Pool and the East Region Pool. Starting in model year 2015, Manufacturers may trade or transfer specified TZEV credits used to meet the same model year subdivision 1962.1(d)(5)(E)3.c. requirements within the West Region pool, and will incur no premium on their credit values. For example, for a manufacturer to make up a 2016 shortfall of 100 credits in State X, the manufacturer may transfer 100 (2016 model year) TZEV credits from State Y, within the West Region pool. Manufacturers may trade or transfer TZEV credits to meet the same model year subdivision 1962.1(d)(5)(E)3.c. within the East Region pool, and will incur no premium on their credit values. For example, for a manufacturer to make up a 2016 model year shortfall of 100 credits in State W, the manufacturer may transfer 100 (2016 model year) TZEV credits from State Z, within the East Region pool.

ii. Trading and Transferring TZEV Credits between the West Region Pool and the East Region Pool. Manufacturers may trade or transfer specified TZEV credits used to meet the

same model year percentages in subdivision 1962.1(d)(5)(E)3.c. between the West Region pool and the East Region pool; however, any credits traded or transferred will incur a premium of 30% of their value. For example, in order for a manufacturer to make up a 2016 model year shortfall of 100 credits in the West Region Pool, the manufacturer may transfer 130 (2016 model year) TZEV credits from the East Region Pool. No credits may be traded or transferred to the East Region pool or West Region pool from a manufacturer's California ZEV bank, or from the East Region pool or West Region pool to a manufacturer's California ZEV bank.

c. *Total Requirement Percentages.* Requirements for the minimum ZEV floor, and allowed percentages for AT PZEVs and PZEVs in subdivision 1962.1(b) remain in effect for large and intermediate volume manufacturers choosing the optional section 177 state compliance path in each section 177 state. However, the optional section 177 compliance path requires manufacturers to meet additional ZEV requirements and allows manufacturers to meet reduced TZEV percentages as described above in subdivision 1962.1(d)(5)(E)3.a. and b. The table below enumerates the total annual percentage obligation in each section 177 state for the 2015 through 2017 model years if the manufacturer elects the optional section 177 state compliance path and produces the minimum number of credits required to meet its minimum ZEV floor and the maximum percentage allowed to be met with credits from TZEVs, AT PZEVs and PZEVs.

Years	Total ZEV Percent Requirement for Optional Compliance Path	Minimum ZEV Floor for Optional Compliance Path	TZEVs for Optional Compliance Path	AT PZEVs (no change)	PZEVs (no change)
2015	13.25%	3.00%	2.25%	2.00%	6.00%
2016	14.15%	3.75%	2.40%	2.00%	6.00%
2017	15.05%	4.50%	2.55%	2.00%	6.00%

d. *Reporting Requirements.* On an annual basis, by May 1st of the calendar year following the close of a model year, each manufacturer that elects the optional section 177 state compliance path shall submit, in writing, to the Executive Officer and each section 177 state a report, including an itemized list, that demonstrates the manufacturer has met the requirements of this subdivision 1962.1(d)(5)(E)3. in each section 177 state as well as in the East Region pool and in the West Region pool. The itemized list shall include the following:

i. The manufacturer's total applicable volume of PCs and LDTs delivered for sale in each section 177 state within the pool, as determined under subdivision 1962.1(b)(1)(B).

ii. Make, model, vehicle identification number, credit earned, and section 177 state where delivery for sale and placement in service for ZEV occurred to meet the manufacturer's additional ZEV obligation under subdivision 1962.1(d)(5)(E)3.a.

iii. Make, model, vehicle identification number, credit earned, and section 177 state where delivery for sale of each TZEV occurred and section 177 state where delivery for sale and placement in service of each ZEV occurred to meet manufacturer's requirements under subdivision 1962.1(d)(5)(E)3.c.

e. *Failure to Meet Optional Section 177 State Compliance Path Requirements.* A manufacturer that elects the optional section 177 state compliance path and does not meet the requirements in subdivision 1962.1(d)(5)(E)3.a. by June 30, 2018 in all section 177 states within an applicable pool shall be treated as subject to the total ZEV percentage requirements in section 1962.1(b) for the 2015 through 2017 model years in each section 177 state and the pooling provisions in subdivision 1962.1(d)(5)(E)3.a. shall not apply. Any transfers of ZEV credits between section 177 states will be null and void, and ZEV credits will return to the section 177 state in which the credits were earned. A manufacturer that elects the optional section 177 state compliance path and does not meet the percentages in subdivision 1962.1(d)(5)(E)3.b. in a model year or make up their deficit within the specified time and with the specified credits allowed by subdivision 1962.1(g)(7)(A) in all section 177 states within an applicable pool shall be treated as subject to the total ZEV percentage requirements in section 1962.1(b) for the 2015 through 2017 model years and the pooling provisions in subdivision 1962.1(d)(5)(E)3.b. shall not apply. Any transfers of TZEV credits between section 177 states will be null and void if a manufacturer fails to comply, and TZEV credits will return to the section 177 state in which the credits were earned. Penalties shall be calculated separately by each section 177 state where a manufacturer fails to make up the ZEV deficits by the end of the 2018 model year.

f. The provisions in section 1962.1 shall apply to a manufacturer electing the optional section 177 state compliance path, except as specifically modified by this subdivision 1962.1(d)(5)(E)3.

(F) ***NEVs.*** Beginning in 2010 model year, to be eligible for the credit amount in ~~section~~subdivision 1962.1(d)(5)(C), NEVs must meet the following specifications and requirements in this ~~section~~subdivision 1962.1(d)(5)(F):

1. ***Specifications.*** A 2010 through 2017~~and subsequent~~ model year NEV earns credit when it meets all the following specifications:

a. *Acceleration.* The vehicle has a 0-20 mph acceleration of 6.0 seconds or less when operating with a payload of 332 pounds and starting with the battery at a 50% state of charge.

b. *Top Speed.* The vehicle has a minimum top speed of 20 mph when operating with a payload of 332 pounds and starting with the battery at a 50% state of charge. The vehicle's top speed shall not exceed 25 mph when tested in accordance with 49 CFR 571.500 (68 FR 43972, July 25, 2003).

c. *Constant Speed Range.* The vehicle has a minimum 25-mile range when operating at constant top speed with a payload of 332 pounds and starting with the battery at 100% state of charge.

2. *Battery Requirement.* A 2010 through 2017~~and subsequent~~ model year NEV must be equipped with one or more sealed, maintenance-free batteries.

3. *Warranty Requirement.* A 2010 through 2017~~and subsequent~~ model year NEV drive train, including battery packs, must be covered for a period of at least 24 months. ~~At least~~ The first 6 months ~~of the first 12 months~~ of the NEV warranty period must be covered by a full warranty; the ~~remainder of the first 12 months and all of the second 12 months of the~~ remaining warranty period may be optional extended warranties (available for purchase) and may be prorated. If the extended warranty is prorated, the percentage of the battery pack's original value to be covered or refunded must be at least as high as the percentage of the prorated coverage period still remaining. For the purpose of this computation, the age of the battery pack must be expressed in intervals no larger than three months. Alternatively, a manufacturer may cover 50 percent of the original value of the battery pack for the full period of the extended warranty.

4. Prior to allowance approval, the Executive Officer may request that the manufacturer provide copies of representative vehicle and battery warranties.

5. *NEV Charging Requirements.* Model year 2014 through 2017 NEVs must meet charging connection standard portion of the requirements specified in subdivision 1962.3(c)(2).

(G) *Type I.5x and Type IIx Vehicles.* Beginning in 2012 model year, to be eligible for the credit amount in subdivision 1962.1(d)(5)(C), Type I.5x and Type IIx vehicles must meet the following specifications and requirements:

1. *PZEV Requirements.* Type I.5x and Type IIx vehicles must meet all PZEV requirements, specified in subdivision 1962.1(c)(2)(A) through (D).

2. *Type G Requirements.* Type I.5x and Type IIx vehicles must meet the requirements for Type G advanced componentry allowance, specified in subdivision 1962.1(c)(4)(B).

3. *APU Operation.* The vehicle's UDDS range after the APU first starts and enters "charge sustaining hybrid operation" must be less than or equal to the vehicle's UDDS all-electric test range prior to APU start. The vehicle's APU cannot start under any user-selectable driving mode unless the energy storage system used for traction power is fully depleted.

4. *Minimum Zero Emission Range Requirements.*

Vehicle Category	Zero Emission UDDS Range
Type I.5x	≥ 75 miles, < 100 miles
Type IIx	≥ 100 miles

(e) *[Reserved].*

(f) *Extended Service Multiplier for 1997-2003 Model Year ZEVs and PZEVs With ≥ 10 Mile Zero-Emission Range.* Except in the case of a NEV, an additional ZEV or PZEV multiplier will be earned by the manufacturer of a 1997 through 2003 model year ZEV, or PZEV with ≥ 10 mile zero-emission range for each full year it is registered for operation on public roads in California beyond its first three years of service, in the 2009 through 2011 calendar years. For additional years of service starting earlier than April 24, 2003, the manufacturer will receive 0.1 times the ZEV credit that would be earned by the vehicle if it were leased or sold new in that year, including multipliers, on a year-by-year basis beginning in the fourth year after the vehicle is initially placed in service. For additional years of service starting April 24, 2003 or later, the manufacturer will receive 0.2 times the ZEV credit that would be earned by the vehicle if it were leased or sold new in that year, including multipliers, on a year-by-year basis beginning in the fourth year after the vehicle is initially placed in service. The extended service multiplier is reported and earned in the year following each continuous year of service. Additional credit cannot be earned after model year 2011.

(g) *Generation and Use of ~~ZEV~~ Credits; Calculation of Penalties*

(1) *Introduction.* A manufacturer that produces and delivers for sale in California ZEVs or PZEVs in a given model year exceeding the manufacturer's ZEV requirement set forth in ~~section~~subdivision 1962.1(b) shall earn ~~ZEV~~ credits in accordance with this ~~section~~subdivision 1962.1(g).

(2) *~~ZEV~~ Credit Calculations.*

(A) *Credits from ZEVs.* For model years 2009 through 2014, ~~T~~the amount of g/mi ~~ZEV~~ credits earned by a manufacturer in a given model year from ZEVs

shall be expressed in units of g/mi NMOG, and shall be equal to the number of credits from ZEVs produced and delivered for sale in California that the manufacturer applies towards meeting the ZEV requirements for the model year subtracted from the number of ZEVs produced and delivered for sale in California by the manufacturer in the model year and then multiplied by the NMOG fleet average requirement for PCs and LDT1s, or LDT2s as applicable, for 2009 through 2011 model years, and for PCs and LDT1s for 2012 through 2014 ~~that~~ model years.

For model years 2015 through 2017, the amount of credits earned by a manufacturer in a given model year from ZEVs shall be expressed in units of credits and shall be equal to the number of credits from ZEVs produced and delivered for sale in California that the manufacturer applies towards meeting the ZEV requirements, or, if applicable, requirements specified under subdivision 1962.1(d)(5)(E)3., for the model year subtracted from the number of ZEV credits produced and delivered for sale in California by the manufacturer in the model year or model years.

(B) ***Credits from PZEVs.*** For model years 2009 through 2014, ~~T~~the amount of g/mi ~~ZEV~~ credits from PZEVs earned by a manufacturer in a given model year shall be expressed in units of g/mi NMOG, and shall be equal to the total number of PZEVs produced and delivered for sale in California that the manufacturer applies towards meeting its ZEV requirement for the model year subtracted from the total number of PZEV allowances from PZEVs produced and delivered for sale in California by the manufacturer in the model year and then multiplied by the NMOG fleet average requirement for PCs and LDT1s, or LDT2s as applicable, for 2009 through 2011 model years, and for PCs and LDT1s for 2012 through 2014 ~~that~~ model years.

For model years 2015 through 2017, the amount of credits earned by a manufacturer in a given model year from PZEVs shall be expressed in units of credits, and shall be equal to the number of credits from PZEVs produced and delivered for sale in California that the manufacturer applies towards meeting the ZEV requirements, or, if applicable, requirements specified under subdivision 1962.1(d)(5)(E)3., for the model year subtracted from the number of PZEV credits produced and delivered for sale in California by the manufacturer in the model year or model years.

(C) ***Separate Credit Accounts.*** The number of credits from a manufacturer's [i] ZEVs, [ii] Type I.5x and Type IIx vehicles, [~~iii~~iii] ~~Enhanced AT PZEVs~~TZEVs, [~~iii~~iv] AT PZEVs, [iv] all other PZEVs, and [vi] NEVs shall each be maintained separately.

(D) Rounding Credits. For model year 2012 through 2014, ZEV credits and debits shall be rounded to the nearest 1/1000th only on the final credit and debit totals using the conventional rounding method. For model year 2015 through 2017, ZEV credits and debits shall be rounded to the nearest 1/100th only on the final credit and debit totals using the conventional rounding method.

(E) *Converting g/mi NMOG ZEV Credits to ZEV Credits.* After model year 2014 compliance, all manufacturer ZEV, Type I.5x and Type IIx, TZEV, AT PZEV, PZEV, and NEV accounts will be converted from g/mi NMOG to credits. Each g/mi NMOG account balance will be divided by 0.035. Starting in model year 2015, credits will no longer be expressed in terms of g/mi credits, but only as credits.

(F) *Converting PZEV and AT PZEV Credits after Model Year 2017.* After model year 2017 compliance, a manufacturer's PZEV and AT PZEV credit accounts will be converted to be used for compliance with requirements specified in subdivision 1962.2(b). For LVMs, PZEV accounts will be discounted 93.25%, and AT PZEV accounts will be discounted 75%. For IVMs, PZEV accounts and AT PZEV accounts will be discounted 75%. This will be a one time calculation after model year 2017 compliance is complete.

(3) *ZEV Credits for MDVs and LDTs Other Than LDT1s.* ZEVs and PZEVs classified as MDVs or as LDTs other than LDT1s may be counted toward the ZEV requirement for PCs, LDT1s and LDT2s as applicable, and included in the calculation of ZEV credits as specified in this ~~section~~subdivision 1962.1(g) if the manufacturer so designates.

(4) *ZEV Credits for Advanced Technology Demonstration Programs.*

(A) *TZEVs.* ~~In model years~~ For 2009 through 2014 model years, ~~ZEVs and Enhanced AT PZEVs, excluding NEVs,~~ TZEVs placed in a California advanced technology demonstration program for a period of two or more years, may earn ZEV credits even if it is not "delivered for sale" or registered with the California Department of Motor Vehicles (DMV). To earn such credits, the manufacturer must demonstrate to the reasonable satisfaction of the Executive Officer that the vehicles will be regularly used in applications appropriate to evaluate issues related to safety, infrastructure, fuel specifications or public education, and that for 50 percent or more of the first two years of placement the vehicle will be operated in California. Such a vehicle is eligible to receive the same allowances and credits that it would have earned if placed in service. To determine vehicle credit, the model year designation for a demonstration vehicle shall be consistent with the model year designation for conventional vehicles placed in the same timeframe. Manufacturers may earn credit for as many as 25 vehicles per model, per ZEV state, per year under this ~~section~~subdivision 1962.1(g)(4). A manufacturer's vehicles in excess of the 25-vehicle cap will not be eligible for advanced technology demonstration program credits.

(B) *ZEVs.* In model years 2009 through 2017, ZEVs, including Type I.5x and IIx vehicles, excluding NEVs and Type 0 ZEVs, placed in a California advanced technology demonstration program for a period of two or more years, may earn ZEV credits even if it is not "delivered for sale" or registered with the California DMV. To earn such credits, the manufacturer must demonstrate to the reasonable satisfaction of the Executive Officer that the vehicles will be regularly used in applications appropriate to evaluate issues related to safety, infrastructure, fuel

specifications or public education, and that for 50 percent or more of the first two years of placement the vehicle will be operated in California. Such a vehicle is eligible to receive the same allowances and credits that it would have earned if placed in service. To determine vehicle credit, the model year designation for a demonstration vehicle shall be consistent with the model year designation for conventional vehicles placed in the same timeframe. Manufacturers may earn credit for as many as 25 vehicles per model, per ZEV state, per year under this subdivision 1962.1(g)(4). A manufacturer's vehicles in excess of the 25-vehicle cap will not be eligible for advanced technology demonstration program credits.

(5) *ZEV Credits for Transportation Systems.*

(A) *General.* In model years 2009 through 2011, a ZEV placed, for two or more years, as part of a transportation system may earn additional ZEV credits, which may be used in the same manner as other credits earned by vehicles of that category, except as provided in subdivision (g)(5)(C) below. In model years 2012~~09 and subsequent~~ through 2017, a ZEV, Type I.5x and Type IIx vehicles, or TZEV placed, for two or more years, as part of a transportation system may earn additional ZEV credits, which may be used in the same manner as other credits earned by vehicles of that category, except as provided in subdivision (d)(5)(E)2. and as provided in ~~section~~subdivision (g)(5)(C) below. In model years 2009 through 2011, an ~~Enhanced AT PZEV,~~ AT PZEV or PZEV placed as part of a transportation system may earn additional ZEV credits, which may be used in the same manner as other credits earned by vehicles of that category, except as provided in ~~section~~subdivision (g)(5)(C) below. A NEV is not eligible to earn credit for transportation systems. To earn such credits, the manufacturer must demonstrate to the reasonable satisfaction of the Executive Officer that the vehicle will be used as a part of a project that uses an innovative transportation system as described in ~~section~~subdivision (g)(5)(B) below.

(B) *Credits Earned.* In order to earn additional credit under this section (g)(5), a project must at a minimum demonstrate [i] shared use of ZEVs, Type I.5x and Type IIx vehicles, ~~Enhanced AT PZEVs~~TZEV, AT PZEVs, or PZEVs, and [ii] the application of "intelligent" new technologies such as reservation management, card systems, depot management, location management, charge billing and real-time wireless information systems. If, in addition to factors [i] and [ii] above, a project also features linkage to transit, the project may receive further additional credit. For ZEVs only, not including NEVs, a project that features linkage to transit, such as dedicated parking and charging facilities at transit stations, but does not demonstrate shared use or the application of intelligent new technologies, may also receive additional credit for linkage to transit. The maximum credit awarded per vehicle shall be determined by the Executive Officer, based upon an application submitted by the manufacturer and, if appropriate, the project manager. The maximum credit awarded shall not exceed the following:

Type of Vehicle	*Model Year*	*Shared Use, Intelligence*	*Linkage to Transit*
PZEV	through 2011	2	1
AT PZEV	through 2011	4	2
~~Enhanced AT PZEV~~ TZEV	2009 through 2011	4	2
ZEV	2009 through 2011	6	3
~~Enhanced AT PZEV~~ TZEV	2012 ~~and subsequent~~through 2017	~~1~~0.5	~~1~~0.5
ZEV and Type I.5x and Type IIx vehicles	2012 ~~and subsequent~~through 2017	~~2~~0.75	~~1~~0.75

(C) ***Cap on Use of Transportation System Credits.***

1. ***ZEVs.*** Credits earned or allocated by ZEVs or Type I.5x and Type IIx vehicles pursuant to this ~~section~~subdivision (g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-tenth of a manufacturer's ZEV obligation in any given model year, and may be used to satisfy up to one-tenth of a manufacturer's ZEV obligation which must be met with ZEVs, as specified in ~~section~~subdivision 1962.1(b)(2)(D)3.

2. ***~~Enhanced AT PZEVs~~TZEVs.*** Credits earned or allocated by ~~Enhanced AT PZEVs~~TZEVs pursuant to this ~~section~~subdivision (g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-tenth of a manufacturer's ZEV obligation in any given model year, or, if applicable, up to one-tenth of the total ZEV percentages specified under subdivision 1962.1(d)(5)(E)3., but may only be used in the same manner as other credits earned by vehicles of that category.

3. ***AT PZEVs.*** Credits earned or allocated by AT PZEVs pursuant to this ~~section~~subdivision (g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-twentieth of a manufacturer's ZEV obligation in any given model year, but may only be used in the same manner as other credits earned by vehicles of that category.

4. ***PZEVs.*** Credits earned or allocated by PZEVs pursuant to this ~~section~~subdivision (g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-fiftieth of the manufacturer's ZEV obligation in any given model year, but may only be used in the same manner as other credits earned by vehicles of that category.

(D) ***Allocation of Transportation System Credits.*** Credits shall be assigned by the Executive Officer to the project manager or, in the absence of a

separate project manager, to the vehicle manufacturers upon demonstration that a vehicle has been placed in a project for the time specified in subdivision 1962.1(g)(5)(A). Credits shall be allocated to vehicle manufacturers by the Executive Officer in accordance with a recommendation submitted in writing by the project manager and signed by all manufacturers participating in the project, and need not be allocated in direct proportion to the number of vehicles placed. Credits will no longer be allocated for vehicles placed in transportation systems after 2017 model year.

(6) ***Use of ZEV Credits.*** For model years 2009 through 2014, ~~A~~a manufacturer may meet the ZEV requirements in any given model year by submitting to the Executive Officer a commensurate amount of g/mi ZEV credits, consistent with ~~section~~subdivision 1962.1(b). For model years 2015 through 2017, a manufacturer may meet the ZEV requirements in any given model year by submitting to the Executive Officer a commensurate amount of ZEV credits, consistent with subdivision 1962.1(b). Credits in each of the categories may be used to meet the requirement for that category as well as the requirements for lesser credit earning ZEV categories, but shall not be used to meet the requirement for a greater credit earning ZEV category. For example, credits produced from ~~Enhanced AT PZEVs~~TZEVs may be used to comply with AT PZEV requirements, but not with the portion that must be satisfied with ZEVs. These credits may be earned previously by the manufacturer or acquired from another party.

(A) ***NEVs.*** Credits earned from NEVs offered for sale or placed in service in model years 2001 through 2005 cannot be used to satisfy more than the percentage limits described in the following table:

Model Years	***ZEV Obligation that:***	***Percentage limit for NEVs allowed to meet each Obligation[1]:***
2009 – 2011	Must be met with ZEVs	50%
2009	May be met with AT PZEVs but not PZEVs	75%
2010 – 2011		50%
2009 – 2011	May be met with PZEVs	No Limit
2012 – ~~2014~~2017	Must be met with ZEVs	0%
	May be met with ~~Enhanced AT PZEVs~~TZEVs and AT PZEVs	50%
	May be met with PZEVs	No Limit

[1] If applicable, obligation in this table means requirements specified under subdivision 1962.1(d)(5)(E)3..

Additionally, credits earned from NEVs ~~offered for sale or~~ placed in service in model years 2006 through 2017 ~~or later~~ can be used to ~~satisfy~~ meet the percentage limits described in the following table:

Model Years	***ZEV Obligation that:***	***Percentage Limit for NEVs allowed to meet each Obligation[1]:***
2009 - 2011	May be met through compliance with Primary Requirements	No Limit
	May be met through compliance with Alternative Requirements, and must be met with ZEVs	0%
	May be met through compliance Alternative Requirements, and may be met with AT PZEVs or PZEVs	No Limit
2012 – ~~2014~~2017	Must be met with ZEVs	0%
	May be met with ~~Enhanced AT PZEVs~~TZEVs, AT PZEVs, or PZEVs	No Limit

[1] If applicable, obligation in this table means requirements specified under subdivision 1962.1(d)(5)(E)3..

This limitation applies to NEV credits earned by the same manufacturer or earned by another manufacturer and acquired.

(B) ***Carry forward provisions for LVMs for 2009-2011 Model Years***. ~~ZEV c~~Credits from ZEVs, excluding credits generated from NEVs, generated from excess production in ~~model years~~ 2009 through 2011 model years~~and subsequent~~, including those acquired from another party, may be carried forward and applied to the ZEV minimum floor requirement specified in ~~section~~subdivisions 1962.1(b)(2)(B)1.b. and (b)(2)(D) for two subsequent model years. Beginning with the third subsequent model year, those earned ~~ZEV~~ credits may no longer be used to satisfy the manufacturer's percentage ZEV obligation that may only be satisfied by credits from ZEVs, but may be used to satisfy the manufacturer's percentage ZEV obligation that may be satisfied by credits from ~~Enhanced AT PZEVs~~TZEVs, AT PZEVs, or PZEVs. For example, ZEV credit earned in 2010 would retain full flexibility through 2012, after which time that credit could only be used as ~~Enhanced AT PZEV~~TZEV, AT PZEV, or PZEV credits.

(C) ***Carry forward provisions for manufacturers other than LVMs for 2009-2011 Model Years***. ~~ZEV c~~Credits generated from ZEVs, excluding credits generated from NEVs, from 2009 through 2011~~and subsequent~~ model year production by manufacturers that are not LVMs may be carried forward by the manufacturer producing the ~~ZEV~~ credit until the manufacturer becomes subject to the LVM requirements, after the transition period permitted in ~~section~~subdivision 1962.1(b)(7)(A).

When subject to the LVM requirements, a manufacturer must comply with the provisions of ~~section~~subdivision 1962.1(g)(6)(B).

~~ZEV c~~Credits traded by a manufacturer other than a LVM to any other manufacturer, including a LVM, are subject to ~~section~~subdivision 1962.1(g)(6)(B), beginning in the model year in which they were produced (e.g., a 2009 model year ~~ZEV~~ credit traded in calendar year 2010 can only be applied towards the portion of the manufacturer's requirement that must be met with ZEVs through model year 2011; beginning in model year 2012, the credit can only be applied to the portion of the manufacturer's requirement that may be met with ~~Enhanced AT PZEVs~~TZEVs, AT PZEVs, or PZEVs).

(D) ***Type I.5x and Type IIx Vehicles.*** Credits earned from Type I.5x and Type IIx vehicles offered for sale or placed in service may meet up to 50% of the portion of a manufacturer's requirement that must be met with credits from ZEVs.

(7) ***Requirement to Make Up a ZEV Deficit.***

(A) ***General.*** A manufacturer that produces and delivers for sale in California fewer ZEVs than required in a given model year shall make up the deficit by the end of the third model year by submitting to the Executive Officer a commensurate amount of g/mi ~~ZEV~~ credits generated by ZEVs, for model year 2009 through 2014, and the commensurate amount of credits generated by ZEVs for model year 2015 through 2017. The amount of ~~g/mi ZEV~~ credits required to be submitted shall be calculated by [i] adding the number of credits from ZEVs produced and delivered for sale in California by the manufacturer for the model year to the number of allowances from partial ZEV allowance vehicles produced and delivered for sale in California by the manufacturer for the model year (for a LVM, not to exceed that permitted under ~~section~~subdivision 1962.1(b)(2)), [ii] subtracting that total from the number of ZEV~~s~~ credits required to be produced and delivered for sale in California by the manufacturer for the model year, and, for model year 2009 through 2014 compliance, [iii] multiplying the resulting value by the fleet average requirements for PCs and LDT1s for the model year in which the deficit is incurred. Credits earned by delivery for sale of Type I.5x and Type IIx vehicles, TZEV, NEV, AT PZEV, and PZEV are not allowed to be used to fulfill a manufacturer's ZEV deficit; only credits from ZEVs may be used to fulfill a manufacturer's ZEV deficit.

(8) ***Penalty for Failure to Meet ZEV Requirements.*** Any manufacturer that fails to produce and deliver for sale in California the required number of ZEVs and submit an appropriate amount of g/mi ~~ZEV~~ credits, for model years 2009 through 2014, and credits for model years 2015 through 2017, and does not make up ZEV deficits within the specified time allowed by ~~section~~subdivision 1962.1(g)(7)(A) shall be subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer that 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 ZEV deficits are not balanced by the end of the specified time allowed by ~~section~~subdivision 1962.1(g)(7)(A). For the purposes of Health and Safety Code

section 43211, the number of vehicles not meeting the state board's standards shall be equal to the manufacturer's credit deficit, rounded to the to the nearest 1/1000th for model years 2009 through 2014 and rounded to the nearest 1/100th for model years 2015 through 2017, calculated according to the following equations, provided that the percentage of a ~~LVM's~~ manufacturer's ZEV requirement for a given model year that may be satisfied with PZEV allowance vehicles or credit from such vehicles may not exceed the percentages permitted under ~~section~~subdivision ~~1962.1(b)(2)(A)~~1962.1(b)(2):

For 2009 through 2014 model years:

(No. of ~~ZEVs~~ credits required to be ~~produced and delivered for sale in California~~ generated for the model year) – (~~No. of ZEVs produced and delivered for sale in California for the model year) – (No. of ZEV allowances from partial ZEV allowance vehicles produced and delivered for sale in California for the model year) - [~~(Amount of ~~ZEV~~ credits submitted for compliance for the model year) / (the fleet average requirement for PCs and LDT1s for the model year)~~]~~

For 2015 through 2017 model years:

(No. of credits required to be generated for the model year) – (Amount of credits submitted for compliance for the model year)

(h) ***Test Procedures.***

(1) ***Determining Compliance***. The certification requirements and test procedures for determining compliance with this section 1962.1 are set forth in "California Exhaust Emission Standards and Test Procedures for 2009 ~~and Subsequent~~through 2017 Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes," adopted ~~by the state board on~~ December 17, 2008, and last amended ~~December 2, 2009~~March 22, 2012, which is incorporated herein by reference.

(2) ***NEV Compliance.*** The test procedures for determining compliance with ~~section~~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" ~~adopted on~~ (December 1, 2004), and ETA-NTP004 (revision ~~2~~3) "Electric Vehicle Constant Speed Range Tests" ~~adopted on December 1, 2004~~ (February 1, 2008), both of which are incorporated by reference herein.

(i) ***ZEV-Specific Definitions.*** The following definitions apply to this section 1962.1.

(1) "Advanced technology PZEV" or "AT PZEV" means any PZEV with an allowance greater than 0.2 before application of the PZEV early introduction phase-in multiplier.

(2) "Auxiliary power unit" or "APU" means any device that provides electrical or mechanical energy, meeting the requirements of subdivision 1962.1(c)(2), to a Type I.5x or Type IIx vehicle, after the zero emission range has been fully depleted. A fuel fired heater does not qualify under this definition for an APU.

(23) "Battery electric vehicle" means any vehicle that operates solely by use of a battery or battery pack, or that is powered primarily through the use of an electric battery or battery pack but uses a flywheel or capacitor that stores energy produced by the electric motor or through regenerative braking to assist in vehicle operation.

(34) "Charge ~~depleting~~ depletion ~~actual~~ range actual" or "R_{cda}" means the distance achieved by a hybrid electric vehicle on the urban driving cycle at the point when the zero-emission energy storage device is depleted of off-vehicle charge and regenerative braking derived energy.

(5) "Conventional rounding method" means to increase the last digit to be retained when the following digit is five or greater. Retain the last digit as is when the following digit is four or less.

(6) "East Region pool" means the combination Section 177 states east of the Mississippi River.

(47) "Electric drive system" means an electric motor and associated power electronics which provide acceleration torque to the drive wheels sometime during normal vehicle operation. This does not include components that could act as a motor, but are configured to act only as a generator or engine starter in a particular vehicle application.

(58) "Enhanced AT PZEV" means any model year 2009 through 2011 PZEV that has an allowance of 1.0 or greater per vehicle without multipliers and makes use of a ZEV fuel. Enhanced AT PZEV means Transitional Zero Emission Vehicle.

(69) "Neighborhood electric vehicle" or "NEV" means a motor vehicle that meets the definition of Low-Speed Vehicle either in section 385.5 of the Vehicle Code or in 49 CFR 571.500 (as it existed on July 1, 2000), and is certified to zero-emission vehicle standards.

(~~7~~10) "Placed in service" means having been sold or leased to an end-user and not to a dealer or other distribution chain entity, and having been individually registered for on-road use by the California ~~Department of Motor Vehicles~~DMV.

(11) "Proportional value" means the ratio of a manufacturer's California applicable sales volume to the manufacturer's Section 177 state applicable sales volume. In any given model year, the same applicable sale volume calculation method must be used to calculate proportional value.

(12) "Range Extended Battery Electric Vehicle" means a vehicle powered predominantly by a zero emission energy storage device, able to drive the vehicle for more than 75 all-electric miles, and also equipped with a backup APU, which does not operate until the energy storage device is fully depleted, and meeting requirements in subdivision 1962.1(d)(5)(G).

(813) "Regenerative braking" means the partial recovery of the energy normally dissipated into friction braking that is returned as electrical current to an energy storage device.

(~~9~~14) "Section 177 state" means a state that is administering the California ZEV requirements pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

(15) "Transitional Zero Emission Vehicle" means a PZEV that has an allowance of 1.0 or greater, and makes use of a ZEV fuel.

(~~10~~16) "Type 0, I, I.5, II, III, IV, and V ZEV" all have the meanings set forth in section 1962.1(d)(5)(A).

(17) "West Region pool" means the combination of Section 177 states west of the Mississippi River.

(~~11~~18) "ZEV fuel" means a fuel that provides traction energy in on-road ZEVs. Examples of current technology ZEV fuels include electricity, hydrogen, and compressed air.

(j) ***Abbreviations.*** The following abbreviations are used in this section 1962.1:

"AER" means all-electric range.
"APU" means auxiliary power unit.
"AT PZEV" means advanced technology partial zero-emission vehicle.
"CFR" means Code of Federal Regulations.
"DMV" means the California Department of Motor Vehicles.
"EAER" means equivalent all-electric range.
"$EAER_{u40}$" means the urban equivalent all-electric range that a 40 mile R_{cda} plug-in hybrid electric vehicle achieves.

"FR" means Federal Register.
"HEV" means hybrid-electric vehicle.
"LDT" means light-duty truck.
"LDT1" means a light-truck with a loaded vehicle weight of 0-3750 pounds.
"LDT2" means a "LEV II" light-duty truck with a loaded vehicle weight of 3751 pounds to a gross vehicle weight of 8500 pounds, or a "LEV I" light-duty truck with a loaded vehicle weight of 3751-5750 pounds.
"LVM" means large volume manufacturer.
"MDV" means medium-duty vehicle.
"Non-Methane Organic Gases" or "NMOG" means the total mass of oxygenated and non-oxygenated hydrocarbon emissions.
"NEV" means neighborhood electric vehicle.
"NOx" means oxides of nitrogen.
"PC" means passenger car.
"PZEV" means partial allowance zero-emission vehicle, any vehicle that is delivered for sale in California and that qualifies for a partial ZEV allowance of at least 0.2.
"R_{cda}" means urban charge ~~depleting~~ depletion ~~actual~~ range actual~~(urban Cycle)~~.
"SAE" means Society of Automotive Engineers.
"SULEV" means super-ultra-low-emission-vehicle.
"TZEV" means transitional zero emission vehicle.
"Type I.5x" means range extended 75 mile to 100 mile all electric range battery electric vehicle.
"Type IIx" means range extended 100 mile or greater all electric range battery electric vehicle.
"UDDS" means urban dynamometer driving cycle.
"UF" means utility factor.
"US06" means the US06 Supplemental Federal Test Procedure
"VMT" means vehicle miles traveled.
"ZEV" means zero-emission vehicle.

(k) ***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 this article remains in full force and effect.

(l) ***Public Disclosure.*** Records in the Board's possession for the vehicles subject to the requirements of section 1962.1 shall be subject to disclosure as public records as follows:

(1) Each manufacturer's annual production data and the corresponding credits per vehicle earned for ZEVs (including ZEV type), ~~Enhanced AT PZEVs~~ TZEVs, AT PZEVs, and PZEVs for the 2009 through 2017~~and subsequent~~ model years; and

(2) Each manufacturer's annual credit balances for 2010 through 2017~~and subsequent~~ years for:

(A) Each type of vehicle: ZEVs (minus NEVs), Type I.5x, and Type IIx vehicles, NEVs, ~~Enhanced AT PZEVs~~TZEVs, AT PZEVs, and PZEVs; and

(B) Advanced technology demonstration programs; and

(C) Transportation systems; and

(D) Credits earned under ~~section~~subdivision 1962.1(d)(5)(C), including credits acquired from, or transferred to another party.

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, 43204, 43205, 43205.5 and 43206, Health and Safety Code.

§ 1962.1. Zero-Emission Vehicle Standards for 2009 through 2017 Model Year Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles.

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(b) ***Percentage ZEV Requirements.***

* * * * *

(2) ***Requirements for Large Volume Manufacturers.***

* * * * *

(D) ***Requirements for Large Volume Manufacturers in Model Years 2012 through 2017.***

1. ***2012 through 2014 Requirements.*** On an annual basis, a manufacturer must meet the total ZEV obligation with ZEV credits generated by such vehicles, excluding credits generated by NEVs and Type 0 ZEVs equal to at least 0.79% of its annual sales, using either production volume determination method described in subdivision 1962.1(b)(1)(B). No more than 50% of the total obligation may be met with credits generated from PZEVs. No more than 75% of the total obligation may be met with credits generated from AT PZEVs. No more than 93.4% may be met with credits generated from TZEVs, Type 0 ZEVs, and NEVs, as limited in subdivision 1962.1(g)(6). The entire obligation may be met solely with credits generated from ZEVs.

2. ***2015 through 2017 Requirements.*** On an annual basis, a manufacturer must meet its ZEV obligation with ZEV credits generated by such vehicles, excluding credits generated by NEVs and Type 0 ZEVs, equal to at least 3% of its annual sales, using either production volume determination method described in subdivision 1962.1(b)(1)(B). No more than 42.8% of the total obligation may be met with credits generated from PZEVs. No more than 57.1% of the total obligation may be met with credits generated from AT PZEVs. No more than 78.5% may be met with credits generated from TZEVs, Type 0 ZEVs, and NEVs, as limited in subdivision 1962.1(g)(6). The entire obligation may be met solely with credits generated from ZEVs.

* * * * *

(c) ***Partial ZEV Allowance Vehicles (PZEVs).***

* * * * *

(3) *Zero-Emission VMT PZEV Allowance.*

(A) *Calculation of Zero-~~-~~Emission VMT Allowance.* A vehicle that meets the requirements of subdivision 1962.1(c)(2) and has zero-emission vehicle miles traveled ("VMT") capability will generate an additional zero emission VMT PZEV allowance calculated as follows:

Range	*Zero-emission VMT Allowance*
$EAER_u$ < 10 miles	0.0
$EAER_u$ ≥10 to 40 miles	$EAER_u \times (1 - UF_{Rcda})/11.028$
$EAER_u$ > 40 miles	~~$(EAER_{u40}) \times [1 - (UF_{40} * R_{cda}/EAER_u)]/11.028$~~ $3.627 \times (1 - UF_n)$ Where, ~~UF_{40}= utility factor at 40 miles~~ ~~$EAER_{u40}$= 40 miles~~ $n = 40 \times (R_{cda}/EAER_u)$

A vehicle cannot generate more than 1.39 zero-emission VMT PZEV allowances.

The urban equivalent all-electric range ($EAER_u$) and urban charge depletion range actual (R_{cda}) shall be determined in accordance with section G. ~~5.4~~11.4 and G.11.9, respectively, 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," adopted December 17, 2008, and last amended ~~March 22, 2012~~December 6, 2012, incorporated by reference in section 1962.1(h). The utility Factor (UF) shall be determined according to SAE International's Surface Vehicle Information Report J2841 SEP2010 (Revised September 2010), incorporated by reference herein, from the Fleet Utility Factors (FUF) Table in Appendix B or using a polynomial curve fit with "FUF Fit" coefficients from Table 2 Utility Factor Equation Coefficients ~~based on the charge depleting actual range (urban cycle) (R_{cda}) shall be determined according to Section 4.5.2 Equation 6 and the "Fleet UF" Utility Factor Equation Coefficients in Section 4.5.2, Table 3 of SAE J2841 March 2009~~.

* * * * *

(h) ***Test Procedures.***

(1) ***Determining Compliance.*** The certification requirements and test procedures for determining compliance with this section 1962.1 are set forth in "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," adopted December 17, 2008, and last amended ~~March 22, 2012~~December 6, 2012, which is incorporated herein by reference.

* * * * *

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, 43204, 43205, 43205.5 and 43206, Health and Safety Code.

Final Regulation Order – Part 3

ZERO-EMISSION VEHICLE STANDARDS FOR 2018 AND SUBSEQUENT MODEL YEAR PASSENGER CARS, LIGHT-DUTY TRUCKS, AND MEDIUM-DUTY VEHICLES

Note: Set forth below are the 2012 amendments to the California zero emission vehicle (ZEV) regulation. This is a newly adopted regulation, shown without underline as permitted by California Code of Regulations, title 1, section 8.

Adopt Title 13, Motor Vehicles, Division 3, Air Resources Board, Chapter 1, Motor Vehicle Pollution Control Devices, Article 2, Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1962.2, Zero-Emission Vehicle Standards for 2018 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. to read:

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

(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) ***Percentage ZEV Requirements.***

(1) ***General ZEV Credit Percentage Requirement.***

(A) ***Basic Requirement.*** The minimum ZEV credit percentage requirement for each manufacturer is listed in the table below as the percentage of the PCs and LDTs, produced by the manufacturer and delivered for sale in California that must be ZEVs, subject to the conditions in this subdivision 1962.2(b). The ZEV requirement will be based on the annual NMOG production report for the appropriate model year.

Model Year	Credit Percentage Requirement
2018	4.5%
2019	7.0%
2020	9.5%
2021	12.0%
2022	14.5%
2023	17.0%
2024	19.5%
2025 and subsequent	22.0%

(B) ***Calculating the Number of Vehicles to Which the Percentage ZEV Requirement is Applied.*** For 2018 and subsequent model years, a manufacturer's production volume for the given model year will be based on the three-year average of the manufacturer's volume of PCs and LDTs, produced and delivered for sale in California in the prior second, third, and fourth model year [for example, 2019 model year ZEV requirements will be based on California production volume average of PCs and LDTs for the 2015 to 2017 model years]. This production averaging is used to determine ZEV requirements only, and has no effect on a manufacturer's size determination (eg. three-year average calculation method). In applying the ZEV requirement, a PC or LDT, that is produced by one manufacturer (e.g., Manufacturer A), but is marketed in California by another manufacturer (e.g., Manufacturer B) under the other manufacturer's (Manufacturer B) nameplate, shall be treated as having been produced by the marketing manufacturer (i.e., Manufacturer B).

1. ***[Reserved]***

2. ***[Reserved]***

3. A manufacturer may apply to the Executive Officer to be permitted to base its ZEV obligation on the number of PCs and LDTs, produced by the manufacturer and delivered for sale in California that same model year (ie, same model-year calculation method) as an alternative to the three-year averaging of prior year production described above, for up to two model years, total, between model year 2018 and model year 2025. For the same model-year calculation method to be allowed, a manufacturer's application to the Executive Officer must show that their volume of PCs and LDTs produced and delivered for sale in California has decreased by at least 30 percent from the previous year due to circumstances that were unforeseeable and beyond their control.

(C) ***[Reserved]***

(D) ***Exclusion of ZEVs in Determining a Manufacturer's Sales Volume.*** In calculating a manufacturer's applicable sales, using either method described in subdivision 1962.2(b)(1)(B), a manufacturer shall exclude the number of NEVs produced and delivered for sale in California by the manufacturer itself, or by a subsidiary in which the manufacturer has more than 33.4% percent ownership interest.

(2) ***Requirements for Large Volume Manufacturers.***

(A) ***[Reserved]***

(B) ***[Reserved]***

(C) ***[Reserved]***

(D) ***[Reserved]***

(E) ***Requirements for Large Volume Manufacturers in 2018 and through 2025 Model Years.*** LVMs must produce credits from ZEVs equal to minimum ZEV floor percentage requirement, as enumerated below. Manufacturers may fulfill the remaining ZEV requirement with credits from TZEVs, as enumerated below.

Model Years	Total ZEV Percent Requirement	Minimum ZEV floor	TZEVs
2018	4.5%	2.0%	2.5%
2019	7.0%	4.0%	3.0%
2020	9.5%	6.0%	3.5%
2021	12.0%	8.0%	4.0%
2022	14.5%	10.0%	4.5%
2023	17.0%	12.0%	5.0%
2024	19.5%	14.0%	5.5%
2025	22.0%	16.0%	6.0%

(F) ***Requirements for Large Volume Manufacturers in Model Year 2026 and Subsequent.*** In 2026 and subsequent model years, a manufacturer must meet a total ZEV credit percentage of 22%. The maximum portion of a manufacturer's credit percentage requirement that may be satisfied by TZEV credits is limited to 6% of the manufacturer's applicable California PC and LDT production volume. ZEV credits must satisfy the remainder of the manufacturer's requirement.

(3) ***Requirements for Intermediate Volume Manufacturers.*** For 2018 and subsequent model years, an intermediate volume manufacturer may meet all of its ZEV credit percentage requirement, under subdivision 1962.2(b), with credits from TZEV.

(4) ***Requirements for Small Volume Manufacturers.*** A small volume manufacturer is not required to meet the ZEV credit percentage requirements. However, a small volume manufacturer may earn, bank, market, and trade credits for the ZEVs and TZEVs it produces and delivers for sale in California.

(5) ***[Reserved]***

(6) ***[Reserved]***

(7) ***Changes in Small Volume and Intermediate Volume Manufacturer Status.***

(A) ***Increases in California Production Volume.*** In 2018 and subsequent model years, if a small volume manufacturer's average California production volume exceeds 4,500 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years (i.e., total production volume exceeds 13,500 vehicles in a three-year period), for three consecutive averages, the manufacturer shall no longer be treated as a small volume manufacturer, and must comply with the ZEV requirements for intermediate volume manufacturers beginning with the next model year after the last model year of the third consecutive average. For example, if (a small volume) Manufacturer A exceeds 4,500 PCs, LDTs, and MDVs for their 2018 – 2020, 2019 – 2021, and 2020 – 2022 model year averages, Manufacturer A would be subject to intermediate volume requirements starting in 2023 model year.

If an intermediate volume manufacturer's average California production volume exceeds 20,000 units of new PCs, LDTs, and MDVs based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years (i.e., total production volume exceeds 60,000 vehicles in a three-year period), for three consecutive averages, the manufacturer shall no longer be treated as an intermediate volume manufacturer and shall comply with the ZEV requirements for large volume manufacturers beginning with the next model year after the last model year of the third consecutive average. For example, if (an intermediate volume) Manufacturer B exceeds 20,000 PCs, LDTs, and MDVs for its 2018 – 2020, 2019 – 2021, and 2020 – 2022 average, Manufacturer B would be subject to large volume manufacturer requirements starting in 2023 model year.

Any new requirement described in the this subdivision will begin with the next model year after the last model year of the third consecutive average when a manufacturer ceases to be a small or intermediate volume manufacturer in 2018 or subsequent years due to the aggregation requirements in majority ownership situations.

(B) ***Decreases in California Production Volume.*** If a manufacturer's average California production volume falls below 4,500 or 20,000 units of new PCs, LDT1 and 2s, and MDVs, based on the average number of vehicles produced and delivered for sale for the three previous consecutive model years, for three consecutive averages, the manufacturer shall be treated as a small volume or intermediate volume manufacturer, as applicable, and shall be subject to the requirements for a small volume or intermediate volume manufacturer beginning with the next model year. For example, if Manufacturer C falls below 20,000 PCs, LDTs, and MDVs for its 2019 – 2021, 2020 – 2022, and 2021 – 2023 averages, Manufacturer C would be subject to IVM requirements starting in 2024 model year.

(C) ***Calculating California Production Volume in Change of Ownership Situations.*** Where a manufacturer experiences a change in ownership in a particular model year, the change will affect application of the aggregation requirements on the manufacturer starting with the next model year. When a manufacturer is simultaneously producing two model years of vehicles at the time of a

change of ownership, the basis of determining next model year must be the earlier model year. The manufacturer's small or intermediate volume manufacturer status for the next model year shall be based on the average California production volume in the three previous consecutive model years of those manufacturers whose production volumes must be aggregated for that next model year. For example, where a change of ownership during the 2019 calendar year occurs and the manufacturer is producing both 2019 and 2020 model year vehicles resulting in a requirement that the production volume of Manufacturer A be aggregated with the production volume of Manufacturer B, Manufacturer A's status for the 2020 model year will be based on the production volumes of Manufacturers A and B in the 2017 – 2019 model years. Where the production volume of Manufacturer A must be aggregated with the production volumes of Manufacturers B and C for the 2019 model year, and during that model year a change in ownership eliminates the requirement that Manufacturer B's production volume be aggregated with Manufacturer A's, Manufacturer A's status for the 2020 model year will be based on the production volumes of Manufacturers A and C in the 2017 – 2019 model years. In either case, the lead time provisions in subdivisions 1962.2(b)(7)(A) and (B) will apply.

(c) Transitional Zero Emission Vehicles (TZEV).

(1) ***Introduction.*** This subdivision 1962.2(c) sets forth the criteria for identifying vehicles delivered for sale in California as TZEVs.

(2) ***TZEV Requirements.*** In order for a vehicle to be eligible to receive a ZEV allowance, the manufacturer must demonstrate compliance with all of the following requirements:

(A) ***SULEV Standards.*** Certify the vehicle to the 150,000-mile SULEV 20 or 30 exhaust emission standards for PCs and LDTs in subdivision 1961.2(a)(1). Bi-fuel, fuel flexible and dual-fuel vehicles must certify to the applicable 150,000-mile SULEV 20 or 30 exhaust emission standards when operating on both fuels. Manufacturers may certify 2018 and 2019 TZEVs to the 150,000-mile SULEV exhaust emission standards for PCs and LDTs in subdivision 1961(a)(1);

(B) ***Evaporative Emissions.*** Certify the vehicle to the evaporative emission standards in subdivision 1976(b)(1)(G). Manufacturers may certify 2018 and 2019 TZEVs to the evaporative standards for PCs and LDTs in subdivision 1976(b)(1)(E);

(C) ***OBD.*** Certify that the vehicle will meet the applicable on-board diagnostic requirements in sections 1968.1 or 1968.2, as applicable, for 150,000 miles; and

(D) ***Extended Warranty.*** Extend the performance and defects warranty period set forth in subdivisions 2037(b)(2) and 2038(b)(2) 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 used for traction power (such as a battery, ultracapacitor, or other electric storage device).

(3) ***Allowances for TZEVs***

(A) ***Zero Emission Vehicle Miles Traveled TZEV Allowance Calculation.*** A vehicle that meets the requirements of subdivision 1962.2(c)(2) and has zero-emission vehicle miles traveled (VMT), as defined by and calculated by 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," adopted March 22, 2012, which is incorporated herein by reference, and measured as equivalent all electric range (EAER) capability will generate an allowance according to the following equation:

UDDS Test Cycle Range (EAER)	*Allowance*
<10 all electric miles	0.00
≥10 all electric miles	TZEV Credit = [(0.01) * EAER + 0.30]
>80 miles (credit cap)	1.10

1. Allowance for US06 Capability. TZEVs with US06 all electric range capability (AER) of at least 10 miles shall earn an additional 0.2 allowance. US06 test cycle range capability shall be determined in accordance with section E.8 of the "California Exhaust Emission Standards and Test Procedures for the 2018 and Subsequent Model Zero-Emission Vehicles, and Hybrid Electric Vehicles in the Passenger Car, Light-Duty Truck, and Medium Duty Vehicle Classes," adopted March 22, 2012, which is incorporated herein by reference.

(B) ***[Reserved]***

(C) ***[Reserved]***

(D) ***[Reserved]***

(E) ***Credit for Hydrogen Internal Combustion Engine Vehicles.*** A hydrogen internal combustion engine vehicle that meets the requirements of subdivision 1962.2(c)(2) and has a total range of at least 250 UDDS miles will earn an allowance of 0.75, which may be in addition to allowances earned in subdivision 1962.2(c)(3)(A), and subject to an overall credit cap of 1.25

(d) ***Qualification for Credits From ZEVs.***

(1) ***[Reserved]***

(2) ***[Reserved]***

(3) ***[Reserved]***

(4) ***[Reserved]***

(5) ***Credits for 2018 and Subsequent Model Year ZEVs.***

(A) ***ZEV Credit Calculations.*** Credits from a ZEV delivered for sale are based on the ZEV's UDDS all electric range, determined in accordance with the "California Exhaust Emission Standards and Test Procedures for the 2018 and Subsequent Model Zero-Emission Vehicles, and Hybrid Electric Vehicles in the Passenger Car, Light-Duty Truck, and Medium Duty Vehicle Classes," adopted March 22, 2012, which is incorporated herein by reference, using the following equation:

ZEV Credit = (0.01) * (UDDS range) + 0.50

1. A ZEV with less than 50 miles UDDS range will receive zero credits.

2. Credits earned under this provision 1962.2(d)(5)(A) are be capped at 4 credits per ZEV.

(B) ***[Reserved]***

(C) ***[Reserved]***

(D) ***[Reserved]***

(E) ***Counting Specified ZEVs Placed in Service in a Section 177 State and in California.*** Large volume manufacturers and intermediate volume manufacturers with credits earned from hydrogen fuel cell vehicles that are certified to the California ZEV standards applicable for the ZEV's model year, delivered for sale and placed in service in California or in a section 177 state, may be counted towards compliance in California and in all section 177 states with the percentage ZEV requirements in subdivision 1962.2(b). The credits earned are multiplied by the ratio of a manufacturer's applicable production volume for a model year, as specified in subdivision 1962.2(b)(1)(B), in the state receiving credit to the manufacturer's applicable production volume as specified in subdivision 1962.2(b)(1)(B), for the same model year in California(hereafter, "proportional value"). Credits generated from ZEV placement in a section 177 state will be earned at the proportional value in the section 177 state, and earned in California at the full value specified in subdivision 1962.2(d)(5)(A).

1. ***Optional Section 177 State Compliance Path.***

a. *Reduced ZEV and TZEV Percentages.* Large volume manufacturers and intermediate volume manufacturers that have fully complied with the optional section 177 state compliance path requirements in subdivision 1962.1(d)(5)(E)3. are allowed to meet ZEV percentage requirements and optional TZEV percentages reduced from the minimum ZEV floor percentages and TZEV percentages in subdivision 1962.2(b)(2)(E) in each section 177 state equal to the following percentages of their sales volume determined under subdivision 1962.2(b)(1)(B):

ZEVs

Model Year	2018	2019	2020	2021
Existing Minimum ZEV Floor	2.00%	4.00%	6.00%	8.00%
Section 177 State Adjustment for Optional Compliance Path	62.5%	75%	87.5%	100%
Minimum Section 177 State ZEV Requirement	1.25%	3.00%	5.25%	8.00%

TZEVs

Model Year	2018	2019	2020	2021
Existing TZEV Percentage	2.50%	3.00%	3.50%	4.00%
Section 177 State Adjustment for Optional Compliance Path	90.00%	100%	100%	100%
New Section 177 State TZEV Percentage	2.25%	3.00%	3.50%	4.00%

Total Percent Requirement

Model Year	2018	2019	2020	2021
New Total Section 177 State Optional Requirements	3.50%	6.00%	8.75%	12.00%

i. Trading and Transferring ZEV and TZEV Credits within West Region Pool and East Region Pool. Manufacturers that have fully complied with the optional section 177 state compliance path requirements in subdivision 1962.1(d)(5)(E)3. may trade or transfer specified model year ZEV and TZEV credits within the West Region pool to meet the same model year requirements in subdivision 1962.2(d)(5)(E)2.a, and will incur no premium on their credit values. For example, for a manufacturer to make up a 2019 model year shortfall of 100 credits in State X, the manufacturer may transfer 100 (2019 model year) ZEV credits from State Y, within the West Region pool. Manufacturers that have fully complied with the optional section 177 state compliance path requirements in subdivision 1962.1(d)(5)(E)3. may trade or transfer specified model year ZEV and TZEV credits within the East Region pool to meet the same model year requirements in subdivision

1962.2(d)(5)(E)2.a, and will incur no premium on their credit values. For example, for a manufacturer to make up a 2019 model year shortfall of 100 credits in State W, the manufacturer may transfer 100 (2019 model year) ZEV credits from State Z, within the East Region pool.

ii. Trading and Transferring ZEV and TZEV Credits between the West Region Pool and East Region Pool. Manufacturers that have fully complied with the optional section 177 state compliance path requirements in subdivision 1962.1(d)(5)(E)3. may trade or transfer specified model year ZEV and TZEV credits to meet the same model year requirements in subdivision 1962.2(d)(5)(E)2.a. between the West Region pool and the East Region pool; however, any credits traded will incur a premium of 30% of their value. For example, in order for a manufacturer to make up a 2019 model year shortfall of 100 credits in the West Region Pool, the manufacturer may transfer 130 (2019 model year) credits from the East Region Pool. No credits may be traded or transferred to the East Region pool or West Region pool from a manufacturer's California ZEV bank, or from the East Region pool or West Region pool to a manufacturer's California ZEV bank.

b. *Reporting Requirements.* On an annual basis, by May 1st of the calendar year following the close of a model year, each manufacturer that elects the optional section 177 state compliance path under subdivision 1962.1(d)(5)(E)3, shall submit, in writing, to the Executive Officer and each section 177 state a report, including an itemized list, that indicates where vehicles have been placed within the East Region pool and within the West Region pool. The itemized list shall include the following:

i. The manufacturer's total applicable volume of PCs and LDTs delivered for sale in each section 177 state within the regional pool, as determined under subdivision 1962.2(b)(1)(B).

ii. Make, model, vehicle identification number, credit earned, and section 177 state where delivery for sale of each TZEV and ZEV occurred and to meet manufacturer's requirements under subdivision 1962.2(d)(5)(E)2.a.

c. *Failure to Meet Optional Section 177 State Compliance Path Requirements.* A manufacturer that elects the optional section 177 state compliance path under subdivision 1962.1(d)(5)(E)3, and does not meet the modified percentages in subdivision 1962.2(d)(5)(E)2.a. in a model year or make up their deficit within the specified time and with the specified credits allowed by subdivision 1962.2(g)(7)(A) in all section 177 states of the applicable pool, shall be treated as subject to the total ZEV percentage requirements in section 1962.2(b) for the 2018 through 2021 model years in

each section 177 state, and the pooling provisions in subdivision 1962.2(d)(5)(E)2.a. shall not apply. Any transfers of ZEV or TZEV credits between section 177 states will be null and void if a manufacturer fails to comply, and ZEV or TZEV credits will return to the section 177 state in which the credits were earned. Penalties shall be calculated separately by each section 177 state where a manufacturer fails to make up the ZEV deficits by the end of the 2018 model year.

d. The provisions of section 1962.2 shall apply to a manufacturer electing the optional section 177 state compliance path, except as specifically modified by this subdivision 1962.2(d)(5)(E)2.

(F) ***NEVs.*** NEVs must meet the following to be eligible for 0.15 credits:

1. ***Specifications***. A NEV earns credit when it meets all the following specifications:

a. ***Acceleration.*** The vehicle has a 0-20 mph acceleration of 6.0 seconds or less when operating with a payload of at least 332 pounds and starting with the battery at a 50% state of charge.

b. ***Top Speed.*** The vehicle has a minimum top speed of 20 mph when operating with a payload of at least 332 pounds and starting with the battery at a 50% state of charge. The vehicle's top speed shall not exceed 25 mph when tested in accordance with 49 CFR 571.500 (68 FR 43972, July 25, 2003).

c. ***Constant Speed Range.*** The vehicle has a minimum 25-mile range when operating at constant top speed with a payload of least 332 pounds and starting with the battery at 100% state of charge.

2. ***Battery Requirement.*** A NEV must be equipped with one or more sealed, maintenance-free batteries.

3. ***Warranty Requirement.*** A NEV drive train, including battery packs, must be covered for a period of at least 24 months. The first 6 months of the NEV warranty period must be covered by a full warranty; the remaining warranty period may be optional extended warranties (available for purchase) and may be prorated. If the extended warranty is prorated, the percentage of the battery pack's original value to be covered or refunded must be at least as high as the percentage of the prorated coverage period still remaining. For the purpose of this computation, the age of the battery pack must be expressed in intervals no larger than three months. Alternatively, a manufacturer may cover 50 percent of the original value of the battery pack for the full period of the extended warranty.

Prior to credit approval, the Executive Officer may request that the manufacturer provide copies of representative vehicle and battery warranties.

4. ***NEV Charging Requirements.*** A NEV must meet charging requirements specific in subdivision 1962.3(c)(2).

(G) ***BEVx.*** A BEVx must meet the following in order to receive credit, based on its all electric UDDS Range, through subdivision 1962.2(d)(5)(A):

1. ***Emissions Requirements.*** BEVxs must meet all TZEV requirements, specified in subdivision 1962.2(c)(2)(A) through (D).

2. ***APU Operation.*** The vehicle's UDDS range after the APU first starts and enters "charge sustaining hybrid operation" must be less than or equal to the vehicle's UDDS all-electric test range prior to APU start. The vehicle's APU cannot start under any user-selectable driving mode unless the energy storage system used for traction power is fully depleted.

3. ***Minimum Zero Emission Range Requirements.*** BEVxs must have a minimum of 75 miles UDDS all electric range.

(e) ***[Reserved]***

(f) ***[Reserved]***

(g) ***Generation and Use of Credits; Calculation of Penalties***

(1) ***Introduction.*** A manufacturer that produces and delivers for sale in California ZEVs or TZEVs in a given model year exceeding the manufacturer's ZEV requirement set forth in subdivision 1962.2(b) shall earn ZEV credits in accordance with this subdivision 1962.2(g).

(2) ***ZEV Credit Calculations.***

(A) ***Credits from ZEVs.*** The amount of credits earned by a manufacturer in a given model year from ZEVs shall be expressed in units of credits, and shall be equal to the number of credits from ZEVs produced and delivered for sale in California that the manufacturer applies towards meeting the ZEV requirements, or, if applicable, requirements specified under subdivision 1962.2(d)(5)(E)2.a. for the model year subtracted from the number of ZEVs produced and delivered for sale in California by the manufacturer in the model year.

(B) ***Credits from TZEVs.*** The amount of credits earned by a manufacturer in a given model year from TZEVs shall be expressed in units of credits, and shall be equal to the total number of TZEVs produced and delivered for sale in California that the manufacturer applies towards meeting its ZEV requirement, or, if applicable, requirements specified under subdivision 1962.2(d)(5)(E)2.a. for the model year subtracted from the total number of ZEV allowances from TZEVs produced and delivered for sale in California by the manufacturer in the model year.

(C) ***Separate Credit Accounts.*** Credits from a manufacturer's ZEVs, BEVxs, TZEVs, and NEVs shall each be maintained in separate accounts.

(D) **Rounding Credits.** ZEV credits and debits shall be rounded to the nearest 1/100th only on the final credit and debit totals using the conventional rounding method.

(3) ***ZEV Credits for MDVs.*** Credits from ZEVs and TZEVs classified as MDVs, may be counted toward the ZEV requirement for PCs and LDTs, and included in the calculation of ZEV credits as specified in this subdivision 1962.2(g) if the manufacturer so specifies.

(4) ***ZEV Credits for Advanced Technology Demonstration Programs.***

(A) ***[Reserved]***

(B) ***ZEVs.*** ZEVs, including BEVxs, excluding NEVs, placed in a small or intermediate volume manufacturer's California advanced technology demonstration program for a period of two or more years, may earn ZEV credits even if the vehicle is not "delivered for sale" or registered with the California DMV. To earn such credits, the manufacturer must demonstrate to the reasonable satisfaction of the Executive Officer that the vehicles will be regularly used in applications appropriate to evaluate issues related to safety, infrastructure, fuel specifications or public education, and that for 50 percent or more of the first two years of placement the vehicle will be operated in California. Such a vehicle is eligible to receive the same credit that it would have earned if delivered for sale, and for fuel cell vehicles, placed in service. To determine vehicle credit, the model year designation for a demonstration vehicle shall be consistent with the model year designation for conventional vehicles placed in the same timeframe. Manufacturers may earn credit for up to 25 vehicles per model, per section 177 state, per year under this subdivision1962.2(g)(4). A manufacturer's vehicles in excess of the 25-vehicle cap will not be eligible for advanced technology demonstration program credits.

(5) ***ZEV Credits for Transportation Systems.***

(A) ***[Reserved]***

(B) ***[Reserved]***

(C) ***Cap on Use of Transportation System Credits.***

1. ***ZEVs.*** Transportation system credits earned or allocated by ZEVs or BEVxs pursuant to subdivision 1962.1 (g)(5), not including any credits earned by the vehicle itself, may be used to satisfy up to one-tenth of a manufacturer's ZEV obligation in any given model year, and may be used to satisfy up to one-tenth of a

manufacturer's ZEV obligation which must be met with ZEVs, as specified in subdivision 1962.2(b)(2)(E) or, if applicable, requirements specified under subdivision 1962.2(d)(5)(E)2.a..

2. ***TZEVs.*** Transportation system credits earned or allocated by TZEVs pursuant to subdivision 1962.1(g)(5), not including all credits earned by the vehicle itself, may be used to satisfy up to one-tenth of the portion of a manufacturer's ZEV obligation that may be met with TZEVs, or, if applicable, the portion of a manufacturer's obligation that may be met with TZEVs specified under subdivision 1962.2(d)(5)(E)2.a. in any given model year, but may only be used in the same manner as other credits earned by vehicles of that category.

(6) ***Use of ZEV Credits.*** A manufacturer may meet the ZEV requirements in a given model year by submitting to the Executive Officer a commensurate amount of ZEV credits, consistent with subdivision 1962.2(b). Credits in each of the categories may be used to meet the requirement for that category as well as the requirements for lesser credit earning ZEV categories, but shall not be used to meet the requirement for a greater credit earning ZEV category, except for discounted PZEV and AT PZEV credits. For example, credits produced from TZEVs may be used to comply with the portion of the requirement that may be met with credits from TZEV, but not with the portion that must be satisfied with credits from ZEVs. These credits may be earned previously by the manufacturer or acquired from another party.

(A) ***Use of Discounted PZEV and AT PZEV Credits and NEV Credits.*** For model years 2018 through 2025, discounted PZEV and AT PZEV credits, and NEV credits may be used to satisfy up to one-quarter of the portion of a manufacturer's requirement that can be met with credits from TZEVs, or, if applicable, the portion of a manufacturer's obligation that may be met with TZEVs specified under subdivision 1962.2(d)(5)(E)2.a.. Intermediate volume manufacturers may fulfill their entire requirement with discounted PZEV and AT PZEV credits, and NEV credits in model years 2018 and 2019. These credits may be earned previously by the manufacturer or acquired from another party. Discounted PZEV and AT PZEV credits may no longer be used after model year 2025 compliance.

(B) ***Use of BEVx Credits.*** BEVx credits may be used to satisfy up to 50% of the portion of a manufacturer's requirement that must be met with ZEV credits.

~~**(C)** ***GHG-ZEV Over Compliance Credits.***~~

~~1. **Application.** Manufacturers may apply to the Executive Officer, no later than December 31, 2016, to be eligible for this subdivision 1962.2(g)(6)(C), based on the following qualifications:~~

~~**a.** A manufacturer must have no model year 2017 compliance debits and no outstanding debits from all previous model year compliance with sections 1961.1 and 1961.3, and~~

b. A manufacturer must have no model year 2017 compliance debits and no outstanding debits from all previous model year compliance with section 1962.1, and

c. A manufacturer must submit documentation of its projected product plans to show over compliance with the manufacturer's section 1961.3 requirements by at least 2.0 gCO_2/mile in each model year through the entire 2018 through 2021 model year period, and its commitment to do so in each year.

2. Credit Generation and Calculation. Manufacturers must calculate their over compliance with section 1961.3 requirements for model years 2018 through 2021 based on compliance with the previous model year standard. For example, to generate credits for this subdivision 1962.2(g)(6)(C) for model year 2018, manufacturers would calculate credits based on model year 2017 compliance with section 1961.3.

a. At least 2.0 gCO_2/mile over compliance with section 1961.3 is required in each year and the following equation must be used to calculate the amount of ZEV credits earned for purposes of this subdivision 1962.2(g)(6)(C), and:

[(Manufacturer US PC and LDT Sales) x (gCO_2/mile below manufacturer GHG standard for a given model year)] / (Manufacturer GHG standard for a given model year)

b. Credits earned under section 1961.3(a)(9) may not be included in the calculation of gCO_2/mile credits for use in the above equation in subdivision a.

c. Banked gCO_2/mile credits earned under sections 1961.1 and 1961.3 from previous model years or from other manufacturers may not be included in the calculation of gCO_2/mile credits for use in the above equation in subdivision a.

3. Use of GHG-ZEV Over Compliance Credits. A manufacturer may use no more than the percentage enumerated in the table below to meet either the total ZEV requirement nor the portion of their ZEV requirement that must be met with ZEV credits, with credits earned under this subdivision 1962.2(g)(6)(C).

2018	2019	2020	2021
50%	50%	40%	30%

Credits earned in any given model year under this subdivision 1962.2(g)(6)(C) may only be used in the applicable model year and may not be used in any other model year.

~~gCO_2/mile credits used to calculate GHG-ZEV over compliance credits under this provision must also be removed from the manufacturer's GHG compliance bank, and cannot be banked for future compliance toward 1961.3.~~

4. Reporting Requirements. Annually, manufacturers are required to submit calculations of credits for this subdivision 1962.2(g)(6)(C) for the model year, any remaining credits/debits from previous model years under 1961.3, and projected credits/debits for future years through 2021 under 1961.3 and this subdivision 1962.2(g)(6)(C).

If a manufacturer, who has been granted the ability to generate credits under this subdivision 1962.2(g)(6)(C), fails to over comply by at least 2.0 gCO_2/mile in any one year, the manufacturer will be subject to the full ZEV requirements for the model year and future model years, and will not be able to earn credits for any other model year under this subdivision 1962.2(g)(6)(C).

5. If the Executive Officer does not make a determination that a Federal greenhouse gas fleet standard is functionally equivalent to subdivision 1961.3, than ~~this subdivision 1962.2(g)(6)(C) 1. through 4. is unavailable for use by any manufacturer.~~

(7) *Requirement to Make Up a ZEV Deficit.*

(A) *General.* A manufacturer that produces and delivers for sale in California fewer ZEVs than required in a given model year shall make up the deficit by the next model year by submitting to the Executive Officer a commensurate amount of ZEV credits. The amount of ZEV credits required to be submitted shall be calculated by [i] adding the number of credits from ZEVs produced and delivered for sale in California by the manufacturer for the model year to the number of credits from TZEVs produced and delivered for sale in California by the manufacturer for the model year (for a LVM, not to exceed that permitted under subdivision 1962.2(b)(2)), and [ii] subtracting that total from the number of credits required to be produced and delivered for sale in California by the manufacturer for the model year. BEVx, TZEV, NEV, or converted AT PZEV and PZEV credits are not allowed to be used to fulfill a manufacturer's ZEV deficit; only credits from ZEVs may be used to fulfill a manufacturer's ZEV deficit.

(8) *Penalty for Failure to Meet ZEV Requirements.* Any manufacturer that fails to produce and deliver for sale in California the required number of ZEVs and submit an appropriate amount of credits and does not make up ZEV deficits within the specified time allowed by subdivision 1962.2(g)(7)(A) shall be subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer that 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 ZEV deficit is not balanced by the end of the specified time allowed by subdivision 1962.2(g)(7)(A). For the purposes of Health and Safety Code section 43211, the number of vehicles not

meeting the state board's standards shall be equal to the manufacturer's credit deficit, rounded to the nearest 1/100th, calculated according to the following equation, provided that the percentage of a manufacturer's ZEV requirement for a given model year that may be satisfied with TZEVs or credit from such vehicles may not exceed the percentages permitted under subdivision 1962.2(b)(2):

(No. of ZEV credits required to be generated for the model year) – (Amount of credits submitted for compliance for the model year)

(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," adopted March 22, 2012, which is incorporated herein by reference.

(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) ***ZEV-Specific Definitions.*** The following definitions apply to this section 1962.2.

(1) "Auxiliary power unit" or "APU" means any device that provides electrical or mechanical energy, meeting the requirements of subdivision 1962.2(c)(2), to a BEVx, after the zero emission range has been fully depleted. A fuel fired heater does not qualify under this definition for an APU.

(2) "Charge depletion range actual" or "R_{cda}" means the distance achieved by a hybrid electric vehicle on the urban driving cycle at the point when the zero-emission energy storage device is depleted of off-vehicle charge and regenerative braking derived energy.

(3) "Conventional rounding method" means to increase the last digit to be retained when the following digit is five or greater. Retain the last digit as is when the following digit is four or less.

(4) "Discounted PZEV and AT PZEV credits" means credits earned under section 1962 and 1962.1 by delivery for sale of PZEVs and AT PZEVs, discounted according to subdivision 1962.1(g)(2)(F).

(5) "East Region pool" means the combination of Section 177 states east of the Mississippi River.

(6) "Energy storage device" means a storage device able to provide the minimum power and energy storage capability to enable engine stop/start capability, traction boost, regenerative braking, and (nominal) charge sustaining mode driving capability. In the case of TZEVs, a minimum range threshold relative to certified, new-vehicle range capability is not specified or required.

(7) "Hydrogen fuel cell vehicle" means a ZEV that is fueled primarily by hydrogen, but may also have off-vehicle charge capability.

(8) "Hydrogen internal combustion engine vehicle" means a TZEV that is fueled exclusively by hydrogen.

(9) "Majority ownership situations" means when one manufacturer owns another manufacturer more than 33.4%, for determination of size under CCR Section 1900.

(10) "Manufacturer US PC and LDT Sales" means a manufacturer's total passenger car and light duty truck (up to 8,500 pounds loaded vehicle weight) sales sold in the United States of America in a given model year.

(11) "Neighborhood electric vehicle" or "NEV" means a motor vehicle that meets the definition of Low-Speed Vehicle either in section 385.5 of the Vehicle Code or in 49 CFR 571.500 (as it existed on July 1, 2000), and is certified to zero-emission vehicle standards.

(12) "Placed in service" means having been sold or leased to an end-user and not to a dealer or other distribution chain entity, and having been individually registered for on-road use by the California DMV.

(13) "Proportional value" means the ratio of a manufacturer's California applicable sales volume to the manufacturer's Section 177 state applicable sales volume. In any given model year, the same applicable sales volume calculation method must be used to calculate proportional value.

(14) "Range Extended Battery Electric Vehicle" or "BEVx" means a vehicle powered predominantly by a zero emission energy storage device, able to drive the vehicle for more than 75 all-electric miles, and also equipped with a backup APU, which does not operate until the energy storage device is fully depleted, and meeting requirements in subdivision 1962.2(d)(5)(G).

(15) "Section 177 state" means a state that is administering the California ZEV requirements pursuant to section 177 of the federal Clean Air Act (42 U.S.C. § 7507).

(16) "Transitional zero emission vehicle" or "TZEV" means a vehicle that meet the all criteria of subdivision 1962.2(c)(2) and qualifies for an allowance in subdivision 1962.2(c)(3)(D) or (E).

(17) "West Region pool" means the combination of Section 177 states west of the Mississippi River.

(18) "Zero emission vehicle" or "ZEV" means a vehicle that produces zero exhaust emissions of any criteria pollutant (or precursor pollutant) or greenhouse gas under any possible operational modes or conditions.

(19) "Zero emission vehicle fuel" means a fuel that provides traction energy in on-road ZEVs. Examples of current technology ZEV fuels include electricity, hydrogen, and compressed air.

(j) ***Abbreviations.*** The following abbreviations are used in this section 1962.2:

"AER" means all-electric range.
"APU" means auxiliary power unit.
"AT PZEV" means advanced technology partial zero-emission vehicle.
"BEVx" means range extended battery electric vehicle.
"CFR" means Code of Federal Regulations.
"CO_2" means carbon dioxide.
"DMV" means the California Department of Motor Vehicles.
"EAER" means equivalent all-electric range.
"FR" means Federal Register.
"g" means grams.
"HEV" means hybrid-electric vehicle.
"LDT" means light-duty truck.
"LDT1" means a light-truck with a loaded vehicle weight of 0-3750 pounds.
"LDT2" means a "LEV II" light-duty truck with a loaded vehicle weight of 3751 pounds to a gross vehicle weight of 8500 pounds, or a "LEV I" light-duty truck with a loaded vehicle weight of 3751-5750 pounds.
"LVM" means large volume manufacturer.
"MDV" means medium-duty vehicle.
"NMOG" means non-methane organic gases, or the total mass of oxygenated and non-oxygenated hydrocarbon emissions.
"NEV" means neighborhood electric vehicle.
"NOx" means oxides of nitrogen.
"PC" means passenger car.
"PZEV" means partial allowance zero-emission vehicle
"SAE" means Society of Automotive Engineers.
"SULEV" means super-ultra-low-emission-vehicle.
"TZEV" means transitional zero emission vehicle.
"UDDS" means urban dynamometer driving cycle.

"US" means United States of America.
"US06" means the US06 Supplemental Federal Test Procedure
"VMT" means vehicle miles traveled.
"ZEV" means zero-emission vehicle.

(k) ***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 this article remains in full force and effect.

(l) ***Public Disclosure.*** Records in the Board's possession for the vehicles subject to the requirements of section 1962.2 shall be subject to disclosure as public records as follows:

(1) Each manufacturer's annual production data and the corresponding credits per vehicle earned for ZEVs and TZEVs for the 2018 and subsequent model years; and

(2) Each manufacturer's annual credit balances for 2018 and subsequent years for:

(A) Each type of vehicle: ZEV (minus NEV), BEVx, NEV, TZEV, and discounted PZEV and AT PZEV credits; and

(B) Advanced technology demonstration programs; and

(C) Transportation systems; and

(D) Credits earned under section 1962.2(d)(5)(A), including credits acquired from, or transferred to another party, and the parties themselves.

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.

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

* * * * *

(c) Transitional Zero-Emission Vehicles (TZEV).

* * * * *

(2) *TZEV Requirements.*

* * * * *

(B) *Evaporative Emissions.* Certify the vehicle to the evaporative emission standards in subdivision 1976(b)(1)(G). or 1976(b)(1)(E) ~~Manufacturers may certify 2018 and 2019 TZEVs to the evaporative standards for PCs and LDTs in subdivision 1976(b)(1)(E)~~;

* * * * *

(3) *Allowances for TZEVs*

(A) *Zero-Emission Vehicle Miles Traveled TZEV Allowance Calculation.* A vehicle that meets the requirements of subdivision 1962.2(c)(2) and has zero-emission vehicle miles traveled (VMT), as defined by and calculated by 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," adopted March 22, 2012, last amended December 6, 2012, which is incorporated herein by reference, and measured as equivalent all electric range (EAER) capability will generate an allowance according to the following equation:

UDDS Test Cycle Range (~~E~~AER)	*Allowance*
<10 all electric miles	0.00
≥10 all electric miles	TZEV Credit = [(0.01) * EAER + 0.30]
>80 miles (credit cap)	1.10

1. Allowance for US06 Capability. TZEVs with US06 all electric range capability (AER) of at least 10 miles shall earn an additional 0.2

allowance. US06 test cycle range capability shall be determined in accordance with section ~~E.8~~G.7.5 of the "California Exhaust Emission Standards and Test Procedures for the 2018 and Subsequent Model Zero-Emission Vehicles, and Hybrid Electric Vehicles in the Passenger Car, Light-Duty Truck, and Medium Duty Vehicle Classes," adopted March 22, 2012, last amended December 6, 2012, which is incorporated herein by reference.

* * * * *

(g) ***Generation and Use of Credits; Calculation of Penalties***

* * * * *

(6) ***Use of ZEV Credits.***

* * * * *

~~**(C)** ***GHG-ZEV Over Compliance Credits.***~~

1. Application. Manufacturers may apply to the Executive Officer, no later than December 31, 2016, to be eligible for this subdivision 1962.2(g)(6)(C), based on the following qualifications:

a. A manufacturer must have no model year 2017 compliance debits and no outstanding debits from all previous model year compliance with sections 1961.1 and 1961.3, or must have demonstrated compliance with the National greenhouse gas program as allowed by subdivisions 1961.1(a)(1)(A)(ii) and 1961.3(c); ~~.~~ and

b. A manufacturer must have no model year 2017 compliance debits and no outstanding debits from all previous model year compliance with section 1962.1; ~~.~~ and

c. A manufacturer must submit documentation of its projected product plans to show over compliance with the manufacturer's section 1961.3 requirements, or over compliance with National greenhouse gas program requirements as allowed by subdivision 1961.3(c), by at least 2.0 gCO_2/mile in each model year through the entire 2018 through 2021 model year period, and its commitment to do so in each year.

2. Credit Generation and Calculation. Manufacturers must calculate their over compliance with section 1961.3 requirements, or over compliance with the National greenhouse gas program requirements as allowed by subdivision 1961.3(c), for model years 2018 through 2021 based on compliance with the previous model year standard. For example, to generate credits for this subdivision 1962.2(g)(6)(C) for model year 2018, manufacturers would calculate credits based on model year 2017 compliance with section 1961.3, or over compliance with the National greenhouse gas program as allowed by subdivision 1961.3(c).

a. At least 2.0 gCO_2/mile over compliance with section 1961.3, or over compliance with the National greenhouse gas program as allowed by subdivision 1961.3(c), is required in each year and the following equation must be used to calculate the amount of ZEV credits earned for purposes of this subdivision 1962.2(g)(6)(C), and:

[(Manufacturer US PC and LDT Sales) x (gCO_2/mile below manufacturer GHG standard for a given model year)] / (Manufacturer GHG standard for a given model year)

b. Credits earned under ~~section~~ subdivision 1961.3(a)(9), or credits earned under 40 CFR, part 86, Subpart S, §86.1866-12(a), §86.1866-12(b), or §86.1870-12, may not be included in the calculation of gCO_2/mile credits for use in the above equation in subdivision a. All ZEVs included in the calculation above must include upstream emission values found in section 1961.3.

c. Banked gCO_2/mile credits earned under sections 1961.1 and 1961.3, or under the National greenhouse gas program requirements as allowed by subdivision 1961.3(c), from previous model years or from other manufacturers may not be included in the calculation of gCO_2/mile credits for use in the above equation in subdivision a.

3. Use of GHG-ZEV Over Compliance Credits. A manufacturer may use no more than the percentage enumerated in the table below to meet either the total ZEV requirement nor the portion of their ZEV requirement that must be met with ZEV credits, with credits earned under this subdivision 1962.2(g)(6)(C).

2018	2019	2020	2021
50%	50%	40%	30%

~~Credits earned in any given model year under this subdivision 1962.2(g)(6)(C) may only be used in the applicable model year and may not be used in any other model year.~~

gCO_2/mile credits used to calculate GHG-ZEV over compliance credits under this provision must also be removed from the manufacturer's GHG compliance bank, and cannot be banked for future compliance toward section 1961.3, or towards compliance with the National greenhouse gas program requirements as allowed by subdivision 1961.3(c).

4. Reporting Requirements. Annually, manufacturers are required to submit calculations of credits for this subdivision 1962.2(g)(6)(C) for the model year, any remaining credits/debits from previous model years under section 1961.3~~,~~ or under the National greenhouse gas program requirements as allowed by subdivision 1961.3(c), and projected credits/debits for future years through 2021 under section 1961.3 or under the National greenhouse gas program requirements as allowed by subdivision 1961.3(c) and this subdivision 1962.2(g)(6)(C).

If a manufacturer, who has been granted the ability to generate credits under this subdivision 1962.2(g)(6)(C), fails to over comply by at least 2.0 gCO_2/mile in any one year, the manufacturer will be subject to the full ZEV requirements for the model year and future model years, and will not be able to earn credits for any other model year under this subdivision 1962.2(g)(6)(C).

~~**5. If the Executive Officer does not make a determination that a Federal greenhouse gas fleet standard is functionally equivalent to subdivision 1961.3, than this subdivision 1962.2(g)(6)(C) 1. through 4. is unavailable for use by any manufacturer.**~~

* * * * *

(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," adopted March 22, 2012, last amended December 6, 2012, which is incorporated herein by reference.

* * * * *

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.

Final Regulation Order – Part 5

ELECTRIC VEHICLE CHARGING REQUIREMENTS

Note: Set forth below are the 2012 amendments to the California zero emission vehicle (ZEV) regulation. The text of the amendments is shown in underline to indicate additions and ~~strikeout~~ to indicate deletions, compared to the preexisting regulatory language.

Amend (and Renumber) Title 13, Motor Vehicles, Division 3, Air Resources Board, Chapter 1, Motor Vehicle Pollution Control Devices, Article 2, Approval of Motor Vehicle Pollution Control Devices (New Vehicles), § 1962.2, Electric Vehicle Charging Requirements to read:

§ 1962.~~2.~~3. Electric Vehicle Charging Requirements.

(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 ~~1.0 or greater~~ 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~~, other than battery electric vehicles and hybrid electric vehicles that are only capable of Level 1 charging~~.

(b) *Definitions*.

(1) The definitions in section 1962.1 and 1962.2 apply to this section.

~~(2) "Level 1 charging" means a charging method that allows an electric vehicle or hybrid electric vehicle to be charged by having its charger connected to the most common grounded receptacle (NEMA 5-15R). A vehicle that is only capable of Level 1 charging is one that is charged by an on-board or off-board charger capable of accepting energy from the existing AC supply network. The maximum power is 12 amps, with a branch circuit rating of 15 amps, and continuous power of 1.44 kilowatts.~~

(c) *Requirements*.

(1) Beginning with the 2006 model year, all vehicles identified in ~~subsection~~ subdivision (a) must be equipped with a conductive charger inlet ~~port~~ 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 ~~NOV 2001~~ JAN 2010, SAE Electric Vehicle and Plug in Hybrid Electric Vehicle Conductive Charge 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 ~~kilovolt amps.~~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.

Amend Title 13, California Code of Regulations, section 1965 to read:

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

In addition to all other requirements, emission control labels required by California certification procedures and smog index labels shall conform to the "California Motor Vehicle Emission Control and Smog Index Label Specifications," adopted March 1, 1978, as last amended ~~February 26, 1999~~ October 22, 1999, which is incorporated herein by reference.

Note: Authority cited: Sections 39600, 39601 and 43200, Health and Safety Code. Reference: Section 39002, 29003, 43000, 43013, 43100, 43101, 43102, 43103, 43104, 43107 and 43200, Health and Safety Code.

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

In addition to all other requirements, emission control labels are required by the California certification procedures ~~and smog index labels shall conform to~~ 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 ~~November 22, 2000~~] September 5, 2003, which is incorporated herein by reference, the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty trucks and Medium-Duty Vehicles," incorporated by reference in §1961(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 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," adopted September 5, 2003, 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 and 43200, Health and Safety Code. Reference: Sections 39002, 39003, 43000, 43013, 43100, 43101, 43102, 43103, 43104, 43107 and 43200, Health and Safety Code.

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

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 ~~for 2001~~ 2009 through 2016 ~~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(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 March 22, 2012, 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.

FINAL REGULATION ORDER

Amend section 1968.2, title 13, California Code of Regulations, to read as follows:

Note: The amendments are shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions from the existing regulatory text. Various portions of the regulations that are not modified by the proposed amendments are omitted from the text shown and indicated by " * * * * ".

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

(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.

* * * *

(c) *Definitions.*

* * * *

"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.

* * * *

"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 the title 13, CCR, section 1971.1 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.

* * * *

(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.

* * * *

(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).

* * * *

(3.2) 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 ~~introductory~~ 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).

* * * *

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

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(4.3) Denominator Specifications

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(4.3.2) Specifications for incrementing:

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(F) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator(s) for the following monitors of ~~output~~ 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 (sections ~~(f)(9.2.1),~~ (f)(9.2.4)~~, and (f)(9.2.5)~~)

(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

* * * *

(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))
~~(iii) PM filter active/intrusive injection (section (f)(9.2.6))~~

* * * *

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

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(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 ~~emission~~ applicable standards.

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(15) *Comprehensive Component Monitoring*

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(15.4) MIL Illumination and Fault Code Storage:

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(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).

* * * *

(f) *Monitoring Requirements for Diesel/Compression-Ignition Engines.*

(1) Non-Methane Hydrocarbon (NMHC) Converting Catalyst Monitoring

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(1.2) Malfunction Criteria:

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(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:

* * * *

(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.

* * * *

(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:

* * * *

(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.

* * * *

(2) *Oxides of Nitrogen (NOx) Converting Catalyst Monitoring*

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(2.2) Malfunction Criteria:

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(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:

* * * *

(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; ~~and~~

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

~~c~~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 ~~2013~~ 2016 and subsequent model year vehicles.

* * * *

(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)~~(A),~~ (B)~~,~~ and (D) (~~e.g.~~i.e., ~~SCR performance,~~ 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.

* * * *

(3) *Misfire Monitoring*

(3.1) Requirement:

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

* * * *

(3.2) 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 ~~vehicles~~ 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 ~~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, 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 ~~that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed~~ 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 exceed 1.5 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 ~~2.0 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~~.

(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, ~~M~~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)~~(B)~~ 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), ~~T~~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) ~~Additionally, f~~For misfires identified in section (f)(3.2.2) ~~2010 and subsequent model year vehicles subject to (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, ~~T~~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.

~~(B)~~(C) If a monitoring system cannot detect all misfire patterns under all required engine speed and load conditions as required in sections (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, ~~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), 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)~~(B)~~, 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)~~(B)~~ 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)~~(B)~~ 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.

* * * *

(4) *Fuel System Monitoring*

(4.1) Requirement:

The OBD II system shall monitor the fuel delivery system to determine its ability to comply with ~~emission~~ <u>applicable</u> 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:

* * * *

(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;

* * * *

(5) *Exhaust Gas Sensor Monitoring*

* * * *

(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:

* * * *

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.

* * * *

(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:

* * * *

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.

* * * *

(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:

* * * *

(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; ~~and~~

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

~~c~~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 ~~2013~~ 2016 and subsequent model year vehicles.

* * * *

(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), ~~and~~ (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), ~~and~~ (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)~~, and (5.2.2)(D)~~ (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).

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(6) *Exhaust Gas Recirculation (EGR) System Monitoring*

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(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:

* * * *

(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.

* * * *

(6.2.6) EGR Catalyst Performance: For catalysts located in the EGR system ~~on 2013 and subsequent model year vehicles~~ 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. ~~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).~~

(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.

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(7) *Boost Pressure Control System Monitoring*

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(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:

* * * *

(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.

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(8) NOx Adsorber Monitoring

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(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:

* * * *

(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.

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(9) *Particulate Matter (PM) Filter Monitoring*

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(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:

* * * *

(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.

* * * *

(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:

* * * *

(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.

* * * *

(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.

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(12) *Cold Start Emission Reduction Strategy Monitoring*

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(12.2) Malfunction Criteria: The OBD II system shall, to the extent feasible, detect a malfunction if either of the following occurs:

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(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:

* * * *

(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.

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(13) *Variable Valve Timing And/Or Control (VVT) System Monitoring*

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(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:

* * * *

(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.

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(15) Comprehensive Component Monitoring

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(15.2) Malfunction Criteria:

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(15.2.2) Output Components/Systems:

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(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).

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(15.4) MIL Illumination and Fault Code Storage:

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(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).

* * * *

(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 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 ~~significant errors of commission in detecting~~ 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 ~~2013~~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 ~~significant errors of commission in detecting~~ false indications of a malfunction.

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(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).

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(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 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 ~~of~~ 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.

* * * *

(h) *Monitoring System Demonstration Requirements For Certification*

* * * *

(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).

* * * *

(4.3) 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).

* * * *

(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.

* * * *

(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:

* * * *

(2.5) Data supporting the misfire monitor:

(~~2.5~~2.5.1) For gasoline vehicles, data supporting the misfire monitor~~,~~ shall includ~~ing~~e:

(~~2.5.1~~ A)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~~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.

(~~2.5.3~~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.

(~~2.5.4~~D) Manufacturers are not required to use the durability demonstration vehicle to collect the misfire data for sections (i)(2.5.1)(A) though (~~2.5.3~~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.

* * * *

(j) *Production Vehicle Evaluation Testing.*

* * * *

(2) *Verification of Monitoring Requirements.*

* * * *

(2.3) Evaluation requirements:

* * * *

(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 ~~emission standards are~~ malfunction threshold (e.g., 1.5 times the applicable standards) is exceeded is not required.

* * * *

NOTE: Authority cited: Sections 39010, 39600, 39601, 43000.5, 43013, 43016, 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.

FINAL REGULATION ORDER

Amend section 1968.5, title 13, California Code of Regulations, to read as follows:

Note: Amendments are shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions from the existing regulatory text. Various portions of the regulations that are not modified by the proposed amendments are omitted from the text shown and indicated by " * * * * ".

§ 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.

(a) *General*

* * * *

(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(c), which are incorporated by reference herein. The following definitions are specifically applicable to section 1968.5 and take precedence over any contrary definitions.

* * * *

"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 ~~requirements of~~ title 13, CCR section 1968.2(c). ~~For purposes of section 1968.5, a motor vehicle class shall be considered nonconforming~~ irrespective of whether vehicles in the motor vehicle class, on average, meet other applicable ~~tailpipe or evaporative~~ 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).

* * * *

(b) *Testing Procedures*

* * * *

(3) *Vehicle Selection for Enforcement Testing*.

* * * *

(D) *Vehicles to be included in a Test Sample Group*.

* * * *

(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.
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(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(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(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(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, ~~and~~ NMHC converting ~~oxidation~~ catalyst monitors, PM sensor monitors, and PM sensor heater monitors utilizing a denominator incremented in accordance with title 13, CCR section 1968.2(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.

* * * *

(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*.

* * * *

(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(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:

* * * *

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(f)(2.2.2)), reductant delivery performance monitor (title 13, CCR section 1968.2(f)(2.2.3)(A)), and NOx sensor monitor (title 13, CCR section 1968.2(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(f)(2.2.2)(A)(ii)c. or 1968.2(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(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(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(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(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 ~~2016~~ 2018 model year vehicles certified to a ratio of 0.100 in accordance with title 13, CCR section 1968.2(d)(3.2.1)(D),

* * * *

(c) *Remedial Action*

* * * *

(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(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(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(d)(3.2.1) for the same major monitor. For monitors on 2004 through ~~2016~~ 2018 model year vehicles certified to the 0.100 ratio in title 13, CCR section 1968.2(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(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(e) (e.g., 2006 and 2007 model year for cold start strategy monitoring in title 13, CCR section 1968.2(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(f) and for the PM filter filtering performance monitor (title 13, CCR section 1968.2(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(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(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(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.

~~(vi)~~(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.

* * * *

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.

FINAL REGULATION ORDER

Amend section 1971.1, title 13, California Code of Regulations, to read as follows:

Note: The proposed amendments are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions from the existing regulatory text.

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

(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), 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]

(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

[1] Unless otherwise noted, all section references refer to section 1971.1 of title 13, CCR.

considered alternate-fueled 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.

~~"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.~~

"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," ~~May 2007~~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 ~~February 2008~~May 2010)," ~~January 2009~~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 ~~containing software~~ 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) ~~excluding~~ except for anti-lock brake system (ABS) control units or stability/traction control units,:

(a) has primary control over ~~the~~ any rationality fault diagnostic~~s~~ or functional check for more than ~~two~~ four ~~of the~~ 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, f~~F~~or purposes of criteria~~a~~on (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:

(~~a~~1) Begins with engine start and ends with engine shutoff;

(~~b~~2) Begins with engine start and ends after four hours of continuous engine-on operation;

(~~c~~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

(~~d~~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 (~~a~~1) and (~~d~~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.

"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.

"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 ~~or an alternate-fueled 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 ~~currently commanding the MIL on and 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).

<u>"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).</u>

"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~~-20~~ 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.~~3~~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) ~~The storage and erasure of~~ For 2010 through 2015 model year engines, the OBD system shall store and erase freeze frame conditions ~~shall be done~~ 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 ~~may~~ 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, ~~T~~the OBD 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. 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, ~~C~~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 ~~may~~ 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, ~~T~~the OBD system may erase a previously MIL-on 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. 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, ~~C~~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

~~if any of the following conditions listed below occurs~~. The Executive Officer shall approve the request upon determining that the manufacturer has submitted data and/or engineering evaluation that verify ~~the conditions below~~ 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, ~~and~~ (2) is not caused by ~~or invoked to protect~~ 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(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), ~~T~~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, <u>for</u> the evaporative system monitor ~~denominator(s)~~<u>, 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)</u> shall be incremented if and only if:

(i) Cumulative time since <u>engine</u> 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 <u>component</u> monitors ~~of output components~~ (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 manufacturers may use the criteria specified in title 13, CCR section 1968.2(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 monitors of the following components 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) Engine cooling system input components (section (g)(1))
(ii)(i) “Other emission control systems” (section (g)(4))
(iii)(ii) Comprehensive component input components that require extended monitoring evaluation (section (g)(3)) (e.g., stuck fuel level sensor rationality)
(iv)Comprehensive component input component temperature sensor rationality monitors (section (g)(3)) (e.g., intake air temperature sensor, ambient temperature sensor, fuel temperature sensor)
(v)(iii) PM filter frequent regeneration (section (e)(8.2.2))
(iv) PM sensor monitoring capability monitor (section (e)(9.2.2)(D))

(G) For monitors of 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) ~~Particulate matter~~ Catalyzed PM filter~~s~~ NMHC conversion (section~~s~~ ~~(e)(8.2.1),~~ (e)(8.2.4)~~, and (8.2.5)~~)

(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 ~~hybrid vehicles,~~ vehicles that employ alternate engine start hardware or strategies (e.g., ~~integrated starter and generators~~ 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 ~~vehicles~~ engines ~~(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.

(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 ~~in~~ of sections (d)(4.3.2)(B) ~~through (C)~~ are satisfied (i.e., vehicle speed/calculated load, ambient temperature, elevation, idle operation, ~~engine cold start,~~ 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 ~~bank 1, NMHC catalyst bank 2, NOx catalyst bank 1~~, NOx catalyst ~~bank 2~~, exhaust gas sensor ~~bank 1, exhaust gas sensor bank 2~~, 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 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 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 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; 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:

(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 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 on all engine ratings in all engine families.

(7.4) Small volume manufacturers shall be exempt from the requirements of section 1971.1 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.

(7.5.2) For 2013 through ~~2019~~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; 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 ~~2020~~ 2018 and subsequent model year engines, a manufacturer shall implement an OBD system meeting the requirements of section 1971.1. 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, 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 ~~emission~~ 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 ~~vehicles~~ 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~~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 ~~causing excess emissions~~. 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 ~~manufacturer~~ 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 ~~and subsequent~~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 ~~causing the engine's NMHC, CO, or NOx 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~~.

(A) Manufacturers shall ~~determine~~ evaluate the percentage of misfire ~~evaluated~~ in 1000 revolution increments ~~that would cause NMHC, CO, or NOx emissions from an emission durability demonstration engine to exceed 2.0 times any of the applicable standards or PM emissions to exceed the applicable standard plus 0.02 g/bhp-hr 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.

(2.2.3) A malfunction shall be detected if the percentage of misfire ~~established~~ specified in section (e)(2.2.2)~~(A)~~ 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), ~~T~~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) ~~Additionally, f~~For misfires identified in section (e)(2.2.2) ~~2013 and subsequent model year engines equipped with sensors that can detect combustion or combustion quality~~:

(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), ~~all~~ under positive torque conditions between 20 percent and 75 percent of peak torque with engine speed~~s~~ up to 75 percent of the maximum engine speed ~~and load conditions~~.

(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, ~~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), 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 ~~2013 and subsequent model year engines~~ misfires identified in section (e)(2.2.2)~~equipped with sensors that can detect combustion or combustion quality~~:

(A) Upon detection of the percentage of misfire specified in section (e)(2.2.2)~~(A)~~, 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, t~~T~~he 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 maximum detectable boost when little or no boost is expected.

(4.2.3) Slow response:

(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 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 ~~2013~~ 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 ~~where~~ 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 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.

~~(B)~~(D) Except as provided for below in section (e)(6.2.1)(E), ~~F~~for ~~2013~~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)(~~B~~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.

~~(ii)~~(iv) Except as provided for below in section (e)(6.2.2)(A)(v), ~~F~~for ~~2013~~ 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)~~(A),~~ (B)~~,~~ and (D) (~~e.g.~~i.e., ~~SCR performance,~~ 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) ~~Except as specified in section (e)(8.2.1.)(C) below, f~~For all 2013 model year engines and 2014 and ~~through~~ 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 ~~(e.g., cracking)~~ 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.

~~(C)~~(D) ~~For 2013 through 2015 model year engines subject to (d)(7.2.2)(A) and~~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 ~~2013~~ 2015 and subsequent model year engines~~,~~ ~~for~~ with catalyzed PM filters that convert NMHC emissions~~,~~:

(i) ~~t~~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 ~~II~~ 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).

~~(ii)~~(iv) Except as provided for below in section (e)(9.2.2)(A)(v), ~~F~~for ~~2013~~ 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 ~~any of~~ 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), ~~and~~ (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), ~~and~~ (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), ~~and (9.2.2)(D)~~ (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 (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~~, if an engine~~ incorporate~~s~~ a specific engine control strategy to reduce cold start emissions, the OBD system shall monitor the ~~system~~ strategy to verify ~~the strategy~~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 ~~emission~~ 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 ~~vehicle~~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 ~~vehicles~~ 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 ~~vehicle~~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 ~~vehicles~~ 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, f~~F~~rom 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 ~~each engine restart~~ <u>engine fueling begins for the initial start and after each time fueling resumes.</u>

(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.~~3~~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 ~~of the secondary air system~~.

(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 ~~required to be equipped with~~ subject to evaporative emission standards ~~systems~~ 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 ~~vehicles~~ 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 ~~both~~ 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) ~~and~~ through (~~C~~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, ~~hot restart conditions~~ engine block

heater operation). ~~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 (g)(1.2.1)(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.~~ 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.

~~(E)~~(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 ~~engine~~ 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~~s~~ 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), ~~F~~for hybrid~~s~~ 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 ~~given~~ 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 ~~2013~~ 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, ~~T~~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) ~~or~~ 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 ~~a higher threshold (or, in the case of section (e)(8.2.1), the exclusion of specific failure modes)~~ to prevent ~~significant errors of commission in detecting~~ 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.

~~(5.7)~~(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", ~~May 2007~~ 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:~~2005~~ "Road Vehicles-Diagnostics Communication ~~on~~ over Controller Area Network (CAN) - Part 4: Requirements for emission-related systems", ~~January 2005~~ 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, ~~March 2009~~April 2011;

(1.7.2) J1939/1 ~~Recommended Practice for~~ On-Highway Equipment Control and Communication~~s~~ Network ~~for On-Highway Equipment~~, ~~September 2000~~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, ~~March 2004~~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 ~~2006~~2010;

(1.7.7) J1939/31 Network Layer, ~~April 2004~~May 2010;

(1.7.8) J1939/71 Vehicle Application Layer (Through ~~February 2008~~May 2010), ~~January 2009~~March 2011;

(1.7.9) J1939/73 Application Layer—Diagnostics, ~~September 2006~~February 2010;

(1.7.10) J1939/81 Network Management, ~~May 2003~~June 2011; and

(1.7.11) J1939/84 OBD Communications Compliance Test Cases For Heavy Duty Components and Vehicles, December ~~2008~~2010.

(1.8) SAE J2403 “Medium/Heavy-Duty E/E Systems Diagnosis Nomenclature,” ~~August 2007~~ February 2011 (SAE J2403).

(1.9) SAE J1699-3 —“Vehicle OBD II Compliance Test Cases”, ~~May 2006~~ 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) If the connector is covered, the cover must be removable by hand without the use of any tools and be labeled "OBD" 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). 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.

(2.2) 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).

(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) ~~and~~ 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). ~~The readiness status for all components or systems identified in (f)(2) and (g)(3) shall always indicate "complete". The readiness status for all other components or systems shall immediately indicate "complete" upon the respective monitor(s) (except those monitors specified under section (h)(4.1.4) 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. 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".~~

(4.1.1) ~~Subject to Executive Officer approval, a manufacturer may request that the readiness status for a monitor be set to indicate "complete" without monitoring having been completed 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). 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".~~ 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 the evaporative system monitor, the readiness status shall be set in accordance with section (h)(4.1) when both the functional check of the purge valve and, if applicable, the leak detection monitor of the orifice size specified in section (f)(7.2.2)(B) (e.g., 0.150 inch) indicate that they are complete.~~ 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”.

~~(4.1.3)~~(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 ~~remain~~ continuously illuminate~~d~~ in the key on, engine off position for at least 15~~-20~~ 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.

~~(4.1.4)~~(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).

(~~G~~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 ~~status~~ 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 ~~status~~ 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. ~~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/J1939 specifications.~~ 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.

~~(4.7.5)~~(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 ~~shall be erased in conjunction with reprogramming of the VIN or the ESN~~.

(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), ~~I~~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.

~~(D) The counters shall be made available to a generic scan tool in accordance with the SAE J1979/J1939 specifications and may be rescaled when transmitted, if required by the SAE specifications, from a resolution of one second per bit to no more than three minutes per bit.~~

(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).

~~(6) Service Information:~~

~~(6.1) Engine manufacturers shall provide the aftermarket service and repair industry emission-related service information as set forth in sections (h)(6.3) through (6.5).~~

~~(6.2) The Executive Officer shall waive the requirements of sections (h)(6.3) through (6.5) upon determining that ARB or U.S. EPA has adopted a service information regulation or rule that is in effect and operative and requires engine manufacturers to provide emission-related service information:~~
~~(A) of comparable or greater scope than required under these provisions;~~
~~(B) in an easily accessible format and in a timeframe that is equivalent to or exceeds the timeframes set forth below; and~~
~~(C) at fair and reasonable cost.~~

~~(6.3) Manufacturers shall make readily available, at a fair and reasonable price to the automotive repair industry, vehicle repair procedures which allow effective emission-related diagnosis and repairs to be performed using only the SAE J1978/J1939 generic scan tool and commonly available, non-microprocessor based tools.~~

~~(6.4) As an alternative to publishing repair procedures required under section (h)(6.3), a manufacturer may publish repair procedures referencing the use of manufacturer-specific or enhanced equipment provided the manufacturer meets one of the following conditions:~~

~~(6.4.1) makes available to the aftermarket scan tool industry the information needed to manufacture scan tools to perform the same emission-related diagnosis and repair procedures (excluding any reprogramming) in a comparable manner as the manufacturer-specific diagnostic scan tool, or~~

~~(6.4.2) makes available for purchase, at a fair and reasonable price to the automotive repair industry, a manufacturer-specific or enhanced tool to perform the emission-related diagnosis and repair procedures (excluding any reprogramming).~~

~~(6.5) Manufacturers shall make available:~~

~~(6.5.1) Information to utilize the test results reported as required in section (h)(4.5). The information must include a description of the test and test result, typical passing and failing values, associated fault codes with the test result, and scaling, units, and conversion factors necessary to convert the results to engineering units.~~

~~(6.5.2) A generic description of each of the diagnostics used to meet the~~

~~requirements of this regulation. The generic description must include a text description of how the diagnostic is performed, typical enable conditions, typical malfunction thresholds, typical monitoring time, fault codes associated with the diagnostic, and test results (section (h)(4.5)) associated with the diagnostic. Vehicles that have diagnostics not adequately represented by the typical values identified above shall be specifically identified along with the appropriate typical values.~~

~~(6.5.3) Information necessary to execute each of the diagnostics used to meet the requirements of sections (e)(1) through (f)(9). The information must include either a description of sample driving patterns designed to be operated in-use or a written description of the conditions the vehicle needs to operate in to execute each of the diagnostics necessary to change the readiness status from "not complete" to "complete" for all monitors. The information shall be able to be used to exercise all necessary monitors in a single driving cycle as well as be able to be used to exercise the monitors to individually change the readiness status for each specific monitor from "not complete" to "complete".~~

~~(7) Exceptions to Standardization Requirements.~~

~~(7.1) For 2020 and subsequent model year alternate-fueled engines derived from a diesel-cycle engine, a manufacturer may meet the standardized requirements of section (h) that are applicable to diesel engines in lieu of the requirements applicable to gasoline engines.~~

(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) ~~specified~~ 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 2010 through 2012 model year engines, a~~ 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). ~~For 2013 and subsequent model year engines, the manufacturer shall perform a test at the malfunction criteria limit specified in section (e)(2.2.2).~~

(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 ~~FTP~~ 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 ~~criteria~~ 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 ~~criteria~~ 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 ~~criteria~~ 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)~~(A)(i), (e)(6.2.1)(B)(i),~~ 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 ~~the~~ each malfunction limit calibrated to the emission threshold malfunction criteria (e.g., 2.0 times the ~~FTP~~ 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 ~~FTP~~ 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) ~~to detect a malfunction before emissions exceed 1.5 times the applicable standards~~. 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) ~~to detect a malfunction before emissions exceed 1.5 times the applicable standards~~.

(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.

~~(C)~~(D) For other fuel metering or control systems, the manufacturer shall perform a test at the criteria limit(s).

~~(D)~~(E) ~~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 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 ~~criteria~~ limit calibrated to the emission threshold malfunction criteria (e.g., 1.5 times the standard) ~~specified~~ 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 ~~criteria~~ 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 ~~threshold~~ 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 ~~threshold~~ 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 ~~FTP~~ 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 ~~emission~~ 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 ~~be required to~~ 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 <u>emission threshold</u> 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) ~~Except for 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)), i~~<u>I</u>f the MIL first illuminates after emissions exceed the applicable <u>emission threshold</u> 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 ~~before~~ <u>without</u> emissions exceed<u>ing</u> the applicable <u>emission threshold</u> malfunction criteria specified in sections (e) through (g). If the <u>system or</u>

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 ~~is~~ performance~~ing~~ 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~~or slightly better than the malfunction criteria~~). 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. ~~When tested with the component adjusted to the worst acceptable limit, the MIL must not illuminate during the test and the engine emissions must be below the applicable malfunction criteria specified in sections (e) through (g).~~ 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), i~~I~~n 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~~(s)~~ 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, ~~testing shall be continued until~~ either of the following conditions ~~are~~ must be satisfied by the test results:

(i) The MIL is illuminated and emissions do not exceed the emission threshold~~s~~ 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 ~~threshold~~ malfunction criteria identified below. ~~The manufacturer shall demonstrate acceptable limits by continuing testing until~~ The demonstration shall be deemed appropriate when the test results show:

a. The MIL is illuminated and emissions exceed the emission threshold~~s~~ malfunction criteria specified in sections (e) or (f) by ~~10~~

20 percent or less of the applicable standard (e.g., emissions are less than ~~1.85~~ 2.2 times the applicable standard for an emission threshold malfunction criterion of ~~1.75~~ 2.0 times the standard); and

b. The MIL is not illuminated and emissions are below the emission threshold~~s~~ malfunction criteria specified in sections (e) or (f) by no more than 20 percent of the standard (e.g., emissions are between ~~1.55~~ 1.8 and ~~1.75~~ 2.0 times the applicable standard for an emission threshold malfunction criterion of ~~1.75~~ 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 <u>exhaust</u> 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~~ July 7, 2009, 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/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 ~~P~~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 ~~should~~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) ~~Data supporting the limit for the time between engine starting and attaining the designated heating temperature for after-start heated catalyst systems.~~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, 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, ~~and~~ 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) ~~Any other information determined by the Executive Officer to be necessary to demonstrate compliance with the requirements of this regulation.~~ 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)).

~~(2.18)~~(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. In granting the certification, the Executive Officer shall consider the following factors: the extent to which the requirements of section 1971.1 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, 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(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. 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, t~~T~~he 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 ~~3~~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; 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 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.

(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~~6) 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~~ six 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.

(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 standards~~ 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(c).

NOTE: Authority cited: Sections 39010, 39600, 39601, 43000.5, 43013, 43016, 43018, 43100, 43101, 43104, 43105, 43105.5, ~~and~~ 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.

Final Regulation Order

Adopt new section 1971.5, title 13, California Code of Regulations

(Note: All of the text below is new language shown in plain text with major section headings and definition terms shown in italics to be added to title 13, California Code of Regulations)

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

(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 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.

(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(c), which are incorporated by reference herein. The following definitions are specifically applicable to section 1971.5 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(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 requirements of Cal. Code Regs., title 13, section 1971.1. For purposes of section 1971.5, an engine class shall be considered nonconforming irrespective of whether engines in the engine class, on average, meet applicable tailpipe or evaporative emission standards.

"*OBD Emission Testing*" refers to testing conducted to determine compliance with the malfunction criteria in Cal. Code Regs., title 13, section 1971.1(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 measure 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(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, 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, 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(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 (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 to procure engines consistent with the procurement process followed by the Executive Officer under Cal. Code Regs., title 13, 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 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 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 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 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.

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(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(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(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(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 and NMHC converting catalyst monitors, and other diesel monitors using a denominator incremented in accordance with Cal. Code Regs., title 13, section 1971.1(d)(4.3.2)(G) or (H), or
4. 150 for diesel monitors utilizing a denominator incremented in accordance with Cal. Code Regs., title 13, section 1971.1(d)(4.3.2)(D), (E), or (F) (e.g., cold start monitors, comprehensive component output component monitors, etc.), 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.

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 (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.

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.

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(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(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(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(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. 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(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) on the applicable standard (i.e., FTP or SET).

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(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(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(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(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) on the applicable standard (i.e., FTP or SET).

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(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, section 1971.1(e)(8.2.1)(C) 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 either 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(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 either 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 either 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 either 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(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 0.050 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) 2016 and subsequent model year engines certified to a ratio of 0.100 in accordance with Cal. Code Regs., title 13, section 1971.1(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.

(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 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 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(h)(1) and section 1971.1(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(h)(4.2), and in accordance with SAE J1979/J1939 and Cal. Code Regs., title 13, section 1971.1(d)(2.1.2) during the MIL functional check and, if applicable Cal. Code Regs., title 13, section 1971.1(h)(4.1.3) 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(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(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(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(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(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(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(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(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 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

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 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(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(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(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(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(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(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(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(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(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(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(d)(3.2) 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(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(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(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(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, section 1971.1(e)(8.2.1)(C) (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 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).

(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(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) 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 II 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(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(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(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(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(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(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(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(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 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.

(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(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, Mobile Source Operations Division, 9528 Telstar Avenue, Suite 4, El Monte, California 91731, 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. 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 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, Mobile Source Operations Division, 9528 Telstar Avenue, Suite 4, El Monte, California 91731. 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(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, 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 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.

FINAL REGULATION ORDER

Amend section 1971.5, title 13, California Code of Regulations, to read as follows:

Note: The amendments are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions from the existing regulatory text. Various portions of the regulations that are not modified by the proposed amendments are omitted from the text shown and indicated by " * * * * ".

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

(a) *General.*

* * * *

(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(c), which are incorporated by reference herein. The following definitions are specifically applicable to section 1971.5 and take precedence over any contrary definitions.

* * * *

"*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 ~~requirements of~~ Cal. Code Regs., title 13, section 1971.1(c), ~~. For purposes of section 1971.5, an engine class shall be considered nonconforming~~ irrespective of whether engines in the engine class, on average, meet other applicable ~~tailpipe or evaporative~~ 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(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).

* * * *

(b) *Testing Procedures for ARB-Conducted Testing.*

* * * *

(3) *Engine Selection for ARB-Conducted Enforcement Testing*.

* * * *

(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 ~~to procure engines consistent with the procurement process followed by the Executive Officer under Cal. Code Regs., title 13, 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 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.

* * * *

(D) Engines to be included in a Test Sample Group.

* * * *

(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.

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(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(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(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(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, ~~and~~ NMHC converting catalyst monitors, PM sensor monitors, and PM sensor heater monitors ~~and other diesel monitors~~ using a denominator incremented in accordance with Cal. Code Regs., title 13, section 1971.1(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(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.

* * * *

(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(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) ~~on the applicable standard (i.e., FTP or SET)~~.

* * * *

(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(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) ~~on the applicable standard (i.e., FTP or SET)~~.

* * * *

(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(e)(8.2.1)(~~C~~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 ~~either~~ 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(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 ~~either~~ 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 ~~either~~ 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 ~~either~~ 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(d)(3.2.2) and PM filter filtering performance monitors (section 1971.1(e)(8.2.1)) and missing substrate monitors (section 1971.1(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(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.

* * * *

(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 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 for 2013 and subsequent model year engines cannot obtain valid and correct data for the following parameters:

* * * *

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(h)(4.2), and in accordance with SAE J1979/J1939 and Cal. Code Regs., title 13, section 1971.1(d)(2.1.2) during the MIL functional check and, if applicable Cal. Code Regs., title 13, section 1971.1(h)(4.1.~~3~~6) during the MIL readiness status check;

* * * *

(d) *Remedial Action.*

* * * *

(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(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(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(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(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(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(e)(8.2.1)(~~C~~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(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(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(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.

~~(vi)~~(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 ~~II~~ system.

* * * *

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.

SECTION 1976, TITLE 13, CCR

Amend section 1976 to read as follows:

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

(a) [No Change]

(b) [No Change]

(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 "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 June 22, 2006, which is incorporated herein by reference.

(d) [No Change]

(e) [No Change]

(f) [No Change]

NOTE: Authority cited: Sections 39600, 39601, 39667, 43013, 43018, 43101, 43104 and 43107, Health and Safety Code. Reference: Sections 39003, 39500, 39667, 43000, 43013, 43018, 43100, 43101, 43102, 43104 and 43107, Health and Safety Code.

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

(a) *[Fuel evaporative emission standards for 1970 through 1977 model passenger cars and light-duty trucks. No change.]*

(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) *[Evaporative emission standards for 1978 through 1994 model motor vehicles. No change.]*

(B) *[Evaporative emission standards on the three-day diurnal test for 1995 through 2005 model motor vehicles. No change.]*

(C) *[Evaporative emission standards on the supplemental two-day diurnal test for 1995 through 2005 model motor vehicles. No change.]*

(D) *[Zero-emission vehicle evaporative requirements. No change.]*

(E) For 2001 through 2014 model year vehicles, ~~T~~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 ~~and subsequent~~ 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 For vehicles certified to the running loss and the highest whole vehicle diurnal plus hot soak emission 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. The canister bleed emission standard does not have a useful life requirement.

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:

$$\frac{\sum_{i=1}^{n}\left[(\text{number of vehicles in the evaporative family})_i \times (\text{family emission limit})_i\right]}{\sum_{i=1}^{n}(\text{number of vehicles in the evaporative family})_i}$$

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 (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).

Model Years	*Minimum Percentage of Vehicle Fleet* [(1)(2)]
2015, 2016, and 2017	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 manufacturer's projected sales volume of all vehicles) 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 2018 model year and be considered compliant with the requirements of section 1976(b)(1)(G)1. 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.

(b)(2) *[Evaporative emission standards for gasoline-fueled motorcycles. No change.]*

(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 ~~September 27, 2010~~ March 22, 2012, which is incorporated herein by reference.

(d) *[Motorcycle requirements. No change.]*

(e) *[Motorcycle requirements. No change.]*

(f) *Definitions Specific to this Section.*

(1) and (2) *[No change].*

(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.

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

* * * *

(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:

* * * *

(G) For 2015 and subsequent model motor vehicles, the following evaporative emission requirements apply:

* * * *

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 2018 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

* * * *

(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 ~~March 22, 2012~~December 6, 2012, which is incorporated herein by reference.

* * * *

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.

(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 8,501 pounds, shall not exceed the following standards. ~~Gaseous~~ 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/ American Gas Association Standard for Compressed Natural Gas Vehicle Fueling Connection Devices, ANSI/AGA NGV1 standard-1994, 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 gram~~s~~ per gallon of fuel dispensed.

Organic Material Hydrocarbon Equivalent (for alcohol-fueled, fuel-flexible, and hybrid electric vehicles): 0.20 gram~~s~~ per gallon of fuel dispensed.

Hydrocarbons (for liquefied petroleum gas-fueled vehicles): 0.15 gram per gallon of fuel dispensed.

Subsections (a)(2) and (a)(3) [No change.]

(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 September 5, 2003, which is incorporated herein by reference.

Note: Authority cited: Sections 39600, 39667, 43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 39003, 39500, 39667, 43000, 43013, 43018, 43101, 43102, and 43104, Health and Safety Code.

SECTION 1978, TITLE 13, CCR

Amend section 1978 to read as follows:

1978 Standards and Test Procedures for Vehicle Refueling Emissions.

(a) [No Change]

(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 ~~September 5, 2003~~ June 22, 2006, which is incorporated herein by reference.

NOTE: Authority cited: Sections 39600, 39667, 43013, 43018, 43101 and 43104, Health and Safety Code. Reference: Sections 39003, 39500, 39667, 43000, 43013, 43018, 43101, 43102 and 43104, Health and Safety Code.

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

(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, ~~shall not exceed the following standards.~~ and 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, 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/American Gas Association Standard for Compressed Natural Gas Vehicle Fueling Connection Devices, ANSI/AGA NGV1 standard-1994, 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 all of the following provisions are met:

(A) The manufacturer can attest to the following evaluation: "Due to the low vapor pressure of diesel fuel and the vehicle tank temperatures, hydrocarbon vapor concentrations are low and the vehicle meets the 0.20 grams/gallon refueling emission standard without a control system."

(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~~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) Beginning with model year 2015, all vehicles subject to the refueling emission standards in section 1978(a)(1) shall demonstrate compliance except incomplete vehicles of 14,000 pounds gross vehicle weight rating or less 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 ~~September 27, 2010~~ 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, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204 and 43205, Health and Safety Code.

FINAL REGULATION ORDER

AMENDMENTS TO THE REGULATION TO REDUCE EMISSIONS OF DIESEL PARTICULATE MATTER, OXIDES OF NITROGEN AND OTHER CRITERIA POLLUTANTS FROM IN-USE ON-ROAD DIESEL-FUELED VEHICLES

Division 3: Air Resources Board
Chapter 1: Motor Vehicle Pollution Control Devices

Section 2025. Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles

(a) *Purpose*

The purpose of this regulation is to reduce emissions of diesel particulate matter (PM), oxides of nitrogen (NOx) and other criteria pollutants from in-use diesel-fueled vehicles.

(b) *Scope and Applicability*

Except as provided in subsection (c), this regulation applies to any person, business, federal government agency, school district or school transportation provider that owns or operates, leases, or rents, affected vehicles that operate in California. The regulation also applies to persons that sell affected vehicles in California. Affected vehicles are those that operate on diesel-fuel, dual-fuel, or alternative diesel-fuel that are registered to be driven on public highways, were originally designed to be driven on public highways whether or not they are registered, yard trucks with on-road engines or yard trucks with off-road engines used for agricultural operations, both engines of two-engine sweepers, schoolbuses, and have a manufacturer's gross vehicle weight rating (GVWR) greater than 14,000 pounds (lbs). .

(c) *Exemptions*

This regulation does not apply to:

(1) Vehicles subject to the solid waste collection vehicle rule commencing with title 13, CCR, section 2021;

(2) Vehicles owned or operated by a municipality, as defined in title 13, section 2020(b), that comply with the Best Available Control Technology (BACT) requirements of title 13, CCR section 2022.1(a)(1);

(3) Vehicles subject to the fleet rule for public transit agencies commencing with title 13, CCR, section 2023;

(4) Vehicles subject to the rule for mobile cargo handling equipment at ports and intermodal rail yards commencing with title 13, CCR, section 2479;

(5) Military tactical support vehicles, as described in title 13, CCR, section 1905;

(6) Authorized emergency vehicles as described in California Vehicle Code (Veh. Code), section 165;

(7) Off-road vehicles equipped with engines subject to title 13, CCR, sections 2401, 2411, 2421, 2432, and 2449;

(8) Dedicated snow-removal vehicles as defined in section 2025(d)(15);

(9) Historic vehicles as defined in section 2025(d)(36);

(10) Motor homes for non-commercial private use;

(11) Except as specified in section 2025(l) vehicles subject to the regulation for drayage trucks commencing with title 13, CCR, section 2027 until January 1, 2023;

(12) Trucks with a GVWR of 19,500 lbs or less with a pick-up bed used exclusively for personal, non-commercial, or non-governmental use; and

(13) Except for two-engine sweepers, other two-engine on-road vehicles that are subject to title 13, CCR, section 2449, including but not limited to, water well drilling rigs, workover rigs, and cranes, in which one engine provides the motive power for the vehicle and a second engine is an auxiliary engine 50 horsepower or greater that is integrated into the design of the vehicle and provides power for the vehicle to perform a specialized function.

(d) *Definitions*

For purposes of this regulation, the following definitions apply:

(1) "2006 *Baseline Fleet*" means diesel-fueled heavy-duty vehicles with a GVWR greater than 26,000 lbs included in the scope of section 2025(b) that were owned by a fleet and registered to operate in California on October 1, 2006 with the California Department of Motor Vehicles, or were owned by a fleet, registered to operate on October 1, 2006 in a jurisdiction that is an International Registration Plan member, and were driven at least 1,000 miles in California in the calendar year 2006. A fleet owner must include all vehicles that fall within the scope and applicability of section 2025(b) and must exclude all vehicles that are exempt from the regulation in the exemptions section 2025(c).

(2) "*2007 Model Year Emissions Equivalent*" means emissions from:

(A) An engine certified to the 2004 through 2006 model year heavy-duty diesel engine emissions standard that is equipped with the highest level VDECS and reduces NOx emissions by at least 40 percent; or

(B) An engine that was built to the 2004 engine emission standard and was not used in any manufacturer's averaging, banking, or trading program that is equipped with the highest level VDECS and reduces NOx exhaust emissions by at least 40 percent; or

(C) An engine certified to the 2003 or prior model year heavy-duty diesel engine emissions standard that is equipped with the highest level VDECS and reduces NOx exhaust emissions by at least 70 percent; or

(D) An engine certified to the 2007-2009 model year heavy-duty engine emissions standard and meets PM BACT.

(3) "*2010* Model *Year Emissions Equivalent Engine*" means emissions from:

(A) An engine certified to the 2004 through 2006 model year heavy-duty diesel engine emissions standard that is equipped with the highest level VDECS and reduces NOx emissions by at least 85 percent; or

(B) An engine that was built to the 2004 engine emission standard and was not used in any manufacturer's averaging, banking, or trading program that is equipped with the highest level VDECS and reduces NOx exhaust emissions by at least 85 percent; or

(C) An engine certified to the 2007 model year heavy-duty diesel engine emissions standard that meets PM BACT and reduces NOx exhaust emissions by more than 70 percent; or

(D) An engine certified to the 2010 model year or newer heavy-duty diesel engine emissions standard that meets PM BACT; or

(E) A heavy-duty engine certified to 0.2 g/bhp-hr or less NOx emissions level and 0.01 g/bhp-hr or less PM emissions level; or

(F) An off-road engine certified to the Tier 4 Final engine emissions standard.

(4) "*Agricultural Operations*" means:

(A) The activity of growing or harvesting crops for the primary purpose of making a profit or providing a livelihood including any horticultural, viticultural, aquacultural, forestry, dairy, livestock, poultry, bee or farm product. Raising plants at nurseries that sell exclusively retail are not included, or

(B) The cutting or removing of timber, other solid wood products, including Christmas trees, and biomass from forestlands for commercial purposes. The services also include all the work incidental thereto, including but not limited to, construction and maintenance of roads, fuel breaks, firebreaks, stream crossings, landings, skid trails, beds for falling trees, fire hazard abatement, and site preparation that involves disturbance of soil or burning of vegetation following forest removal activities. Forest operations include the cutting or removal of trees, tops, limbs and or brush which is processed into lumber and other wood products, and or for landscaping materials, or biomass for electrical power generation. Forest operations do not include conversion of forestlands to other land uses such as residential or commercial developments.

(5) "*Agricultural Vehicle*" means a vehicle that is eligible to utilize the requirements for agricultural vehicles in section 2025(m) and meets one of the definitions of (A) through (E) below.

(A) A vehicle, or truck-tractor and trailer combination, owned by a farming business and used exclusively in one or more of the following ways:

1. in agricultural operations;

2. to transport harvested farm products to the first point of processing;

3. to directly support farming or forestry operations, which may include supply trucks, cattle trucks, and other vehicles but does not include vehicles that do not directly support farming operations such as personal use vehicles, vehicles rented or leased to others for non-agricultural uses that do not qualify, or vehicles used in a transportation business other than to transport harvested farm products to the first point of processing.

(B) A vehicle, or truck-tractor and trailer combination, owned by a bee keeping business and used exclusively to transport their own bees or honey to the first point of processing.

(C) A truck, or a truck-tractor and trailer combination, that is required to display a hazardous material placard during delivery and exclusively delivers fertilizer or crop protection chemicals that require placard identification for use in agricultural operations from a distribution center to a farm and back, and is owned by a business holding a valid fertilizer or pest control license.

1. Owners of such vehicles must hold:

   a. a valid pest control dealer license issued by the California Department of Pesticide Regulation as required under Food & Agricultural Code, Division 6, Chapter 7, Article 6, Section 12101; or

   b. a valid fertilizing materials license issued by the California Department of Food and Agriculture as required under Food & Agricultural Code, Division 7, Chapter 5, Article 4, Section 14591(a).

2. Such vehicles must exclusively carry products defined under one of the following, and be required to display an appropriate placard, as required by the United States Department of Transportation:

   a. 49 CFR, CHAPTER 1, PART 173.127 (Division 5.1); or

   b. 49 CFR, CHAPTER 1, PART 173.132 (Division 6.1); or

   c. 49 CFR, CHAPTER 1, PART 173.115 Class 2, (Division 2.1, 2.2, and 2.3); or

   d. 49 CFR, CHAPTER 1, PART 173.136 Class 8; or

   e. 49 CFR, CHAPTER 1, PART 173.140 Class 9.

(D) A truck, or truck-tractor and trailer combination, designed for in-field operations, that is exclusively engaged in agricultural operations on the farm. Examples include truck configurations designed to spread manure, dispense hay, and dispense freestall bedding. It also includes water trucks and trucks designed or modified to be used exclusively for the dusting, spraying, fertilizing, or seeding of crops. Except as allowed in (A) above, trucks, or truck-tractor and trailer combinations that transport any products, materials, personnel, or equipment are excluded.

(E) A truck, or truck-tractor and trailer combination, including yard trucks, that exclusively transports any unprocessed horticultural, viticultural, aquacultural, forestry, dairy, livestock, poultry, bee or farm products such as raw, unprocessed crops, livestock, fish, or fowl between the farm and where the first point of processing occurs after harvest. Also included are trucks that are used to harvest crops for silage, and trucks that transport unprocessed agricultural materials from forest or farm to a biomass facility.

(6) *"Alternative Diesel Fuel"* means any fuel used in diesel engines that is not a reformulated diesel fuel as defined in sections 2281 and 2282 of title 13, CCR, and does not require engine or fuel system modifications for the engine to operate, other than minor modifications (e.g., recalibration of the engine fuel control) that may enhance performance. Examples of alternative diesel fuels include, but are not limited to, biodiesel, Fischer-Tropsch fuels, and emulsions of water in diesel fuel. Natural gas is not an alternative diesel fuel. An emission control strategy using a fuel additive will be treated as an alternative diesel fuel based strategy unless:

(A) the additive is supplied to the engine fuel by an on-board dosing mechanism; or

(B) the additive is directly mixed into the base fuel inside the fuel tank of the engine; or

(C) the additive and base fuel are not mixed until engine fueling commences, and no more additive plus base fuel combination is mixed than required for a single fueling of a single engine or vehicle.

(7) "*Alternative Fuel*" means natural gas, propane, ethanol, methanol, hydrogen, electricity, fuel cells, or advanced technologies that do not rely on diesel fuel. "Alternative fuel" also means any of these fuels used in combination with each other or in combination with other non-diesel fuels.

(8) "*Alternative-Fueled Engine*" means an engine that is exclusively fueled with a fuel meeting the definition of alternative fuel.

(9) *"Authorized Emergency Vehicle"* has the same meaning as California Vehicle Code section 165.

(10) *"California Based Broker"* means a person, with operations based in California, who, for compensation, arranges or offers to arrange the transportation of property by an authorized motor carrier. A motor carrier, or person who is an employee or bona fide agent of a carrier, is not a broker 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.

(11) "*Commercial Vehicle*" means a motor vehicle or combination of motor vehicles as defined in California Veh. Code, section 260.

(12) "*Common Ownership or Control*" means being owned or managed day to day by the same person, corporation, partnership, or association. Vehicles managed by the same directors, officers, or managers, or by corporations controlled by the

same majority stockholders are considered to be under common ownership or control even if their title is held by different business entities. Common ownership or control of a federal government vehicle shall be the primary responsibility of the unit that is directly responsible for its day to day operational control.

(13) "*Compliance Year*" means January 1 through December 31 of a calendar year.

(14) "*Compression Ignition Engine*" means an internal combustion engine with operating characteristics significantly similar to the theoretical diesel combustion cycle. The regulation of power by controlling fuel supply in lieu of a throttle is indicative of a compression ignition engine.

(15) "*Dedicated Snow Removal Vehicle*" means a vehicle that has permanently affixed snow removal equipment such as a snow blower or auger, and is operated exclusively to remove snow from public roads, private roads, or other paths to allow on-road vehicle access.

(16) "*Diesel Fuel*" has the same meaning as defined in title 13, CCR, sections 2281 and 2282.

(17) "*Diesel Particulate Filter*" means an emission control technology that reduces diesel particulate matter emissions by directing the exhaust through a filter that physically captures particles but permits gases to flow through. Periodically, the collected particles are either physically removed or oxidized (burned off) in a process called regeneration.

(18) "*Diesel Particulate Matter (PM)*" means the particles found in the exhaust of diesel-fueled compression ignition engines. Diesel PM may agglomerate and adsorb other species to form structures of complex physical and chemical properties.

(19) "*Drayage Truck*" is the same as defined in title 13, CCR, section 2027.

(20) "*Dual-Fuel Engine*" means any compression ignition engine that is engineered and designed to operate on a combination of alternative fuels, such as compressed natural gas (CNG) or liquefied petroleum gas (LPG) and diesel fuel or an alternative diesel fuel. These engines have two separate fuel systems, which inject both fuels simultaneously into the engine combustion chamber. A dual-fuel engine is not an alternative-fuel engine.

(21) "*Electronic Tracking System*"

(A) The tracking device must acquire date, time, and engine-on data at a minimum of 15 minute intervals, with no more than 30 minute data gaps. The tracking device must also acquire location data for vehicles claiming to operate exclusively in NOx-exempt areas and for vehicles that must document low use in California when their total miles of operation exceed 1,000 miles and total hours of operation exceed 100 hours.

(B) The tracking records must be collected by an independent entity with no business relationship to the owners of the vehicles being tracked, other than to provide the tracking service.

(22) "*Emergency Operation*" means operation of an authorized emergency vehicle or emergency support vehicle to help alleviate an immediate threat to public health or safety. Examples of emergency operation include vehicle used at an emergency event to repair or prevent damage to roads, buildings, terrain, and infrastructure as a result of an earthquake, flood, storm, fire, terrorism, or other infrequent acts of nature. Emergency operation includes authorized emergency vehicle and emergency support vehicle travel to and from an emergency event when dispatched by a local, state, or federal agency. Routine operation to prevent public health risks does not constitute emergency operation.

(23) "*Emergency Support Vehicle*" means a vehicle, other than an authorized emergency vehicle that has been dispatched by a local, state, or federal agency that is used to provide transport services or supplies in connection with an emergency operation.

(24) "*Executive Officer*" means the Executive Officer of the ARB or his or her authorized representative.

(25) "*Farm*" means a physical location for which the primary purpose is making a profit or providing a livelihood from:

(A) horticultural, viticultural, aquacultural, forestry or crops or plants that are grown and harvested at the location, (nurseries that sell exclusively retail are not farms); or

(B) raising, breeding, grazing, feeding, or milking animals, fish, fowl, or bees.

(26) "*Farming Business*" means a business involved exclusively in the cultivating, operating, or managing a farm for profit, or a business contracted to harvest trees in a forest for profit. A farming business does not include businesses that derive their principal source of income from providing agricultural services such as, landscape services, veterinary, farm labor, or management for a fee or on a contract basis, or are engaged in the business of artificial insemination, raising, and caring for dogs, cats, or other pet animals.

(27) "*First Point of Processing*" means the location where harvested crops, bees, fowl, fish, livestock, animals, or their products, such as wool, milk, or eggs, are first altered from their original state, or the first location where unaltered products are packaged and prepared for transportation. First point of processing is not a location of the product's final use and for some crops the location may be in the field, such as chipping wood. First point of processing also includes biomass facilities that receive agricultural waste in the form of unprocessed agricultural materials. A first point of processing may include, but is not limited to, packinghouses, slaughterhouses, cotton gins, nut hullers/shellers and processors, dehydrators, lumber mills, feed and grain mills, and biomass facilities. First point of processing does not include distribution centers, wholesale retail sales locations where the first processing of product does not occur, livestock auction houses, and subsequent locations where processing, canning, or similar activities occur after departing a first point of processing location.

(28) "*Fleet"* means one or more vehicles, owned by a person, business, or government agency, traveling in California and subject to this regulation. A fleet may fall into one of the following subclassifications:

(A) "*Federal Fleets*" means a fleet of vehicles owned by a department, agency, or instrumentality of the federal government of the United States of America and its departments, divisions, public corporations, or public agencies including the United States Postal Service. With respect to the Department of Defense and its service branches, federal fleets may be managed regionally, locally, or a combination of regional and local management. There may be multiple federal fleets within a military service or an installation; or

(B) "*Rental or Leased Fleets*" means a fleet of vehicles owned by a person (rental or leasing entity) for the purpose of renting or leasing, as defined in California Uniform Commercial Code, section 10103(a)(10) such vehicles to other persons (renters or lessees) for use or operation.

(29) *"Fleet Owner"* means, except as modified below in paragraphs (A) and (B), either the person registered as the owner or lessee of a vehicle by the California Department of Motor Vehicles (DMV), or its equivalent in another state, province, or country; as evidenced on the vehicle registration document carried in the vehicle.

(A) For vehicles that are owned by the federal government and not registered in any state or local jurisdiction, the owner shall be the department, agency, branch, or other entity of the United States, including the United States Postal Service, to which the vehicles in the fleet are assigned or which have responsibility for maintenance of the vehicles.

(B) For vehicles that are rented or leased:

1. The owner shall be presumed to be the rental or leasing entity for purposes of compliance with section 2025(e), if:

   a. The rental or lease agreement for the vehicle is for a period of less than one year; or

   b. The rental or lease agreement for the vehicle is for a period of one year or longer, unless the terms of the rental or lease agreement or other equally reliable evidence identifies the party responsible for compliance with state laws for the vehicle to be the renting operator or lessee of the vehicle.

2. For purpose of enforcement, if the vehicle is inspected and cited for noncompliance with this regulation and neither the operator of the vehicle nor the rental or leasing entity can produce evidence of the party responsible for compliance with state laws, the owner shall be presumed to be both the rental or leasing entity and the renting operator or lessee~~s~~ of the vehicle.

(30) *"Fleet Size"* means the total number of diesel vehicles with a GVWR greater than 14,000 lbs in a fleet, regardless of whether the vehicles operate in California, that

are under common ownership or control even if they are part of different subsidiaries, divisions, or other organizational structures of a company or agency.

(31) "*Fuel Efficient Hybrid Vehicle*" means a vehicle with an onboard energy storage system that improves the average fuel economy of the vehicle by at least 20 percent compared to a conventional diesel vehicle of the same model year and configuration. The vehicle must have a combination of an engine and onboard energy storage system that provides motive power for accelerating the vehicle, regenerative braking, or operates auxiliary equipment while stationary, such as a boom, auger, or drill rig. The energy storage system can be electric, hydraulic, pneumatic or of any other type that recovers its energy directly or indirectly from the engine. In addition, the onboard energy storage system~~s~~ of the hybrid vehicle can have the capability to supplement its energy from an external power source.

(32) "*Governmental Agency*" means any federal, state, or local governmental agency, including, public schools, water districts, or any other public entity with taxing authority.

(33) "Gross Vehicle Weight Rating (GVWR)" is as defined in Vehicle Code Section 350.

(34) "*Heavy-Duty Pilot Ignition Engine*" means an engine designed to operate using an alternative fuel, except that diesel fuel is used for pilot ignition at an average ratio of no more than one part diesel fuel to ten parts total fuel on an energy equivalent basis. An engine that can operate or idle solely on diesel fuel at any time does not meet this definition.

(35) "*Highest Level VDECS"* means the highest level VDECS verified by ARB under its Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines (Verification Procedure), title 13, CCR, sections 2700-2710, for a specific engine as of 10 months prior to the compliance date, which the diesel emission control strategy manufacturer and authorized diesel emission-control strategy dealer agree can be used on a specific engine and vehicle combination without jeopardizing the original engine warranty in effect at the time of application.

(A) The highest level VDECS is determined solely on verified diesel PM reductions. Plus designations do not affect the diesel PM level assigned to a VDECS; that is, a Level 3 Plus is the same diesel PM level as Level 3.

(B) A Level 2 VDECS shall not be considered the highest level VDECS as long as a Level 3 VDECS can be retrofitted on a vehicle in the fleet.

(C) Level 1 devices are never considered highest level VDECS for the purpose of this regulation.

(36) "*Historic Vehicle*" means a vehicle that meets the qualifications for a historical vehicle and has been issued a historical vehicle license plate pursuant to the California Veh. Code, section 5004, and is operated or moved over the highway primarily for the purpose of historical exhibition or other historic vehicle club activities.

(37) *"Hubodometer"* means a non-resettable device mounted on the axle of a vehicle that measures distance traveled that has a serial number and a lock-out feature that permanently prevents tampering.

(38) "*International Registration Plan (IRP)*" is a registration reciprocity agreement among states of the United States and provinces of Canada providing for payment of license fees on the basis of total distance operated in all jurisdictions.

(39) "*Log Truck*" means a heavy-duty vehicle with a manufacturer's GVWR greater than 33,000 lbs and has log bunks permanently attached that exclusively transports logs.

(40) "*Low-Mileage Construction Truck*" means a vehicle that meets the definition in (A) or (B) as follows:

(A) A dump truck with a GVWR greater than 26,000 lbs that operates less than 20,000 miles per calendar year and is designed to transport construction materials such as dirt, asphalt, rock or construction debris including a transfer truck, or a tractor trailer combination used exclusively to pull bottom dump, end dump or side dump trailers, or

(B) A truck with a GVWR greater than 26,000 lbs that travels less than 15,000 miles per calendar year and is a concrete mixer truck, truck with a concrete placing boom, a water tank truck, a single engine crane with a load rating of 35 tons or more, a tractor that exclusively pulls a low-boy trailer, or a truck owned by a company that holds a valid license issued by the California Contractors State License Board.

(41) "*Low-use Vehicle*" means a vehicle that will be operated fewer than 1,000 miles in California in any compliance year. If that vehicle has an engine that powers other equipment that can only be used while stationary, the engine or power take off (PTO) must also operate less than 100 hours in any compliance year. The hour limitation does not apply for vehicles where the engine is used to power an auxiliary mechanism that strictly loads and unloads cargo from the vehicle (examples include, but are not limited to, dump trucks, cement powder trucks, or trucks with attached lift devices).

(42) "*Motor Carrier*" is the same as defined in California Veh. Code section 408 for fleets other than those that are comprised entirely of school buses, which for the purposes of this regulation, means the registered owner, lessee, licensee, school district superintendent, or bailee of any school bus, who operates or directs the operation of any such bus on either a for-hire or not-for-hire basis.

(43) "*Motor Home*" means a single vehicular unit designed for human habitation for recreational or emergency occupancy and built on, or permanently attached to, a self-propelled motor vehicle chassis, chassis cab, or van, which becomes an integral part of the complete vehicle or a vehicle that exclusively tows a trailer that was originally designed for human habitation for recreational or emergency occupancy.

(44) "*New Fleet*" means a fleet that is acquired or that enters California after January 1, 2012. Such fleets may include new businesses or out-of-state businesses that bring vehicles into California for the first time after January 1, 2012.

(45) "*Non-Commercial Use*" means any use or activity where a fee is not charged and the purpose is not the sale of a good or service, and the use or activity is not intended to produce a profit.

(46) "*NOx Exempt Areas*" are the following counties – Alpine, Colusa, Del Norte, Glenn, Humboldt, Lake, Lassen, Mendocino, Modoc, Monterey, Northern Sonoma (as defined in title 17, CCR section 60100(e), Plumas, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz, Shasta, Sierra, Siskiyou, Trinity, Tehama, and Yuba.

(47) "*Person*" means an individual, corporation, business trust, estate, trust, partnership, Limited Liability Company, association, joint venture, government, governmental subdivision, agency, or instrumentality, public corporation, or any other legal or commercial entity.

(48) *"PM BACT"* means the technology employed on the highest level VDECS for PM or an engine that is equipped with an original equipment manufacturer (OEM) diesel particulate filter and certified to meet the 0.01 g/bhp-hr certification standard.

(49) "*Registered and Driven Safely On-Road*" means a vehicle that meets the requirements to be registered for on-road operation in California Veh. Code division 3, chap. 1, article 1, section 4000 et seq. (i.e., required to be registered or could be registered), and the requirements to be driven safely on-road in "Equipment of Vehicles" requirements in Veh. Code division 12, chap. 1, sections 24000 et seq. and "Size, Weight, and Load" requirements in Veh. Code division 15, sections 35000 et seq, or a vehicle defined as an implement of husbandry as defined in California Veh. Code division 16, chap. 1, section 36000 et seq.

(50) "*Repower*" means to replace the engine in a vehicle with a newer engine certified to lower emission standards for PM or NOx or both as applicable.

(51) "*Responsible Official*" means one of the following:

(A) For a corporation: A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, their delegate, designee, or any other person who performs similar policy or decision-making functions for the corporation;

(B) For a partnership or sole proprietorship: a general partner or the proprietor, respectively;

(C) For a municipality, state, federal, or other governmental agency: either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of the

U.S. EPA). For the purposes of the Department of Defense Military Services, a commanding officer of an installation, base or tenant organization.

(52) "*San Joaquin Valley Air Basin*" includes the entire counties of San Joaquin, Stanislaus, Merced, Madera, Fresno, Tulare, and Kings and western part of Kern County as described starting page 23888 of the Federal Register Vol. 69, No. 84.

(53) *"School Bus"* is a motor vehicle as defined in California Veh. Code, section 545.

(54) "*Specialty Agricultural Vehicle*" means an agricultural vehicle having one of the following body types and has been approved for the exemption in section 2025(m)(11) by the Executive Officer:

(A) A truck, or a truck-tractor and trailer combination, designed or modified to be used exclusively for the fueling, repairing, or loading of an airplane or helicopter used for the dusting, spraying, fertilizing, or seeding of crops; or

(B) A truck, or a truck tractor and trailer combination, that is equipped with a self-loading bed and is designed and used exclusively to transport field manufactured cotton modules to a cotton gin; or

(C) A truck equipped with a water tank owned by a farmer, not operated for compensation, and used exclusively in agricultural operations to provide dust suppression on dirt roads providing access to agricultural fields and for the transportation of water for crop or tree irrigation or for livestock; or

(D) A feed truck or mixer-feed truck specially designed for dispensing feed to livestock. It does not include trucks designed to supply storage silos with feed; or

(E) A truck with a self-loading bed designed to be used in the process of harvesting lettuce. This type of vehicle is commonly referred to as a Fabco truck.

(55) "*Three Day Pass*" means a once-a-year temporary permit to operate a vehicle in California for three consecutive days without meeting the requirements of section 2025(e).

(56) "*Tier 0 Engine*" means an engine not subject to the requirements in title 13, CCR, section 2423; Title 40, Code of Federal Regulations (CFR), Part 89; or Title 40, CFR, Part 1039.

(57) "*Tier 4 Final Engine*" means an engine subject to the final after-treatment-based Tier 4 emission standards in title 13, CCR, section 2423(b)(1)(B) and/or Title 40, CFR, Part 1039.101. This also includes engines certified under the averaging, banking, and trading program with respect to the Tier 4 FEL listed in title 13, CCR, section 2423(b)(2)(B) and/or Title 40, CFR, Part 1039.101

(58) "*Two*-Engine Sweeper" means an on-road heavy-duty vehicle with a manufacturers GVWR greater than 14,000 lbs, used for the express purpose of removing material from road or other surfaces, by mechanical means through the action of one or more brooms, or by suction through a vacuum or regenerative air

system or any combination of the above. A two-engine street sweeper has an engine to propel the vehicle and an auxiliary engine to power the broom or vacuum.

(59) "*Private Utility Vehicle*" means a vehicle owned by a privately-owned or publicly held company or corporation that provides the same or similar services for water, natural gas, and electricity as a public utility operated by a municipality.

(60) "*Verified Diesel Emission Control Strategy*" (VDECS) means an emissions control strategy, designed primarily for the reduction of diesel PM emissions, which has been verified pursuant to the Verification Procedures. VDECS can be verified to achieve Level 1 diesel PM reductions (25 percent), Level 2 diesel PM reductions (50 percent), or Level 3 diesel PM reductions (85 percent). VDECS may also be verified to achieve NOx reductions. See also definition of highest level VDECS.

(61) "*VDECS Failure*" means the condition of not achieving the emissions reductions to which the VDECS is verified. Such condition could be due to inappropriate installation, damage, or deterioration during use. If a Level 3 VDECS is emitting visible smoke, it is assumed to have failed.

(62) "*Yard Truck*" means a vehicle, with an on-road or off-road engine and a hydraulically elevated fifth wheel, that is used in moving and spotting trailers and containers at locations or facilities. Yard trucks are also known as yard goats, hostlers, yard dogs, trailer spotters, or jockeys.

(e) *General Requirements*

Beginning with the applicable effective dates, a fleet owner must comply with the following requirements of this regulation:

(1) Except as otherwise provided below for specific classifications in sections 2025(e)(2) through 2025(e)(5), fleets must meet the following compliance schedule:

(A) Starting January 1, 2015, fleets must meet the requirements of section 2025(f) for all vehicles with a GVWR 26,000 lbs or less except for school buses.

(B) Starting January 1, 2012, for all vehicles with a GVWR greater than 26,000 lbs, excluding school buses, fleets must meet the requirements of section 2025(g) or fleets that report may instead comply with the phase-in option of section 2025(i).

(C) Fleets with one to three vehicles with a GVWR greater than 14,000 lbs may utilize the small fleet compliance option of section 2025(h) for vehicles with a GVWR greater than 26,000 lbs.

(2) Beginning January 1, 2012, fleets with school buses must comply with the requirements of section 2025(k) for all school buses in the fleet.

(3) Beginning January 1, 2021, all private utility vehicle owners must comply with the requirements of section 2025(l)(4).

(4) Beginning January 1, 2023 drayage trucks must comply with the requirements of section 2025(l)(1) through (3).

(5) All fleets may utilize the credit provisions of section 2025(j), the provisions of agricultural vehicles and log trucks of section 2025(m), the provisions for construction trucks, vehicles operating exclusively in the NOx exempt areas, or any of the other extensions, delays, and exemptions of section 2025(p).

(6) Although the total number of vehicles under common ownership or control is determinative of fleet size, if some of the vehicles within the fleet are under the control of different responsible officials because they are part of different subsidiaries, divisions, or other organizational structures of a company or agency, the fleet owner of a "common ownership of control fleet" may elect to have the vehicles under the control of different responsible officials report compliance independently of other vehicles in the general fleet if choosing to comply with the requirements of section 2025(g) or the phase-in option of section 2025(i) for the segment of the fleet under the control of the different responsible officials. However, all vehicles under common ownership and control must be reported for the fleet to use the credits for fleets that have downsized in section 2025(j)(1), the credits for the early addition of newer vehicles in section 2025(j)(3), or the extension for low-mileage construction trucks of section 2025(p)(2).

(7) Except personal, non-commercial, unregistered motor vehicles, or vehicles otherwise not required to obtain authority to operate, the following is required for all fleet owners who elect to utilize the phase-in option of section 2025(i) and the small fleet option of section 2025(h), the credit provisions of section 2025(j) for early PM retrofits, early addition of newer vehicles, hybrid vehicles, alternative fueled vehicles, and vehicles with heavy-duty pilot ignition engines, the agricultural vehicle provisions of section 2025(m), or the exemptions, delay, and extensions of section 2025(p): (A) A valid California motor carrier of property number; or

(B) A valid identification number assigned by the United States Secretary of the Department of Transportation; or

(C) A valid operating authority number issued by the Public Utilities Commission; or

(D) Other applicable valid operating authority number approved by the Executive Officer.

(8) All information specified in section 2025(r) must be reported to the Executive Officer.

(9) Records must be kept as specified in section 2025(s).

(10) Once a vehicle is required to be in compliance with this regulation, it must remain in compliance at all times that it is operating in California.

(f) *Requirements for Vehicles with a GVWR 26,000 lbs or less*

Fleets owners must comply with the schedule in Table 1 for all the vehicles in the fleet with a GVWR 26,000 lbs or less and meet the record keeping requirements of section 2025(s). Fleets do not need to meet the reporting requirements of section 2025(r). School buses are not subject to the requirements of this section and must meet the requirements of section 2025(k).

(1) Except as provided in (3) below, all vehicles with a GVWR 26,000 lbs or less must be equipped with a 2010 model year emission equivalent engine pursuant to the following schedule in Table 1:

Table 1: Compliance Schedule by Engine Model Year for Vehicles with a GVWR 26,000 lbs or less

Compliance Date as of January 1	*Existing Engine Model Year*	*Requirements*
2015	1995 & older	2010 model year emission equivalent
2016	1996	
2017	1997	
2018	1998	
2019	1999	
2020	2003 & older	
2021	2004-2006	
2022	N/A	
2023	All engines	

(2) Any engine that meets PM BACT prior to January 1, 2014, does not have to be upgraded to a 2010 model year emissions equivalent engine until January 1, 2020, but the fleet owner must meet the reporting and record keeping requirements of sections 2025(r) and (s) for the vehicle.

(3) Fleets may use the provisions for agricultural vehicles in section 2025(m) or any of the exemptions, delays, and extensions of section 2025(p), except for the following sections that apply only to heavier trucks: 2025(p)(1)(B), 2025(p)(2), 2025(p)(8), 2025(p)(9), and 2025(p)(10).

(4) Any fleet where all vehicles with a GVWR 26,000 lbs or less meet PM BACT prior to January 1, 2014, does not have to upgrade those vehicles to 2010 model year emissions equivalent engines until January 1, 2023, but must meet the reporting and record keeping requirements of sections 2025(r) and 2025(s) by January 31, 2014 for all the vehicles in the fleet with a GVWR 26,000 lbs or less.

(g) *Requirements for Vehicles with a GVWR greater than 26,000 lbs*

Fleets owners must comply with the schedule in Table 2 for all vehicles in the fleet with a GVWR greater than 26,000 lbs and must comply with the record keeping requirements of section 2025(s), and are not required to meet the reporting

requirements of section 2025(r). A fleet may meet PM BACT by installing the highest level VDECS or by having an engine equipped with an OEM diesel particulate filter. A fleet may meet the 2010 model year emissions equivalent engine requirement by replacing the engine or vehicle with one with a 2010 model year engine or later, retrofitting the engine with a VDECS that achieves 2010 model year equivalent emissions, or by replacing a vehicle with one that has a future compliance deadline. Fleets may alternatively choose to comply using the phase-in option of section 2025(i) or as specified in 2025(g)(3) below.

(1) Starting January 1, 2012, all vehicles in the fleet with a GVWR greater than 26,000 lbs must meet PM BACT and upgrade to a 2010 model year emissions equivalent engine pursuant to the schedule set forth in Table 2 below.

Table 2: Compliance Schedule by Engine Model Year for Vehicles with GVWR greater than 26,000 lbs

Engine Model Year	Compliance Date Install PM Filter by	Compliance Date 2010 Engine by
1993 & older	N/A	January 1, 2015
1994-1995	N/A	January 1, 2016
1996 – 1999	January 1, 2012	January 1, 2020
2000 -2004	January 1, 2013	January 1, 2021
2005-2006	January 1, 2014	January 1, 2022
2007 or newer	January 1, 2014 if not OEM equipped	January 1, 2023

(2) A 2007 model year emissions equivalent engine complies with the BACT requirements until January 1, 2023.

(3) From January 1, 2012 until January 1, 2014, any fleet may optionally choose to meet PM BACT according to the following:

(A) 2003-2004 model year engines and 1993 model year and older engines by January 1, 2012.

(B) 2005-2006 model year engines and 1994-1999 model year engines by January 1, 2013.

(C) All engines by January 1, 2014.

(D) After January 1, 2014, this option expires and the fleet must comply with general requirements of section 2025(e).

(E) Fleet owners choosing this option must comply with the reporting and record keeping requirements of sections 2025(r) and (s).

(4) Any engine that meets PM BACT prior to January 1, 2014, does not have to be upgraded to a 2010 mode l year emissions equivalent engine until January 1, 2020 at which time it must be in compliance with the schedule set forth in Table 2

above. To use the exemption, fleet owners choosing this option must comply with the reporting and record keeping requirements of sections 2025(r) and (s) by January 31, 2014 for the vehicles that meet PM BACT.

(5) Fleets may utilize the exemptions and extensions of sections 2025(p) and 2025(m).

(6) Fleets may use the extension based on the unavailability of highest level VDECS of section 2025(p)(9) for 1996 model year or newer engines.

(h) *Small Fleet Compliance Option*

In lieu of initially complying with the schedule set forth in Table 2 of section 2025(g), a fleet with a fleet size of one to three vehicles with a GVWR greater than 14,000 lbs may alternatively comply with the phase-in schedule to meet PM BACT as specified below for the vehicles in the fleet with a GVWR greater than 26,000 lbs from January 1, 2014 to January 1, 2016. Fleets must comply with the record keeping requirements of section 2025(s) starting January 1, 2012 and must meet the reporting requirements as specified below to utilize this option.

(1) Vehicles within the fleet shall meet PM BACT pursuant to the following schedule:

(A) One vehicle by January 1, 2014

(B) Two vehicles by January 1, 2015

(C) Three vehicles by January 1, 2016

(2) Vehicles that meet PM BACT are exempt from meeting the 2010 model year emissions equivalent engine requirements until January 1, 2020.

(3) Fleets with 1996-1999 model year engines must comply with the reporting requirements of section 2025(r) starting January 31, 2012.

(4) Fleets with 2000-2004 model year engines must comply with the reporting requirements of section 2025(r) starting January 31, 2013.

(5) All fleet owners must comply with the reporting requirements of sections 2025(r) by January 31, 2014.

(6) Beginning January 1, 2020, all vehicles in the fleet must comply with the 2010 model year emissions equivalent engine requirements by engine model year as set forth in Table 2 of section 2025(g).

(7) This option is not available to divisions within a company or subsidiaries under common ownership and control that have a combined fleet size greater than three.

(8) Fleets using this option may also utilize the exemptions and extensions in section 2025(m) and 2025(p).

(9) Fleets may use the extension based on the unavailability of highest level VDECS of section 2025(p)(9) for all engine model years in the fleet.

(i) *Phase-in Option*

In lieu of initially complying with the schedule set forth in Table 2 of section 2025(g), fleets may alternatively comply with the phase-in schedule of this section for the vehicles in the fleet with a GVWR greater than 26,000 lbs from January 1, 2012 to January 1, 2016.

(1) Beginning January 1, 2012, fleets electing this option must meet the PM BACT requirements pursuant to the schedule set forth in Table 3 below and then comply with the requirements of section 2025(g) starting January 1, 2020.

Table 3: Phase-in Compliance Schedule
for Vehicles with GVWR greater than 26,000 lbs

Compliance Date as of January 1	Percent of Fleet Complying with PM BACT
2012	30%
2013	60%
2014	90%
2015	90%
2016	100%
2020	All vehicles must comply with section 2025(g)

(2) If the calculated number of engines required to be brought into compliance with the percentage limits is not equal to a whole number, the owner shall round up to a whole number when the fractional part of the required number of engines is equal to or greater than 0.5, and round down if less than 0.5.

(3) Vehicles in which public funds contributed to the purchase of the vehicle, repower or the engine, or retrofit of the engine must not be included when determining compliance with PM BACT, unless allowed by the funding program guidelines applicable to the particular source of public funds used for the purchase, nor shall the engine be included in the total fleet for purposes of determining the percent complying with PM BACT.

(4) To utilize this option, fleet owners must comply with the reporting and record keeping requirements of sections 2025(r) and 2025(s) beginning January 31, 2012.

(5) Fleets complying with this option may also use the credits of section 2025(j), the agricultural provisions of section 2025(m), the exemptions, delays, and extensions of sections 2025(p).

(6) Fleets may use the extension based on unavailability of highest level VDECS of section 2025(p)(9) for all engine model years.

(j) Credits for *Fleets that have Downsized, Early PM Retrofits, Hybrid Vehicles, Alternative Fueled Vehicles, Vehicles with Heavy-Duty Pilot Ignition Engines*, *and Early Addition of Newer Vehicles*

Fleets can take advantage of credits that reduce the number of vehicles with a GVWR greater than 26,000 lbs that must meet the PM BACT requirements in the phase-in option of section 2025(i) as described in items (1) to (3) below, and does not apply to school buses.

(1) Credit for Fleets that have Downsized

Until January 1, 2016, a fleet that has fewer vehicles with a GVWR greater than 26,000 lbs operating in the compliance year than in the 2006 baseline fleet may claim a credit towards compliance with the phase-in option of section 2025(i) for that year.

(A). The fleet owner may reduce the percent requirement in Table 3 of section 2025(i) by the same percent that the fleet was downsized. For example, a fleet that has 20 percent fewer vehicles operating in 2006 would be able to subtract 20 percent from the annual compliance requirement. That is, if the compliance requirement for the year is 30 percent, the fleet would only need to demonstrate that 10 percent of the existing fleet (30%-20%=10%) met PM BACT.

(B) A vehicle that is not operated in the compliance year may be excluded from the existing fleet in determining the credit if:

1. The vehicle is not driven for the entire compliance year and

a. Either a certificate of non-operation has been issued by the DMV or a request for a non-operation certificate has been filed with DMV prior to the beginning of the compliance year; or

b. An equivalent certificate has been issued by another state or a request for such a certificate has been filed with the state prior to the beginning of the compliance year; or

c. The vehicle is not operated for any purpose during the compliance year except to demonstrate functionality of the vehicle to potential buyers, to move the vehicle short distances for maintenance, or to a storage facility while awaiting sale.

(C) The fleet utilizing this provision must comply with the reporting requirements of section 2025(r)(12) for low-use vehicles and report information for all vehicles in the 2006 baseline fleet per section 2025(r)(13).

(D) For purposes of determining the credit, all vehicles in the scope and applicability section 2025(b), except school buses, must be included in calculating the number of vehicles in the 2006 baseline fleet and in the fleet during the compliance year and all vehicles exempt from the regulation in section 2025(c) must be excluded. The number of vehicles calculated at the beginning of the compliance year will include vehicles that are partially paid for by state funds, all drayage trucks, and all on-road vehicles that are now subject to the title 13, section 2449.

(2) A fleet shall receive a credit to treat another vehicle with a GVWR greater than 26,000 lbs as meeting the PM BACT requirements of section 2025(i) until January 1, 2017 for the following items as described below in 2025(j)(2)(A) to 2025(j)(2)(C).

(A) Credit for Early PM Retrofit

A credit will be granted for each vehicle, with a GVWR greater than 14,000 lbs, that is equipped with the highest level VDECS for PM by July 1, 2011. The fleet may receive a credit for each vehicle for which the highest level VDECS has been ordered and paid for, or for which at least a 20 percent deposit has been paid, by May 1, 2011 and the VDECS is installed by October 1, 2011. The fleet owner must meet the reporting requirements of section 2025(r)(13) by January 31, 2012 to claim the credit and must meeting the record keeping requirements of 2025(s) to document the VDECS purchase and installation.

(B) Credit for Hybrid Vehicles, Alternative Fueled Vehicles, and Vehicles with Heavy-Duty Pilot Ignition Engines

Credit will be granted for each vehicle with a GVWR greater than 26,000 lbs that is a fuel efficient hybrid vehicle, an alternative fueled vehicle, or a vehicle powered by a heavy-duty pilot ignition engine that is added to the fleet before January 1, 2017. The fleet owner must meet the reporting and record keeping requirements of section 2025(r) and 2025(s) for the vehicle by January 31 of the compliance year to use the credit. Vehicles with a GVWR between 14,000 lbs and 26,000 lbs may also earn a credit if added to the fleet prior to July 1, 2011 and information is reported by January 31, 2012. Any alternative fueled engine or vehicle powered by a heavy-duty pilot ignition engine must be counted when determining the number of vehicles in the fleet.

(C) For the same owner, excess PM VDECS credits granted in the Off-road regulation (title 13, CCR section 2449) may be used in the Truck and Bus regulation and excess PM VDECS credits granted in the Truck and Bus regulation may be used in the Off-road regulation until January 1, 2017. Starting January 1, 2017 no credits may be transferred between the regulations.

1. Excess PM VDECS credits earned in the Truck and Bus regulation will be determined for each compliance year. The annual excess PM VDECS credits are determined by counting the number of Level 3 PM VDECS filters and 2007 model year and newer engines that meet PM BACT in the fleet that exceed the minimum number required to meet the PM BACT percentage of section 2025(i) without accounting for the credits specified in sections 2025(j)(2)(A) and 2025(j)(2)(B), and 2025(j)(3). The number of Excess PM VDECS credits cannot exceed the number of Level 3 retrofit VDECS in the fleet. Excess PM VDECS credits can be used in the Off-Road regulation according to section (title 13, CCR section 2449.1(b)).

2. For each compliance year, excess PM VDECS credits earned in the Off-road regulation may be applied as a credit that would treat another vehicle with a GVWR greater than 26,000 lbs in the Truck and Bus regulation section 2025 as compliant in the compliance year when determining compliance with the phase-in option of section 2025(i).

3. Fleets must meet the reporting requirements of section 2025(r)(27) to utilize excess PM VDECS credits.

(3) Credit for Early Addition of Newer Vehicles

The fleet shall receive credit for the addition of a vehicle that has a propulsion engine that is equipped with an OEM diesel particulate filter before January 1, 2012 if the average age of the propulsion engines in the fleet is newer than it was in 2006. Until January 1, 2017, the credit can be applied towards meeting the PM BACT requirements of the phase-in option of section 2025(i).

(A) The credit is a percentage that will be calculated as 5 times the difference in the average age of the 2006 baseline fleet and the average age of the fleet in the compliance year, where:

1. The average age of the fleet in 2006 is calculated as 2007 minus the average age of the engine model years in the 2006 baseline fleet.

2. For vehicles that were in the 2006 baseline fleet and are no longer in the fleet as of January 1, 2012, the vehicle model year minus 0.5 will be used in lieu of the engine model year, unless the fleet has documentation demonstrating the engine model year and engine family.

3. The fleet owner may retain the credit after 2012 if the fleet average age stays the same or newer than it was on January 1, 2012, otherwise the credit will be recalculated.

4. Vehicles that use the exemption for low-use vehicles of 2025(p)(4) may be excluded in determining the credit.

(B) The credit cannot exceed the percentage of the fleet that has 2007 model year or newer engines that meet PM BACT.

(C) The credit shall reduce the PM BACT requirement of the phase-in option in section 2025(i) for the applicable compliance year.

(D) The fleet owner must meet the reporting and record keeping requirements of section 2025(r) and (s) by January 31, 2012.

(4) Credits specified in sections 2025(j)(1) through 2025(j)(3) will not be given for vehicles that were purchased by the fleet or retrofitted to comply with any other California in-use regulation. Credits will also not be given for partially state funded vehicle replacements or retrofits according to the funding program guidelines applicable to the particular source of public funds used for the purchase. Credits are only valid for as long as the vehicle for which the compliance action has been taken remains operational in the fleet or if replaced within 30 days with a vehicle

equipped with an engine that meets PM BACT and is at least one model year newer.

(5) Credits are not transferrable except with appropriate documentation of a change of business form approved by the Executive Officer such as sole proprietorship to partnership, partnership to corporation, mergers or acquisitions of the entire company and fleet of vehicles, or for changes such as from estate tax or inheritance tax planning.

(k) *Requirements for School Buses*

This section applies to diesel-fueled school buses as defined in section 2025(d)(53) with a GVWR greater than 14,000 lbs.

(1) Phase-in Requirements for School Buses

Fleets with school buses manufactured on or after April 1, 1977 must comply with PM BACT as defined in section 2025(d)(48), pursuant to the schedule set forth in Table 5 below.

Table 5: Compliance Schedule for School Buses

Compliance Deadline, as of January 1	*Percent of Fleet Complying with PM BACT*
2012	33%
2013	66%
2014	100%

(2) Credit for School Bus Fleets that have Downsized

(A) Until January 1, 2014, a fleet having fewer school buses on January 1 of the compliance year than it had in the 2006 baseline year may reduce the percent requirement in Table 5 by the same percentage that the fleet has downsized.

For example, a fleet that is 20 percent smaller than it was in 2006 would subtract 20 percent from the annual compliance requirement. If the compliance requirement for the year is 33 percent, the fleet would need to demonstrate that it had PM filters on the 13 percent of the existing fleet (33%-20%=13%).

(B) The credits are not transferrable except with appropriate documentation of a change of business form such as sole proprietorship to partnership or partnership to corporation, or for mergers or acquisitions of the entire company and fleet.

(3) Credits for Hybrid School Buses, Alternative Fueled School Buses, Electric School Buses, and School Buses with Pilot Ignition Engines

Fleets with fuel efficient hybrid school buses, alternative fueled school buses, electric school buses, or school buses with pilot ignition engines shall receive a

credit to treat another school bus in the fleet as compliant until January 1, 2014. A school bus with a dual-fuel engine is not eligible. This credit is not available for school buses that were purchased or retrofitted to comply with any other California in-use regulation. This credit is not available if state funds were used to partially or totally replace or retrofit any school bus unless allowed by the guidelines of the program that funded the bus replacement or retrofit.

(4) Extension of Deadline for Unavailability of VDECS

If a school bus engine cannot be equipped with the highest level VDECS for PM the school bus owner must:

(A) Record and submit to the Executive Officer the information listed in section 2025(k)(4)(B) through (E) by January 31 of the applicable compliance year through January 31, 2017. By January 1, 2018, this extension expires and all school buses using this extension must be replaced with vehicles that are equipped with a 2010 model year emissions equivalent engine or with one that complies with the BACT compliance schedule (i.e., a 1998 model year engine or newer school bus equipped with the highest level VDECS for PM).

(B) Describe the reasons that a compliance extension is needed for each engine or engine-vehicle combination annually.

(C) If during the warranty period the VDECS would void the engine warranty, provide a statement from the engine manufacturer, authorized engine dealer, or vehicle dealer that explains why the warranty would be voided.

(D) If no verified VDECS is commercially available, provide a list of VDECS manufacturers that have been contacted and the manufacturers' responses to your requests to purchase a VDECS from them.

(E) If a verified VDECS is commercially available, but the VDECS manufacturer or an authorized VDECS installer does not deem the VDECS to be technologically feasible for the school bus, provide a statement from the VDECS manufacturer or authorized VDECS installer.

(5) Low-use School Buses

(A) School buses operating fewer than 1,000 miles during any compliance year are exempt from the requirements of section 2025(k), but fleet owners must comply with the record keeping requirements of section 2025(s)(3). Such vehicles must have a properly functioning odometer installed at all times.

(B) A fleet owner of a school bus that exceeds 1,000 miles in any compliance year must immediately count the school bus as part of the fleet, bring the fleet into compliance with the requirements of section 2025(k) in the current compliance year, and notify the Executive Officer of the change in status within 30 days of exceeding the mileage limit.

(6) Any school bus manufactured before April 1, 1977, must be retired from service no later than January 1, 2012**.**

(7) Title 13, CCR section 1272(c) requires that a schoolbus that has been retrofitted with a VDECS must receive a safety inspection from an authorized employee of the department of the California Highway Patrol, prior to its return to service.

(8) School buses that were equipped on or before December 31, 2005, with a Level 2 VDECS, which was highest level VDECS at the time of installation, are considered in compliance with PM BACT.

(9) Section 2025(c)(9) exempts school buses meeting the definition in section 2025(d)(36) of a historic vehicle.

(10) Owners of school buses are subject to the record keeping requirements in section 2025(s)(3).

(11) Owners of school buses are subject to the applicable requirements of sections 2025(t) through 2025(z).

(12) Owners of school buses have the option to delay the requirement to meet PM BACT for 1988-1993 model year engine school buses until January 1, 2014.

(l) Requirements for Drayage Trucks and Utility Vehicles

(1) Drayage trucks that are subject to the Drayage Truck regulation may be included in the fleet for purposes of determining compliance with the PM BACT requirements of the phase-in option in section 2025(i) only if all drayage trucks in the fleet are included.

(2) Starting January 1, 2023, all drayage truck owners must comply with the requirements of section 2025(e).

(3) Drayage trucks may not be used to earn additional credits in section 2025(j) or exemptions and extensions in section 2025(p).

(4) Starting January 1, 2021, all private utility vehicle owners must comply with the requirements of section 2025(e).

(m) *Requirements for Agricultural Fleets*

Beginning January 1, 2011, agricultural vehicles shall be exempt from the requirements of sections 2025(f), 2025(g), 2025(h) or 2025(i) if they meet the definition of an agricultural vehicle and remain below the applicable mileage limits for the period specified. Vehicles meeting the specialty vehicle definition would have no mileage restrictions. Fleets must comply with the reporting and record keeping requirements of sections 2025(r) and 2025(s).

(1) Beginning January 1, 2011 through January 1, 2017, any vehicle meeting the definition of an agricultural vehicle, as defined in section 2025(d)(5), that remains below the annual mileage limits in Table 6 below are exempt from the requirements of section 2025(f) and (g).

Table 6: Agricultural Vehicle Mileage Limits

Engine Model Year	Mileage Limits
1995 and earlier	15,000 miles
1996-2005	20,000 miles
2006 or newer	25,000 miles

(2) Agricultural vehicles that have not exceeded 10,000 miles per year in a calendar year between January 1, 2011 and January 1, 2017, shall continue to be exempt from the requirements of 2025(f) and (g) until January 1, 2023, so long as they do not exceed 10,000 miles in a calendar year.

(3) By January 1, 2017, all agricultural vehicles that have exceeded 10,000 miles in any calendar year since January 1, 2011, must comply with the best available control technology (BACT) requirements of section 2025(f) and (g).

(4) A qualifying agricultural vehicle must be operational, functional, able to start without assistance, and be able to move under its own power. Vehicles that are being used for parts do not qualify as an agricultural vehicle subject to section 2025(m).

(5) Within 30 days of replacing a qualifying agricultural or specialty agricultural vehicle, the agricultural fleet owner must report the required information in section 2025(r)(14)(I).

(6) The maximum number of qualifying agricultural vehicles in a fleet shall be established by the number of agricultural vehicles in the fleet as of January 1, 2009, as reported in section 2025(r)(14). This number shall not increase from one year to the next.

(7) An agricultural vehicle may be replaced by another vehicle so long as the replacement vehicle is equipped with an engine that is at least one model year newer than the engine in the vehicle that it replaced and the original vehicle is scrapped, rendered inoperable, sold out of the agricultural fleet, or no longer meets the definition of an agricultural or specialty agricultural vehicle. The replacement vehicle must be reported within twelve months of the vehicle being replaced or by January 31 of following compliance year whichever is longer. This requirement does not apply if just the engine is being replaced and not the entire vehicle.

(8) When a qualifying agricultural vehicle is replaced, the sum of the miles accrued on the original vehicle in that calendar year, up to the time of replacement, plus the mileage accrued on the replacement vehicle for the remainder of the calendar year

(beginning with the date of replacement) must remain below the mileage thresholds based on the model year of the engine in the replacement vehicle.

(9) A merger of two or more agricultural fleets may not result in more agricultural vehicles after the merger occurs than the sum of the agricultural vehicles in the individual agricultural fleets included in the merger.

(10) The agricultural vehicle exemptions are not transferrable except with appropriate documentation of a change of business form approved by the Executive Officer such as sole proprietorship to partnership, partnership to corporation, mergers or acquisitions of the entire company and fleet of vehicles, or for changes such as from estate tax or inheritance tax planning.

(11) Requirements for specialty agricultural vehicles

(A) Specialty agricultural vehicles, as defined in section 2025(d)(54), are exempt from the requirements of sections 2025(f), 2025(g), 2025(h) and 2025(i), until January 1, 2023.

(B) The Executive Officer will approve a vehicle as qualifying as a specialty agricultural vehicle under the following conditions:

1. The total number of specialty agricultural vehicles operating in the San Joaquin Valley Air Basin does not exceed 1,100, and

2. The total number of specialty agricultural vehicles in the state does not exceed 2,200.

(C) If more vehicles are reported than allowed by the limits, the Executive Officer will randomly approve one vehicle per eligible fleet until all fleets have one approved vehicle, then randomly approve another vehicle for the remaining eligible fleets until they all have one more vehicle approved. Vehicles will continue to be approved in this manner until the limits have been met. Vehicles reported by March 31, 2010, will be given priority should the limits identified in section 2025(m)(11)(B) above be exceeded.

(D) All vehicles with the body types described in section 2025(d)(54) that have not been approved must meet the requirements of section 2025(e) or the agricultural provisions of section 2025(m).

1. In such an instance, the agricultural fleet operator shall be notified in writing by the Executive Officer that the reported vehicle is not eligible as a specialty agricultural vehicle.

(E) A fleet that replaces an agricultural specialty vehicle will not affect the number of approved specialty vehicles in the fleet so long as the replacement vehicle meets the specialty vehicle body type and use requirements.

(12) *Optional Phase in for Log Trucks*

Beginning January 1, 2012, fleets with log trucks as defined in section 2025(d)(39) may opt to have the log trucks in the fleet comply by meeting all of the requirements as set forth below in lieu of meeting the requirements in

sections 2025(g) or 2025(i) and may not use a different compliance option for the fleet of log trucks identified as utilizing this option.

(A) Fleet owners may phase in 2010 model year emission equivalent engines according to the compliance schedule shown in Table 7.

(B) If the calculated number of engines required to be brought into compliance with the percentage limits is not equal to a whole number, the owner shall round up to a whole number when the fractional part of the required number of engines is equal to or greater than 0.5, and round down if less than 0.5.

(C) The number of log trucks and qualifying agricultural vehicles cannot exceed the number of vehicles in the fleet as of January 1, 2009.

(D) The total number of qualifying log trucks cannot increase from one year to the next.

(E) Fleets utilizing the optional phase-in for log truck provision must comply with the reporting requirements of section 2025(r) for all log trucks.

(F) Qualifying log trucks may not utilize any of the credits of section 2025(j) or any of the extensions or exemptions of section 2025(p).

(G) The remaining vehicles in the fleet other than log trucks, must comply with the requirements of section 2025(e).

Table 7: Compliance Schedule for the Log Truck Phase-in Option

Compliance Deadline as of January 1	Percent of Total Fleet with 2010 Model Year Emissions Equivalent Engines
2012	0%
2013	0%
2014	10%
2015	20%
2016	30%
2017	40%
2018	50%
2019	60%
2020	70%
2021	80%
2022	90%
2023	100%

(13) Labeling Requirements for Agricultural Vehicles and Log Trucks

(A) Within 30 days of the reporting date, fleet owners must permanently affix or paint an identification label on each vehicle that utilizes the agricultural provision or the log truck phase-in option of section 2025(m) according to the following specification:

1. The letters AG shall be white block lettering on a black background. Both letters shall be at least three inches high on a five by eight inch background,
2. The label shall be located on the left and right door of the vehicle and in clear view at all times.

(n) *Requirements for* Single-Engine and *Two-Engine Sweepers*

(1) Two-engine sweepers with auxiliary engines 50 hp or greater must comply with section 2025(e). The propulsion engine is required to meet PM BACT and to upgrade to a 2010 model year emissions equivalent engine like other vehicles, and the auxiliary engines must meet PM BACT as follows:

(A) The auxiliary engine is required to meet PM BACT when the propulsion engine is first required to meet PM BACT or to be upgraded to a 2010 model year emissions equivalent. The auxiliary engine is not required to be replaced or upgraded if it meets PM BACT. The reporting requirements of 2025(r)(17) must be met unless the fleet complies with the model year schedules of 2025(f) or 2025(g).

(2) Regardless of fleet size, two-engine sweepers with Tier 0 auxiliary engines, 50 hp or greater, may not operate more than 450 hours per year starting January 1, 2010 until January 1, 2014 and no more than 100 hours per year thereafter. The fleet owner must meet the reporting requirements in 2025(r)(17) for sweepers with Tier 0 auxiliary engines.

(3) Labeling Requirements for Two-Engine Sweepers with Tier 0 Auxiliary Engines

(A) Within 30 days of the reporting date, fleet owners must permanently affix or paint an SW identification label on each two engine sweeper that has a Tier 0 auxiliary engine according to the following specification:

1. The letters SW shall be white block lettering on a black background. Both letters shall be at least three inches high on a five by eight inch background; and
2. The label shall be located on the left and right door of the vehicle and in clear view at all times.

(4) For purposes of determining the downsizing credit of section 2025(j)(1), fleets with street sweepers may also include all single-engine and two-engine street sweepers with a GVWR from 14,001 lbs to 26,000 lbs in the 2006 baseline fleet and in the fleet for the compliance year. To use this option the fleet must meet the same reporting and record keeping requirements for these lighter street sweepers as is required for heavier vehicles.

(o) *Requirements for a New Fleet and Changes in an Existing Fleet*

(1) *New Fleet Requirements*. Owners of new fleets must meet the requirements of section 2025(e) immediately upon purchasing vehicles subject to the regulation or bringing such vehicles into the State of California for the first time after January 1, 2012. New fleets meeting the requirements of sections 2025(h) or 2025(i) must report vehicles subject to the regulation to ARB within 30 days of purchasing or bringing such vehicles into the State, in accordance with the requirements in section 2025(r).

(2) *Changes in an Existing Fleet*

(A) *Adding Vehicles to an Existing Fleet.* Unless the vehicle is a 2007 model year or newer engine that meets PM BACT, a fleet may not operate a newly added vehicle or operate a vehicle that was previously reported as non-operational in California, unless the fleet as newly constituted complies with the requirements of section 2025(e) and must within 30 days of adding the vehicle, file a report with the Executive Officer that it has added a new vehicle, and demonstrate that the fleet, as newly constituted, complies with the requirements of section 2025(o)(2)(C) below. If the vehicle added can comply by meeting PM BACT, the vehicle may be operated within 30 days of adding the vehicle to the fleet, solely for the purpose of having the vehicle's exhaust temperature data logged.

(B) *Removing Vehicles from an Existing Fleet*. If an existing fleet owner meets the requirements of the compliance options other than that of section 2025(f) or 2025(g) when a vehicle is removed from the fleet, it must file a report with the Executive Officer that it has removed a vehicle and demonstrate that the fleet, as newly constituted, will comply with the requirements of section 2025(o)(2)(C) within 30 days of removal of the vehicle.

(C) *Compliance Requirements for an Existing Fleet that has Changed*

1. A fleet owner who elects to utilize the phase-in option of section 2025(i) or uses the extensions, delays, and extensions of section 2025(p) may not add or remove vehicles that cause the percentage calculated for the fleet to fall below the percentage required for the previous compliance date.

2. The addition of vehicles with 2007 or newer model year engines that meet PM BACT need not be reported until the next compliance date unless;

   a. the addition will cause a fleet to increase its size to greater than three vehicles; or

   b. a fleet is utilizing the credit for fleets that have downsized of section 2025(j)(1)

3. A fleet owner of a vehicle that formerly qualified for any of the compliance extensions or exemptions granted in section 2025(p) but whose status has changed so that it no longer meets the applicable

definition, must immediately bring the fleet into compliance with requirements of section 2025(e) for the immediately preceding compliance date, and must notify the Executive Officer of the change in status within 30 days from the date of the change.

(p) *Exemptions, Delays, and Extensions*

(1) Vehicles used Exclusively in NOx Exempt Areas

This section applies to vehicles that are used exclusively in NOx exempt areas as defined in section 2025(d)(46) when operating in California. The fleet owner must meet the record keeping requirements of section 2025(s) and meet the reporting requirements as specified below.

(A) Any vehicle with a GVWR greater than 14,000 lbs that is used exclusively in NOx exempt areas shall meet PM BACT but may be exempt from meeting the 2010 model year emissions equivalent requirements of section 2025(f) or 2025(g) if the vehicle meets PM BACT by the compliance date that the engine would otherwise be required to be upgraded to a 2010 model year emissions equivalent engine.

1. The fleet owner must report information about the vehicle to demonstrate the engine has met PM BACT as specified in section 2025(r) but does not need to report after the initial reporting, as long as the vehicle continues to meet the requirements for the exemption, and;

2. The fleet owner must either meet the electronic tracking and reporting requirements or the vehicle labeling requirements as specified in section 2025(p)(1)(C).

(B) Until January 1, 2014, vehicles with a GVWR greater than 26,000 lbs that are used exclusively in NOx exempt areas shall be exempt from meeting the requirements of section 2025(g), 2025(h) or 2025(i) and must be brought into compliance with PM BACT from 2014 to 2016 as follows:

1. The fleet of vehicles with a GVWR greater than 26,000 lbs including vehicles that operate exclusively in the NOx exempt areas, except for low-use vehicles must meet the following phase-in schedule set forth in Table 8 below. Rounding will be done by the same method as described for the phase-in option of section 2025(i)(2).

Table 8: Compliance Schedule for NOx Exempt Area Fleets

Compliance Deadline, as of January 1	*Percent of Fleet Complying with PM BACT*
2014	33%
2015	66%
2016	100%

2. The fleet owner must meet the reporting requirements of section 2025(r) to use this compliance exemption, and must either meet the electronic tracking and reporting requirements or meet the vehicle labeling requirements as specified in section 2025(p)(1)(C) for any vehicle that uses the exemption.

3. The fleet owner must meet the reporting requirements of section 2025(r) for all the vehicles in the fleet.

4. After the fleet owner reports compliance with PM BACT for every vehicle in the fleet, reporting is no longer required for the NOx exempt area vehicles.

5. Beginning January 1, 2020, all vehicles must comply with the requirements of section 2025(g) except for vehicles that meet the requirements for an exemption as specified in section 2025(p)(1)(A) above.

6. Fleet owners may use the extension of section 2025(p)(9) for any vehicle that operates exclusively in the NOx exempt areas if the highest level VDECS is unavailable.

(C) For each compliance year the exemptions are used, the fleet owner must meet the electronic tracking and reporting requirements of section 2025(r)(16)(A)2, or must label the vehicle by permanently affixing or painting an identification label on the vehicle according to the following specification:

1. The letters NE shall be white block lettering on a black background. Both letters shall be at least three inches high on a five by eight inch background.

2. The label shall be located on the left and right door of the vehicle and in clear view at all times.

(D) Vehicles that use the NOx exempt areas exemptions may travel outside of the designated NOx exempt areas only for repairs or other services to the vehicle. The vehicle owner must obtain a work order from the facility that describes the service and it must show the date of the service and the location of the facility.

(2) Extension for Low-Mileage Construction Trucks

Beginning January 1, 2012, fleets with low-mileage construction trucks as defined in section 2025(d)(40) may opt to have a limited number of low-mileage construction trucks in the fleet comply by meeting all of the requirements as set forth below and do not need to include such vehicles in meeting the fleet requirements of sections 2025(g) through (i).

(A) Beginning, January 1, 2012, up to ten low-mileage construction trucks in the fleet may use the extension. Fleets electing this option must meet the PM BACT requirements for the qualifying low-mileage construction trucks pursuant to the schedule set forth in Table 9, and then comply with the requirements of section 2025(g) starting January 1, 2020. Rounding will be

done by the same method as described for the phase-in option of section 2025(i)(2).

(B) A one truck owner with a low-mileage construction truck must meet PM BACT by January 1, 2016.

(C) If fewer than 9,000 trucks use the extension in 2012, then the Executive Officer will approve additional trucks for the extension by approving one additional extension per fleet owner in a series of rounds until 9,000 trucks have been identified as using the extension. A random selection process will be used to assign extensions that cannot be distributed equally among fleet owners.

Table 9: Compliance Schedule for Fleets with Low-Mileage Construction Trucks

Compliance Deadline, as of January 1	*Percent of Fleet Complying with PM BACT*
2014	33%
2015	66%
2016	100%

(D) Fleets that have low-mileage construction trucks and other vehicles with a GVWR greater than 26,000 lbs, except low-use vehicles, must demonstrate that the combined fleet meets the phase-in schedule of Table 9 and, if so, the low-mileage construction vehicles in the fleet qualifying for the extension under sections 2025(p)(2)(A) and (C) above may delay having to comply with PM BACT until as late as 2016.

(E) Fleets may use the extension based on unavailability of highest level VDECS of section 2025(p)(9) for low-mileage construction trucks.

(F) Fleet owners using this provision must comply with the reporting and record keeping requirements of sections 2025(r) and (s) beginning January 31, 2012.

(G) A low-mileage construction truck that has been approved for the extension may be replaced by another truck and continue to qualify for the extension if the replacement truck has a 1996 model year or newer engine, and the miles traveled after it is placed in service combined with the miles traveled by the original vehicle stays below the annual mileage threshold. The replacement vehicle must be placed in service within one year of removing the original vehicle from the fleet or by the next compliance date, whichever is longer.

(H) Labeling Requirements for Low-Mileage Construction Trucks

1. By January 31, 2012, fleet owners must affix or paint an identification label on up to ten low-mileage construction trucks and within thirty days after notification that any additional trucks have been approved as follows:

a. The letters CT shall be white block lettering on a black background. Both letters shall be at least three inches high on a five by eight inch background.

b. The label shall be located on the left and right door of the vehicle and be in clear view at all times.

(I) Low-mileage construction truck exemptions are not transferrable except with appropriate documentation of a change of business form approved by the Executive Officer such as sole proprietorship to partnership, partnership to corporation, mergers or acquisitions of the entire company and fleet of vehicles, or for changes such as from estate tax or inheritance tax planning.

(3) *Unique Vehicle Extension* – Until January 1, 2017 the fleet owner may apply for, and the Executive Officer will grant, a single one year extension from the requirement to upgrade to a 2010 model year emissions equivalent engine in section 2025(f) and 2025(g) if by January 1, 2014, a VDECS was not available for the engine and a used vehicle or suitable cab and chassis that performs a similar function with a 2010 emissions equivalent engine is not available 6 months prior to the 2010 emissions equivalent engine compliance date. For the extension to be considered the fleet must apply for the extension 4 months prior to the compliance date that the engine is required to upgrade to a 2010 model year emissions equivalent engine.

(4) *Exemption for Low-Use Vehicles*

(A) Low-use vehicles as defined in section 2025(d)(41) are exempt from the requirements of section 2025(e) but the owner must meet reporting and record keeping requirements in accordance with sections 2025(r)(12) and 2025(s).

1. To be considered a low-use vehicle, the fleet owner must submit engine operation data from a properly functioning odometer or hubodometer and non-resettable hour-meter.

2. A vehicle is also considered to be a low-use vehicle if it is not driven for the entire compliance year and either a planned non-operation certificate or a certificate of non-operation has been filed with the DMV or, an equivalent certificate has been filed with another state prior to the beginning of the compliance year. The vehicle must not be operated for any other purpose during the compliance year except to demonstrate functionality of the vehicle to potential buyers, to move the vehicle short distances for maintenance, or to a storage facility while awaiting sale.

3. Low-use vehicles need not be included when determining compliance with the small fleet compliance option of section 2025(h) or the phase-in option of section 2025(i).

(B) Vehicles used both as an emergency support vehicle as defined in section 2025(d)(23), and for other purposes, do not need to consider the hours of operation or mileage the vehicle accrues when used for emergency operations in determining whether the vehicle meets the definition of a low-

use vehicle, but the fleet owner must report information about the emergency hours of operation or mileage as specified in section 2025(r)(15). ~~)~~,

(C) Vehicles that formerly met the low-use vehicle definition, but whose use increases above the specified limits, must immediately be brought into compliance as specified in section 2025(o)(3).

(5) *Exemption for Vehicles Operating with a Three Day Pass*

(A) Until January 1, 2021, a fleet owner that obtains a three-day pass for a vehicle will be allowed to operate one vehicle per calendar year in California without complying with section 2025(e) for the specified three day period per calendar year, provided the information required in section 2025(r)(7) is filed with the Executive Officer at least three days prior to the vehicle's planned use in California.

(B) A three-day pass must be obtained from the Executive Officer either online, email, or by fax. Prior to operating within California, the fleet must obtain written approval from the Executive Officer, which must be carried within the vehicle. The Executive Officer will make every effort to respond to the request within three business days from the receipt of the request. The Executive Officer shall grant the request so long as it is the first request made by the fleet in the calendar year. If the Executive Officer fails to respond to the request by the date of the vehicle's planned entry into the state, the vehicle may operate in California for the requested three-day period, but if the vehicle's operator fails to present documentation to ARB enforcement personnel, upon request, that it has filed a request for a three-day pass and qualifies for operating in the state, the fleet may be cited and subject to penalties.

(6) *Exemption for Vehicles Awaiting Sale* – Vehicles in the possession of dealers, financing companies, or other entities that do not intend to operate the vehicle in California or offer the vehicle for hire for operation in California, and that are operated only to demonstrate functionality to potential buyers or to move short distances while awaiting sale for purposes such as maintenance or storage, are exempt from all requirements in section 2025.

(7) *Exemption for Vehicles Used Solely on San Nicolas or San Clemente Islands* - Vehicles used solely on San Nicolas or San Clemente Islands are exempt from all requirements in section 2025. If the land use plans for the islands are changed to allow use by the general public of the islands, this exemption shall no longer be applicable.

(8) *Compliance Extension for Emissions Control Device Manufacturer Delays* - An owner who has purchased, or has entered into contractual agreement with the seller for the purchase, but has not received a VDECS, a replacement engine, or vehicle in order to comply with this regulation will be excused from immediate compliance if the VDECS or vehicles have not been received due to manufacturing delays as long as all the conditions below are met:

(A) The fleet owner who has purchased, or has entered into contractual agreement with the seller for the purchase, at least 4 months prior to the required compliance date, except in the case where a VDECS is ordered to replace a failed or damaged VDECS, the fleet owner has purchased, or has entered into contractual agreement with the seller for the purchase of a replacement VDECS within 60 days of the VDECS failure.

(B) The owner has identified the vehicle to be equipped with the VDECS or replaced upon receipt of the replacement VDECS or vehicle.

(C) Proof of purchase, such as a purchase order, down payment, or signed contract for the sale, including specifications for each VDECS, must be maintained by the owner and provided to an agent or employee of ARB upon request.

(D) The new or retrofitted vehicles are immediately placed into operation upon receipt and any replaced vehicles are removed from service within 30 days.

(E) Proof of the date that the new or retrofitted vehicles were placed into service and proof of the date that any replaced vehicles were removed from service must be maintained by the owner and provided to an agent or employee of ARB upon request.

(9) *Extension of the PM BACT Compliance Deadline Based on Unavailability of Highest Level VDECS* - If an engine that is required to meet PM BACT cannot be equipped with the highest level VDECS for PM, the Executive Officer may grant a one-year extension of the compliance deadline, which may be extended annually through January 1, 2017, based on an evaluation of information submitted pursuant to section 2025(r)(11) that the engine cannot be equipped with the highest level VDECS for PM provided that all other engines in the fleet are in compliance with the requirements for the compliance year. The request must be filed 4 months prior to the compliance deadline. By January 1, 2018, any vehicle that is not equipped with the highest level VDECS for PM must be replaced with a vehicle that meets PM BACT. The extension for unavailability of highest level VDECS applies to the auxiliary engines in two engine sweepers if the engine that provides motive power must meet PM BACT. By January 1, 2018, any auxiliary engine in a two engine sweeper with a GVWR greater than 26,000 lbs that is not equipped with the highest level VDECS for PM must be replaced with Tier 4 off-road engine or an engine that is equipped with the highest level VDECS for PM. The extension does not apply for engines that are required to meet the 2010 model year equivalent requirements.

(10) *Extension for Meeting PM BACT by 2014*. By January 1, 2014, if every vehicle in the fleet with a GVWR greater than 26,000 lbs is equipped with either a Level 3 VDECS for PM or a 2007 model year or newer engine that meets PM BACT, the vehicles shall be exempt from meeting the 2010 model year emission equivalent engine requirements until January 1, 2023.

(A) Fleet owners must meet reporting requirements of sections 2025(r) by January 31, 2014. The fleet will not need to report again after the initial

reporting to retain the extension unless a vehicle or engine is replaced with one that has a 2006 model year or older engine.

(B) The fleet can retain the exemption if an engine or vehicle is replaced with another one that is equipped with a Level 3 VDECS or has a 2007 model year or newer engine that meets PM BACT. The fleet must report the according to section 2025(o)(2).

(q) *Special Provisions for VDECS and Experimental Diesel Emission Control Strategies*

(1) VDECS *Requirements*

(A) *VDECS Installation*. Before installing a VDECS on a vehicle, the owner must ensure that:

1. The VDECS is verified for use on the engine and vehicle, as described in the Executive Order for the VDECS.
2. Use of the vehicle is consistent with the conditions of the Executive Order for the VDECS.
3. The VDECS is installed in a verified configuration.
4. The engine to be retrofitted must be in its original certified configuration, free of excess oil consumption, must not have malfunctioning fuel delivery systems, or any other mechanical condition that may impair the proper functioning of the VDECS.
5. The VDECS label will be visible after installation.

(B) *VDECS Maintenance*. If a fleet owner installs a VDECS to meet the requirements of section 2025(e), the VDECS must remain installed until the VDECS fails or is damaged or is replaced with a similar or higher level VDECS. Requirements for VDECS failure or damage are in section 2025(q)(2). The owner of a vehicle retrofitted with a VDECS must ensure that the VDECS and engine are properly maintained as recommended by the respective manufacturers.

(2) *Failure or Damage of a VDECS*

In the event of a failure or damage of a diesel emission control strategy, the following conditions apply:

(A) Failure or Damage During the Warranty Period. If a VDECS fails or is damaged within its warranty period, and the VDECS manufacturer or authorized dealer determines that it cannot be repaired, the owner must replace the VDECS with the same level or higher level VDECS for the vehicle within 90 days of the failure.

(B) Failure or Damage Outside of Warranty Period. If a VDECS fails or is damaged outside of its warranty period and cannot be repaired, and if the fleet could not meet an applicable target for the most recent compliance date without the failed VDECS, then within 90 days of the failure, the owner must

replace the failed VDECS with the highest level VDECS available for the engine at time of failure.

(3) *Fuel-Based Strategy VDECS*

(A) If a fleet owner determines that the highest level VDECS for a large percentage of the fleet would be a Level 2 fuel verified as a diesel emission control strategy, and implementation of this VDECS would require installation of a dedicated storage tank, then the owner shall request prior approval from the Executive Officer to allow use of the Level 2 fuel-based strategy across its fleet.

(B) Waiver for Discontinuation of Fuel Verified as a Diesel Emission Control Strategy. If a fleet owner has relied upon a fuel verified as a diesel emission control strategy to meet an applicable requirement and has to discontinue use of the fuel due to circumstances beyond the fleet owner's control, the fleet owner shall apply to the Executive Officer no later than 30 days after discontinuing use of the fuel for a compliance waiver of up to two years to provide the fleet owner time to return to compliance with the applicable requirements. The Executive Officer shall respond to the request within 30 days and grant the request upon finding that the application is complete, outlines the compliance strategy to be used, and that all reporting requirements have been met.

(4) *Use of Experimental Diesel Emission Control Strategies*

(A) If a fleet owner wishes to use an experimental or non-verified diesel emission control strategy to support the verification of a non-verified diesel emission control strategy, the owner must first obtain approval from the Executive Officer for a compliance extension. To obtain approval, the owner must demonstrate either that (1) a VDECS is not available or not feasible for their vehicle or application, or (2) that use of the non-verified strategy is needed to generate data to support verification of the strategy.

1. The application must include the following: emissions data and a detailed description of the control technology that demonstrates that the experimental control strategy achieves at least a Level 2 diesel PM emission reduction, vehicle and engine data, and odometer or hubodometer readings as described in sections 2025(r)(8), 2025(r)(9), and 2025(r)(12)(B).
2. The Executive Officer will treat the strategy as a:
    a. Level 2 VDECS if the application demonstrates that the strategy achieves at least 50 percent reduction in diesel PM.
    b. Level 3 VDECS if the application demonstrates that the strategy achieves at least 85 percent reductions in diesel PM.

(B) Upon approval by the Executive Officer, each vehicle engine retrofitted with the experimental strategy will be allowed to operate for a specified time period necessary to make a determination that the experimental strategy can achieve the projected emissions reductions. The vehicle equipped with the

experimental strategy will be considered to be in compliance under section 2025(f), 2025(g), 2025(h), or 2025(i) during the specified time period. The fleet owner shall keep documentation of this use in records as specified by the Executive Officer.

(C) The fleet owner must bring the fleet into compliance under section 2025(f), 2025(g), 2025(h), or 2025(i) prior to the expiration of the experimental diesel emission control strategy extension.

(5) *VDECS That Impairs Safe Operation of Vehicle* - A fleet owner may request that the Executive Officer find that a VDECS should not be considered the highest level VDECS available because:

(A) It cannot be safely installed or operated in a particular vehicle application; or

(B) Its use would make compliance with occupational safety and health requirements, federal highway safety regulations, or an ongoing local air district permit condition impossible.

If a VDECS manufacturer states that there is no safe or appropriate method of mounting its VDECS on the requesting party's vehicle, then the VDECS will not be considered safe. In the absence of such a declaration by the VDECS manufacturer, the requesting party shall provide other documentation to support its claims.

Documentation may include published reports and other findings of federal, state or local government agencies, independent testing laboratories, engine manufacturers, or other equally reliable sources. The request will only be approved if the requesting party has made a thorough effort to find a safe method for installing and operating the VDECS, including various locations for VDECS mounting, and use of an actively regenerated VDECS. The Executive Officer shall review the documentation submitted and any other reliable information that he or she wishes to consider and shall make his or her determination based upon the totality of the evidence.

Upon finding that a VDECS cannot be installed without violating the safety standards prescribed under title 8, CCR by the California Department of Industrial Relations, Division of Occupational Safety and Health, comparable federal or state health and safety laws where the vehicle operates, or federal highway safety laws, the Executive Officer shall issue a determination that there is no highest level VDECS available. The Executive Officer shall inform the requesting party, in writing, of his or her determination, within 60 days of receipt of the request.

Parties may appeal the Executive Officer's determination as described in (C) and (D) below. During the appeal process described in (C) and (D) below, the requesting party may request the administrative law judge to stay compliance until a final decision is issued. If the stay is granted and the Executive Officer denies the requesting party's request, the requesting party has six months from the date of the Executive Officer's final written decision to bring his or her fleet back into compliance.

(C) *Appeals – Hearing Procedures*

1. Any party whose request has been denied may request a hearing for the Executive Officer to reconsider the action taken by sending a request in writing to the Executive Officer. A request for hearing shall include, at a minimum, the following:
    a. name of the requesting party;
    b. copy of the Executive Officer's written notification of denial;
    c. a concise statement of the issues to be raised, with supporting facts, setting forth the basis for challenging the denial (conclusory allegations will not suffice);
    d. a brief summary of evidence in support of the statement of facts required in c. above; and
    e. the signature of an authorized person requesting the hearing
2. A request for a hearing shall be filed within 30 days from the date of issuance of the notice of the denial.
3. A hearing requested pursuant to this section shall be heard by a qualified and impartial hearing officer appointed by the Executive Officer. The hearing officer may be an employee of the ARB, but may not be any employee who was involved with the denial at issue. In a request for reconsideration, the hearing officer, after reviewing the request for hearing and supporting documentation provided under paragraph 1.d. above, shall grant the request for a hearing if he or she finds that the request raises a genuine and substantial question of law or fact.
4. If a hearing is granted, the hearing officer shall schedule and hold, as soon as practicable, a hearing at a time and place determined by the hearing officer.
5. Upon appointment, the hearing officer shall establish a hearing file. The file shall consist of the following:
    a. the determination issued by the Executive Officer which is the subject of the request for hearing;
    b. the request for hearing and the supporting documents that are submitted with it;
    c. all documents relating to and relied upon by the Executive Officer in making the initial determination to deny the requesting party's original claim; and
    d. correspondence and other documents material to the hearing.
6. The hearing file shall be available for inspection by the applicant at the office of the hearing officer.
7. An applicant may appear in person or be represented by counsel or by any other duly-authorized representative.

8. The ARB may be represented by staff or counsel familiar with the regulation and may present rebuttal evidence.
9. Technical rules of evidence shall not apply to the hearing, except that relevant evidence may be admitted and given probative effect only if it is the kind of evidence upon which reasonable persons are accustomed to relying in the conduct of serious affairs. No action shall be overturned based solely on hearsay evidence, unless the hearsay evidence would be admissible in a court of law under a legally recognized exception to the hearsay rule.
10. Declarations may be used upon stipulation by the parties.
11. The hearing shall be recorded either electronically or by a certified shorthand reporter.
12. The hearing officer shall consider the totality of the circumstances of the denial, including but not limited to, credibility of witnesses, authenticity and reliability of documents, and qualifications of experts. The hearing officer may also consider relevant past conduct of the applicant including any prior incidents involving other ARB programs.
13. The hearing officer's written decision shall set forth findings of fact and conclusions of law as necessary.
14. Within 30 days of the conclusion of a hearing, the hearing officer shall submit a written proposed decision, including proposed finding as well as a copy of any material submitted by the hearing participants as part of that hearing and relied on by the hearing officer, to the Executive Officer. The hearing officer may recommend to the Executive Officer any of the following:
    a. uphold the denial as issued;
    b. modify the denial; or
    c. overturn the denial in its entirety.
15. The Executive Officer shall render a final written decision within 60 working days of the last day of hearing. The Executive Officer may do any of the following based on substantial evidence in the record:
    a. adopt the hearing officer's proposed decision;
    b. modify the hearing officer's proposed decision; or
    c. render a decision without regard to the hearing officer's proposed decision.

(D) *Appeals – Hearing Conducted by Written Submission*

In lieu of the hearing procedure set forth in (C)above, an applicant may request that the hearing be conducted solely by written submission. In such case the requestor must submit a written explanation of the basis for the appeal and provide supporting documents within 20 days of making the request. Subsequent to such a submission the following shall transpire:

1. ARB staff shall submit a written response to the requestor's submission and documents in support of the Executive Officer's action no later than 10 days after receipt of the requestor's submission;
2. The applicant may submit one rebuttal statement which may include supporting information, as attachment(s), but limited to the issues previously raised;
3. If the applicant submits a rebuttal, ARB staff may submit one rebuttal statement which may include supporting information, as attachment(s), but limited to the issues previously raised; and
4. The hearing officer shall be designated in the same manner as set forth in section 2025(q)(5)(C)(3) above. The hearing officer shall receive all statements and documents and submit a proposed written decision and such other documents as described in section 2025(q)(5)(C) (13) above to the Executive Officer no later than 30 working days after the final deadline for submission of papers. The Executive Officer's final decision shall be mailed to the applicant no later than 60 days after the final deadline for submission of papers.
5. The Executive Officer shall render a final written decision within 60 working days of the last day of hearing. The Executive Officer may do any of the following:
    a. adopt the hearing officer's proposed decision;
    b. modify the hearing officer's proposed decision; or
    c. render a decision without regard to the hearing officer's proposed decision.

(r) *Reporting Requirements*

(1) The owner of a fleet is subject to reporting requirements for the vehicles in the fleet as defined in section 2025(d)(28) if the owner has elected to utilize the compliance options of section 2025(f)(4), 2025(g)(3), 2025(g)(4), 2025(h), 2025(i), the credits of section 2025(j), and the agricultural provisions of section 2025(m), single-engine and two-engine street sweeper provisions of section 2025(n), extension or exemptions for vehicles used exclusively in NOx exempt areas of section 2025(p)(1), and the extension for low-mileage construction trucks of section 2025(p)(2). Fleet owners that use the credit for fleets that have downsized provided in section 2025(j)(1)and the credit for the early addition of newer vehicles provided in section 2025(j)(3) must report information for all vehicles under common ownership or control with a GVWR greater than 26,000 lbs in the 2006 baseline fleet and in the fleet for each compliance year. Except as required in section 2025(k)(4), school buses are not required to comply with the reporting requirements.

(2) All fleet owners utilizing any of the credits in section 2025(j) or any of the exemptions, delays, or extensions in section 2025(p) must report according to the requirements of section 2025(r) and maintain records according to section 2025(s) for all of the vehicles in the fleet as defined in section 2025(d)(28).

(3) The owner of a fleet that complies by using the compliance schedule by engine model year set forth in sections 2025(f) and 2025(g) and also utilizes the low-use vehicle provision of section 2025(p)(4) is only required to meet the reporting requirements of section 2025(r) for the low-use vehicles meeting the definition in section 2025(d)(41).

(4) Fleet owners may submit reporting information using forms (paper or electronic) approved by the Executive Officer.

(5) The fleet owner must notify the Executive Officer in writing by the first applicable reporting date and by January 31 of every subsequent compliance year, if applicable, with the name of the responsible official and the location where the records will be kept, and whether any information has changed since its last reporting. Whether the records will be kept inside or outside California, the owner must also comply with section 2025(t).

(6) Each year, fleet owners subject to the reporting requirement must report on their fleet as it was on the compliance date of the current compliance year. The fleet owner must submit the applicable information set forth in sections 2025(r)(5) through (10) by January 31 of each compliance year. Owners must report annually until the year after all of the requirements of section 2025(f) and 2025(g) have been completely met.

(7) *Owner Contact Information*: Compliance reports must include the following information:

(A) Fleet owner's name;

(B) Name of company or agency;

(C) Motor carrier identification number;

(D) Corporate parent name (if applicable);

(E) Corporate parent taxpayer identification number (if applicable);

(F) Company taxpayer identification number;

(G) Street address and mailing address;

(H) Name of responsible person;

(I) Title of responsible person;

(J) Contact name;

(K) Contact telephone number;

(L) Contact email address (if available); and

(M) License number issued by the Public Utilities Commission (if applicable).

(8) *Vehicle Information*

Fleet owners must provide to the Executive Officer a list of all vehicles subject to the reporting requirements along with the information listed in (A) through (S) below for each vehicle:

(A) Vehicle identification number;

(B) Vehicle manufacturer;

(C) Vehicle model;

(D) Gross vehicle weight rating; (E) Vehicle model year;

(F) License plate number;

(G) The state, province, or country where the vehicle is or was registered and type of registration plate;

(H) Vehicle type, including whether the vehicle is a schoolbus, agricultural vehicle, log truck, truck-tractor, two-engine sweeper, low-mileage construction truck or yard truck;

(I) If the vehicle was added after January 1, 2012, the date the vehicle was added otherwise the date first reported;

(J) Date that a vehicle was retired, sold, or scrapped after January 1, 2012;

(K) Whether the vehicle will be designated as a low-use vehicle as defined in section 2025(d)(41);

(L) Whether the vehicle has been certified as non-operational with the California Department of Motor Vehicles or equivalent documentation from the state, province, or country where the vehicle is registered and whether the vehicle will not operate in California.

(M) Whether the vehicle is a fuel efficient hybrid vehicle as defined in section 2025(d)(31);

(N) Whether the vehicle is propelled by an alternative-fueled engine as defined in section 2025(d)(8);

(O) Whether the vehicle will use the extension or exemptions for vehicles used exclusively in NOx Exempt Areas in section 2025(p)(1);

(P) Whether the fleet size is more than three vehicles subject to the regulation with a GVWR greater than 14,000 lbs;

(Q) Whether the vehicle is a log truck utilizing the Optional Phase in for Log Trucks provision in section 2025(m)(12);

(R) Whether the vehicle is a low-mileage construction truck that will use the extension for low-mileage construction trucks specified in section 2025(p)(2); and

(S) Whether the vehicle was partially paid for with public funds, and if so, the information about the funding contract specified in section 2025(r)(18).

(9) *Engine Information Reporting*

Except as provided in section 2025(r)(13)(A) below, the following information for each engine that propels a vehicle reported per section 2025(r)(8) and for each sweeper engine that operates auxiliary equipment must be reported to the Executive Officer:

(A) Engine manufacturer;

(B) Engine model;

(C) Engine family for all 1974 model year and newer engines;

(D) Fuel type

(E) Engine model year;

(F) Whether the engine meets an on-road or off-road emissions standard;

(G) Whether the engine is used to propel the vehicle or to operate auxiliary equipment;

(H) The emissions standard to which the engine was certified if lower than required for the engine model year; and

(I) Whether the engine was partially paid for with public funds, and if so, the information about the funding contract specified in section 2025(r)(18).

(10) *Verified Diesel Emission Control Strategies Reporting*

Except as provided in section 2025(r)(13)(A) below, for each VDECS that is installed on an engine listed per section 2025(r)(9), the fleet owner must report the following information to the Executive Officer:

(A) Description of VDECS installed;

(B) VDECS family name;

(C) Serial number, or experimental part number, or aftermarket part number;

(D) Date installed;

(E) If claiming early PM retrofit credits of section 2025(j)(2)(A) and the VDECS is installed between July 1, 2011 and October 1, 2011, the fleet owner must attest to having records to document the purchase agreement and down payment for the VDECS by May 1, 2011;

(F) Whether the VDECS was partially paid for with public funds and the information in 2025(r)(18) if partially paid for with public funds; and

(G) Whether the VDECS was installed on the engine to comply with another California in-use regulation.

(11) *Reporting for Extension for Unavailability of Highest Level VDECS*

If appropriate, the following information must be submitted to the Executive Officer with a request for an extension based on the unavailability of highest level VDECS:

(A) Owner contact information, vehicle, and engine information listed in sections 2025(r)(7), 2025(r)(8), and 2025(r)(9);

(B) Description of the reason for the compliance extension request for each engine or engine-vehicle combination;

(C) If the VDECS would void the engine warranty, provide a statement from the engine manufacturer or authorized engine or vehicle dealer;

(D) If a verified VDECS is commercially available for the engine family, provide a list of manufacturers and installers that have been contacted and the response~~s~~ to a request to purchase; and

(E) Documentation must be submitted with the initial request and must be reported annually on January 31 following the compliance deadline for each year that the owner is claiming non-availability of the highest VDECS.

(12) *Low-Use Vehicle Reporting*

For vehicles that are designated as low-use, the fleet owner must report the following information to the Executive Officer annually for as long as the fleet owns or operates the vehicle:

(A) Owner, vehicle, and engine information identified in sections 2025(r)(5) through 2025(r)(9);

(B) Mileage readings from a properly functioning odometer or hubodometer taken on January 1 and December 31 of the compliance year. A hubodometer may be used in lieu of the odometer;

(C) If the vehicle uses engine power as specified in 2025(d)(41) , hour-meter readings from a properly functioning non-resettable hour-meter taken on January 1 and December 31 of the compliance year;

(D) The dates and readings of the odometer and non-resettable hour-meter readings. In the event that the odometer is replaced, the original odometer reading and the new odometer reading and the date of replacement must be reported within 30 days the original odometer failed. In the event that the odometer or hubodometer is removed, the reading and date it is removed and the reading of the replacement and the date it is placed in service. If hubodometers are used, the fleet owner must report the serial numbers;

(E) Upon request of an agent or employee of the ARB, the owner of a vehicle operating both inside and outside of California must provide records from a electronic tracking system as defined in section 2025(d)(21) that can acquire date, time, engine-on, and location data. The owner may use other documentation of vehicle operation and location, such as IRP records;

(F) Whether the vehicle is used as an emergency support vehicle as defined in section 2025(d)(23); and, if so, the fleet owner must report the information in section 2025(r)(15); and

(G) Whether a planned non-operation certificate has been filed with the DMV or, an equivalent certificate has been filed with another state prior to the beginning of the compliance year, and whether the vehicle will not be operated in the compliance year.

(13) *Credit for Fleets that have Downsized or Added Newer Vehicles Early Reporting*

Fleets owners claiming credits under section 2025(j) must report the following:

(A) Fleet owners claiming credit for downsizing must report the following:

1. For the vehicles in the 2006 baseline fleet, vehicle information specified in section 2025(r)(8)(A) to 2025(r)(8)(G), and if the vehicle was not registered with the California Department of Motor Vehicles, identify the type of records that are being kept to document proof that the vehicles drove at least 1,000 miles in California in the year 2006. Fleets that include street sweepers with a GVWR from 14,001 to 26,000 lbs for determining the credit, must identify that the vehicle is a street sweeper.
2. For the compliance year, whether the fleet has drayage trucks, on-road vehicles subject to the off-road in-use vehicle regulation, and information about how many are currently in the fleet. Fleets that include street sweepers with a GVWR from 14,001 to 26,000 lbs for determining the credit, must identify that the vehicle is a street sweeper.

(B) For the 2006 baseline fleet, a fleet owner that claims credits for adding cleaner vehicles as specified in section 2025(j)(3) must report the vehicle information in section 2025(r)(13)(A) above and the engine model year, and engine family for all the vehicles in the fleet as of January 1, 2012. The fleet owner has the option to report the engine information for vehicles that are no longer in the fleet if the fleet owner has records to document the engine model year and engine family.

(14) *Agricultural Fleet Reporting*

Until January 1, 2023, fleet owners of all agricultural vehicles that utilize the provisions of section 2025(m), must report the following information to the Executive Officer by April 29, 2011 and every January 31 thereafter:

(A) Information required in sections 2025(r)(5) through 2025(r)(9) for vehicles in the existing fleet and the vehicle information required in section 2025(r)(8) items (A) to (G) for the vehicles in the fleet as of January 1, 2009;

(B) Whether the vehicle is a specialty agricultural vehicle or a log truck;

(C) Whether the vehicle is being added or removed from the fleet and the date of that the vehicle is added or removed;

(D) The vehicle body type if one of the body types described in the definition of specialty agricultural vehicle in section 2025(d)(54);

(E) If eligible to be considered for the specialty vehicle exemption, the priority status of the vehicle in case not all specialty vehicles in the fleet can be approved;

(F) Whether the specialty vehicle will operate exclusively outside the San Joaquin Valley Air Basin;

(G) Whether the vehicle is operated for compensation outside a farming business owner's farm;

(H) Except for specialty agricultural vehicles, mileage from a properly functioning odometer taken on January 1, 2011 and every January 1 thereafter. In the event that the odometer is replaced, the fleet owner shall report the original

odometer reading, the new odometer reading, and the date the original odometer was replaced. If a hubodometer is used in lieu of the odometer, the fleet owner must also report the serial number for each hubodometer used or replaced; and

(I) For an agricultural vehicle being replaced, the owner, vehicle, and engine information set forth in sections 2025(r)(5) through 2025(r)(9), the mileage of both the vehicle being replaced and added, and the date the mileage readings were taken.

(15) *Vehicles used as emergency support vehicles in emergency operations*

A fleet owner must provide the following information to the Executive Officer to qualify a vehicle's usage as emergency operation:

(A) Owner, vehicle, and engine information identified in sections 2025(r)(5) through 2025(r)(9);

(B) Odometer readings from a properly functioning odometer to document use at an emergency event and to document travel to and from the emergency event. In the event that the odometer meter is replaced, the fleet owner shall report the original odometer reading and the new odometer reading and the date that the original odometer was replaced. If a hubodometer is used in lieu of an odometer, the fleet owner must also report the serial number for each hubodometer used or replaced. Vehicles used exclusively for emergency use that are not authorized emergency vehicles do not need to have an hour meter and do not need to report hours. Authorized emergency vehicles are exempt per section 2025(c); and

(C) Records to document dispatch by the local, state, or federal agency or other responsible emergency management entity as approved by the Executive Officer.

(16) *Reporting of Vehicles Utilizing the Exemptions, Delays, and Extensions Provision*

Unless stated otherwise in section 2025(p), fleet owners utilizing the exemptions, delays, and extensions provision of section 2025(p) must provide the following information to the Executive Officer by January 31, 2012:

(A) *Vehicles Operating Exclusively in NOx-exempt areas*

The owner must provide the following information to the Executive Officer by January 31 of each compliance year to demonstrate compliance with the requirements of section 2025(p)(1):

1. Owner, vehicle, engine information, and VDECS listed in sections 2025(r)(5) through 2025(r)(10).
2. For vehicles that are not labeled, records from an electronic tracking system that tracks usage and location in a monthly report format approved by ARB. The system must at a minimum meet the requirements as defined in section 2025(d)(21) and provide the information listed therein.

3. Whether the vehicle is labeled as specified in section 2025(p)(1)(C).

(B) Unique Vehicle Extension

The owner must provide the following information to the Executive Officer by January 31 of each compliance year to demonstrate compliance with the requirements of section 2025(p)(3):

1. Owner, vehicle, and engine information listed in sections 2025(r)(5) through 2025(r)(9).
2. Photos and a complete description of the vehicle and its function.
3. A complete explanation of why the vehicle qualifies as a unique vehicle.
4. Names and phone numbers of sources contacted during the search for a replacement vehicle.
5. Letters from contacted VDECS vendors stating that retrofit technology is unavailable for the unique vehicle.

(17) *Two-Engine Sweepers*

The owner must provide the following information for both the propulsion and auxiliary engine to the Executive Officer by March 31, 2010, April 29, 2011, and January 1 of subsequent compliance years to demonstrate compliance with the requirements of section 2025(n):

(A) Owner, vehicle, and engine information listed in sections 2025(r)(5) through 2025(r)(10);

(B) Engine tier level of the auxiliary engine, model year, and engine family number; and

(C) For Tier 0 auxiliary engines, the hours of use readings taken January 1 and December 31 of each year starting 2010.

(18) *Vehicles Purchased, Repowered, or Retrofitted Using Public Funds*

For owners of vehicles that were purchased, repowered or retrofitted using public funds and where funding program guidelines include criteria which limit funding projects from receiving regulatory benefit or credit, the fleet owner must provide the following information to the Executive Officer for all vehicles that were purchased or retrofitted using public funds:

(A) Owner, vehicle, and engine information listed in sections 2025(r)(5) through 2025(r)(10);

(B) Date the public funding contract began;

(C) Date the contract or emissions surplus contract period ends or ended;

(D) Program providing the funding; and

(E). Information about the contract terms to determine eligibility.

(19) Claiming *a Three Day Pass*

Information listed in sections 2025(r)(7) and 2025(r)(8) items (A) to (G) must be provided for the vehicle and the date for which the three day period would begin.

(20) *Compliance Certification*. All reports submitted to ARB, must be accompanied with a certification signed by a responsible official or a designee thereof that the information reported is accurate and that the fleet is in compliance with the regulation. If a designee signs the compliance certification, a written statement signed by the responsible official designating the designee must be attached to the compliance certification and submitted to the Executive Officer.

(21) *Changes Since Last Reporting* – The fleet owner or responsible person must report to the Executive Officer any additions, removals, or changes to the fleet since the last annual report filed. Such changes shall include, among other things, changes in the fleet's compliance option, vehicles removed from the fleet, vehicles added to the fleet through purchase or by bringing into California, and vehicles newly defined as low-use, or recently repowered or retrofitted. If there are no changes, the fleet owner shall indicate there have been no changes.

(22) *New Fleet Reporting*. New fleets that elect to utilize the phase-in options of section 2025(i) or 2025(h) must submit the information in sections 2025(r)(5) through 2025(r)(9) to the Executive Officer within 30 days of purchasing or bringing such vehicles into the State. Beginning the first January 1 that is more than 30 days after the date of purchase or bringing a vehicle into the State, new fleets must comply with the reporting requirements in section 2025(r).

(23) *Claiming Compliance Extension for Manufacturer Delays*

The fleet owner must report the following information to the Executive Officer by January 31, each year to demonstrate compliance with the requirements of section 2025(p)(8):

(A) The date of purchase or the date the contractual agreement for purchase of VDECS, replacement engine, or vehicle was entered;

(B) The date the VDECS or vehicle was placed into service;

(C) The date the existing vehicle was removed from service; and

(D) Identification of the vehicle that was replaced.

(24) *Reporting for a Compliance Extension for Fleets that Meet PM BACT per section 2025(f) or 2025(g) prior to January 1, 2014*

For fleets complying using the compliance option of section *2025(f) or* 2025(g), the fleet owner must provide the following information about the vehicles that meet PM BACT prior to January 1, 2014:

(A) Owner, vehicle and engine information listed in sections 2025(r)(5) through 2025(r)(9).

(B) Information listed in section 2025(r)(10) for the VDECS.

(25) *Reporting for Small Fleets*

For fleets complying using the phase-in option for small fleets of section 2025(h), the fleet owner must provide the following information about all vehicles in the fleet;

(A) Owner information listed in sections 2025(r)(5) through (7); and

(B) Until January 31, 2014, the vehicle information listed in sections 2025(r)(8) items (A) through(J) and starting January 31, 2014, all the information listed in sections 2025(r)(8) through 2025(r)(10).

(26) *Reporting for Fleets Using Excess PM VDECS Credits*

For fleets claiming Excess PM VDECS credits of section 2025(j)(2)(C), the fleet owner must provide the following information about the vehicles prior to January 1 of the compliance year in which they want to apply it:

(A) Owner, vehicle and engine information listed in sections 2025(r)(5) through 2025(r)(9) for the vehicle that was retrofit.

(B) Information listed in section 2025(r)(10) for the VDECS;

(C) The fleet registration identification number for the Off-road regulation known as the diesel off-road online reporting system, or DOORS ID number.

(s) *Record Keeping*

(1) The owner of a fleet shall maintain the following records specified in sections 2025(s)(3) through 2025(s)(16)as applicable. The owner shall provide these records to an agent or employee of the ARB within five business days upon request. If the records will be kept outside California, the owner must also comply with section 2025(t).

(2) The owner of a fleet subject to the reporting requirements of section 2025(r) shall maintain copies of the information reported under section 2025(r), as well as the records described in sections 2025(s)(3) through 2025(s)(16) below.

(3) School Buses

(A) Fleet owners of school buses shall maintain records of all the information listed in sections 2025(r)(7) through 2025(r)(10).

(B) Fleet owners using the downsize credits of section 2025(k)(2) must maintain records of all the information listed in sections 2025(r)(7) through 2025(r)(10) for all school buses in the 2006 baseline fleet and for all school buses in the fleet on January 1 of the compliance year that were registered. Fleet owners do not have to have to keep engine and VDECS information that is required under sections 2025(r)(9) and 2025(r)(10) for school buses registered on October 1, 2006 that are no longer in the fleet.

(C) Fleet owners with low-use buses must maintain records of all the information listed in section 2025(r)(12) for each low-use bus.

(D) Fleet owners must comply with record keeping requirements for VDECS failures and maintenance as required in sections 2025(s)(10) and 2025(s)(14).

(4) *Motor Carrier or Broker*

(A) Bills of lading and other documentation identifying the motor carrier or broker who hired or dispatched the vehicle and the vehicle dispatched.

(5) *Agricultural Fleets*

(A) Fleets utilizing the agricultural fleet provision must keep and make available upon request proof that all agricultural vehicles were used exclusively in agricultural operations. This may include records used to support proof to other governmental agencies that the primary business function was agricultural. Such documentation may include IRS or Board of Equalization tax forms or bills of lading.

(B) Records must be maintained for each agricultural vehicle demonstrating that the vehicle was operational, functional and capable of performing the duty for which it was designed. This could include maintenance records, mileage records, or licensing records, emissions testing records, or any other source of data approved by the Executive Officer.

(C) The agricultural fleet owner must keep bills of lading for delivery of fertilizer or crop protection products by an agricultural vehicle to a farm. Such records must demonstrate that the operation of the vehicle for the preceding calendar year was used exclusively to deliver such products to farms.

(D) Proof of transference of ownership of any qualifying agricultural vehicle that is added to or removed from the fleet.

(E) Proof of ownership of the vehicles including title, registration, or bills of sale.

(6) *Proof of Operation* – Owners of fleets must keep records showing that any vehicle used to demonstrate compliance using the phase-in options of section 2025(h) and section 2025(i) was operated in California for that applicable compliance year. Records could include IRP records, GPS tracking records, or DMV or law enforcement permits.

(7) *Fleets that have Downsized or have Added Newer Engines Early* –Fleets utilizing the credit for fleets that have downsized of section 2025(j)(1) or the credit for the early addition of newer engines of section 2025(j)(3) must keep the following records at the business office or terminal location identified in the reports filed with the Executive Officer:

(A) For all vehicles in the fleet on October 1, 2006; a,

1. Copy of the vehicle's registration; or

2. Copy of the vehicle's ownership documentation; and

3. Copy of documentation of the engine model year and engine family (only if reported for claiming credit for the early addition of newer vehicles); and

4. If not registered with the California Department of Motor Vehicles, proof that the vehicles in the fleet drove at least 1,000 miles in California in the year 2006.

(B) For all vehicles in the fleet on January 1 of the compliance year:

1. A copy of the certificate of non-operation filed with the Department of Motor Vehicles or equivalent documentation from the state, province, or country where the vehicle is registered; and

2. If scrapped in the previous year, a copy of a non-repairable vehicle certificate issued from the California Department of Motor Vehicles or equivalent documentation from the state, province, or country where the vehicle is registered.

(8) *Changes Since the Last Reporting Period*

(A) For fleets complying using any of the compliance options other than section 2025(f) or 2025(g), must keep documentation of any additions, deletions, or changes to the fleet since the last reporting. Documentation may include bills of sale, purchase orders, maintenance records, registration information, or other documentation.

(B) For each vehicle removed from the fleet, a copy of the bill of sale, or other documentation showing transference of ownership from the former owner and the current owner and the date of the transaction or any other form of vehicle transference approved by the Executive Officer.

(9) *Electronic Tracking* – For fleets using electronic tracking systems as defined in section 2025(d)(21) summary and detailed records must be kept at the business office or terminal location for the fleet. The records must provide;

(A) Vehicle identification number of the vehicle being tracked;

(B) Monthly and annual mileage accrued in California;

(C) Monthly and annual mileage accrued in the NOx Exempt Areas if claiming the vehicle operates exclusively in NOx-exempt areas, and

(D) Monthly and annual hours of engine operation accrued in California except for vehicles that do not use PTO to perform work in a stationary mode.

(10) *VDECS Failure* – Maintain records of any VDECS failure and replacement including:

(A) Date of failure;

(B) Description of failure;

(C) Description of resolution of failure;

(D) Date of resolution of failure;

(E) Past VDECS maintenance records; and

(F) Past engine maintenance records.

(11) *Fuel-based Strategy* – Documentation of any approval from ARB Executive Officer to use a fuel strategy as in section 2025(q)(3) and the most recent two years' worth of records of purchase that demonstrate usage.

(12) *Experimental Diesel Emission Control Strategy* – For fleets using an experimental diesel PM control strategy, record of approval from the Executive Officer for use of the experimental diesel control strategy, the test plan and test data used in the experimental diesel control strategy application, and other records as specified in the approval.

(13) *Manufacturer Delay* – For any vehicle or VDECS for which the fleet owner is utilizing the equipment manufacturer delay provision in section 2025(p)(8), proof of purchase, such as a purchase order or signed contract for the sale, including engine specifications for each applicable piece of equipment or vehicle.

(14) *Maintenance of VDECS Records*

(A) VDECS Documentation. For each engine requiring a VDECS to comply with the regulation, the owner shall keep the following documentation in the vehicle and provide it upon request to an agent or employee of the ARB

1. A statement signed by the installer at the time of installation of the VDECS affirming that the installation was performed by an installer authorized by the VDECS manufacturer;
2. The name of the company installing the device;
3. The date the device was installed;
4. Description of VDECS installed;
5. VDECS family name;
6. Serial number of installed VDECS; and
7. Verification level and year of verification of the installed VDECS.

(15) *Emergency Support Vehicles* – Fleet owners of emergency support vehicles utilizing the provisions of section 2025(p)(1), 2025(p)(2) or 2025(p)(4) shall keep records to document dispatch by a local, state, or federal agency or other responsible emergency management entity as approved by the Executive Officer.

(16) *Low-use Vehicles* – Fleet owners of low-use vehicles that exceed 1,000 miles per year shall;

(A) Keep records of electronic tracking per section 2025(s)(9),

(B) Keep records of dates and the odometer readings when the vehicle leaves and returns to California to demonstrate that no more than 1,000 miles per year was driven in California.

(17) *Early PM Retrofit Credits* - Fleets that are claiming credit for early PM retrofits shall maintain records with the below information;

(A) The bill of sale with date of purchase or order.

(B) The total amount of the purchase and the amount of down payment if not fully paid at the time of purchase.

(C) Work Order or equivalent with the completion date.

(t) *Audit of Records*

The vehicle owner must make records available to ARB at its request for audit to verify the accuracy of the records. In the event the records are not made available within 30 days of the request, the ARB may assess penalties for non-compliance.

(u) *Record Retention*

The fleet owner or responsible person shall maintain the records for each vehicle subject to the reporting and record keeping requirements of sections 2025(r) and (s) for 3 years after it is retired, and for the overall fleet, for as long as the owner has a fleet, or January 1, 2025, whichever is earlier. If fleet ownership is transferred, the seller shall transfer the fleet records to the buyer. Dealers must maintain records of the disclosure of regulation applicability required by section 2025(w) for three years after the sale.

(v) *Right of Entry*

For the purpose of inspecting vehicles subject to this regulation and their records to determine compliance with this regulation, an agent or employee of ARB, upon presentation of proper credentials, has the right to enter any facility (with any necessary safety clearances) where vehicles are located or vehicle records are kept.

(w) *Disclosure of Regulation Applicability*

Any person residing in California selling a vehicle with an engine subject to this regulation must provide the following disclosure in writing to the buyer on the bill of sale, sales contract addendum, or invoice, “An on-road heavy-duty diesel or alternative-diesel vehicle operated in California may be subject to the California Air Resources Board Regulation to Reduce Particulate Matter and Criteria Pollutant Emissions from In-Use Heavy-Duty Diesel Vehicles. It therefore could be subject to exhaust retrofit or accelerated turnover requirements to reduce emissions of air pollutants. For more information, please visit the California Air Resources Board website at http://www.arb.ca.gov/dieseltruck.”

(x) *Compliance Requirement.*

(1) The vehicle owner shall comply with all applicable requirements and compliance schedules set forth in this regulation.

(2) Any in-state or out-of-state motor carrier, California broker, or any California resident who operates or directs the operation of any vehicle subject to this regulation shall verify that each hired or dispatched vehicle is in compliance with the regulation and comply with the record keeping requirements of section 2025(s)(4).

(3) Compliance may be accomplished by keeping at the business location, a copy of the Certificate of Reported Compliance with the In-Use On-Road Diesel Vehicle Regulation for each fleet, or in the vehicle.

(4) Any contract that a lessor and lessee enter into that has an effective date of January 1, 2010 or later shall clearly specify whether or not the leased vehicle is to be excluded from the lessor's fleet for the duration of the lease, or the responsibility will be that of the lessee.

(y) *ARB Certificate of Reported Compliance*

After the required reporting and compliance certification are received by ARB staff, ARB will provide the fleet with a Certificate of Reported Compliance with the In-Use On-Road Diesel Vehicle Regulation. ARB staff will also post on the website for this regulation the name and motor carrier number for fleets that have reported compliance.

(z) *Non-Compliance.*

Any person who fails to comply with the general requirements of this regulation, who fails to submit any information, report, or statement required by this regulation, or who knowingly submits any false statement or representation in any application, report, statement, or other document filed, maintained, or used for the purposes of compliance with this regulation may be subject to civil or criminal penalties under sections 39674, 39675, 42400, 42400.1, 42400.2, 42402.2, and 43016, of the Health and Safety Code. In assessing penalties, the Executive Officer will consider factors, including but not limited to the willfulness of the violation, the length of time of noncompliance, whether the fleet made an attempt to comply, and the magnitude of noncompliance.

(aa) *Severability*

If any subsection, paragraph, subparagraph, sentence, clause, phrase, or portion of this regulation 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 the regulation.

Note: Authority Cited: Sections 39600, 39601, 39650, 39658, 39659, 39666, 39667, 39674, 39675, 42400, 42400.1, 42400.2, 42402.2., 42410, 43013, 43016, 43018, 43023, 43600, California Health and Safety Code. Reference: Sections 39650, 39658, 39659, 39666, 39667, 39674, 39675, 42400, 42400.1, 42400.2, 42402.2, 42410, 40717.9, 43013, 43016, 43018, 43023, 43600, and 43701(b), California Health and Safety Code.

FINAL REGULATION ORDER

REGULATION TO CONTROL EMISSIONS FROM IN-USE ON-ROAD DIESEL-FUELED HEAVY-DUTY DRAYAGE TRUCKS

Amend Article 4.5, Chapter 1, Division 3, title 13, section 2027, California Code of Regulations, to read as follows:

§ 2027. In-Use On-Road Diesel-Fueled Heavy-Duty Drayage Trucks.

(a) *Purpose*. The purpose of this regulation is to reduce emissions and public exposure to diesel particulate matter (diesel PM), oxides of nitrogen (NOx), and other air contaminants by setting emission standards for in-use, heavy-duty diesel-fueled vehicles that transport cargo to and from California's ports and intermodal rail facilities.

(b) *Applicability*. This section shall apply to entities listed below through December 31, 2022. Starting January 1, 2023, drayage trucks are subject to the provisions of title 13, California Code of Regulations, section 2025, the Regulation to Reduce “Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants from In-Use Heavy Duty Diesel-Fueled Vehicles (Truck and Bus Regulation)”, which requires that all not otherwise exempt in-use on-road diesel vehicles, including drayage trucks, have a 2010 model year emissions equivalent engine by January 1, 2023.

(1) This regulation applies to owners and operators of on-road diesel-fueled, alternative diesel-fueled and dual-fueled heavy-duty drayage trucks that operate in California "motor carriers,” that dispatch drayage trucks that operate in California, "marine or port terminals," "intermodal rail yards," and "rail yard and port authorities."

(2) This regulation does not apply to:

(A) dedicated use vehicles;

(B) vehicles operating under an ARB authorized emergency decree;

(C) authorized emergency vehicles;

(D) military tactical support vehicles;

(E) vehicles that operate at port or intermodal rail yard properties in which the ARB Executive Officer has granted an annual exemption under the provisions of subsection (f) to local port or rail yard authorities; and

(F) yard trucks.

(c) *Definitions*. For purposes of this section, the definitions of Health and Safety Code section 39010 through 39060 apply except to the extent that such definitions may be modified by the following definitions that apply specifically to this regulation.

(1) "Alternative Diesel Fuel" means any fuel used in diesel engines that is not a reformulated diesel fuel as defined in sections 2281 and 2282 of title 13, of the California Code of Regulations, and does not require engine or fuel system modifications for the engine to operate, other than minor modifications (e.g., recalibration of the engine fuel control) that may enhance performance. Examples of alternative diesel fuels include, but are not limited to, biodiesel, Fischer-Trosch fuels, and emulsions of water in diesel fuel. Natural gas is not an alternative diesel fuel. An emission control strategy using a fuel additive will be treated as an alternative diesel fuel based strategy unless:

(A) the additive is supplied to the engine fuel by an on-board dosing mechanism, or

(B) the additive is directly mixed into the base fuel inside the fuel tank of the engine, or

(C) the additive and base fuel are not mixed until engine fueling commences, and no more additive plus base fuel combination is mixed than required for a single fueling of a single engine or vehicle.

(2) "ARB" means the California Air Resources Board.

(3) "ARB Designees" are defined as those entities that ARB designates or contracts with to perform certain functions or provide specific services on its behalf under this regulation.

(4) "Authorized Emergency Vehicle" is as defined in Vehicle Code section 165.

(5) "Average Daily Drayage Truck Visits" is determined by dividing the total number of truck visits within a calendar month by the total number of intermodal rail yard open days for that same calendar month as represented by the following equation:

$$\left(\frac{\text{Total number of truck visits}}{\text{Total number of intermodal rail yard open days}} = \text{Average daily truck count} \right)$$

Where:

(A) a 'truck visit' is defined as each occurrence of a drayage truck transgressing from outside intermodal rail yard property onto intermodal rail yard property; and,

(B) an 'open day' is defined as a calendar day in which an intermodal rail yard has drayage truck traffic.

(6) "Beneficial Cargo Owner" is a cargo owner, the person for whose account the ocean or rail transportation is provided, the person to whom delivery is to be made, a shippers' association, or an ocean or rail transportation intermediary that accepts responsibility for payment of all applicable charges.

(7) "Bill of Lading" is a document that states the terms of the contract between a shipper and a transportation company. It serves as a document of title of the goods shipped, a contract of carriage, and a receipt for goods.

(8) "CARB Diesel Fuel" is diesel fuel certified by ARB as meeting the fuel specification standards set forth at title 13, California Code of Regulations (CCR) section 2280 et seq.

(9) "Class I Railroad" is a freight railway based on large revenues ($250 million or more) in comparison to the revenues of Class II (which ranges from greater than $20 million but less than $250 million) and Class III (less than $20 million) railways, as defined by the Surface Transportation Board (STB).

(10) "Compression Ignition Engine" means an internal combustion engine with operating characteristics significantly similar to the theoretical diesel combustion cycle. The regulation of power by controlling fuel supply in lieu of a throttle is indicative of a compression ignition engine.

(11) "Dedicated Use Vehicles" are uni-body vehicles that do not have separate tractor and trailers and include but are not limited to:

(A) Dedicated auto transports;

(B) Dedicated fuel delivery vehicles;

(C) Concrete mixers;

(D) On-road mobile cranes

(12) "Diesel Fuel" means any fuel that is commonly or commercially known, sold, or represented by the supplier as diesel fuel, including any mixture of primarily liquid hydrocarbons (HC) - organic compounds consisting exclusively of the elements carbon and hydrogen - that is sold or represented by the supplier as suitable for use in an internal combustion, compression - ignition (CI) engine.

(13) "Diesel-Fueled" means a CI engine fueled by diesel fuel, CARB diesel fuel, or alternative diesel fuel, in whole or part.

(14) "Diesel particulate matter (diesel PM)" means the particles found in the exhaust of diesel-fueled compression ignition engines. Diesel PM may agglomerate and adsorb other species to form structures of complex physical and chemical properties. ARB has identified diesel PM as a toxic air contaminant.

(15) "Drayage Truck" means any in-use on-road vehicle with a gross vehicle weight rating (GVWR) greater than 26,000 pounds that is used for transporting cargo, such as containerized, bulk, or break-bulk goods, that operates:

(A) on or transgresses through port or intermodal rail yard property for the purpose of loading, unloading or transporting cargo, including transporting empty containers and chassis;

or,

(B) off port or intermodal rail yard property transporting cargo or empty containers or chassis that originated from or is destined to a port or intermodal rail yard property .

Drayage trucks are not:

(C) Vehicles operating off of port or intermodal rail yard properties that transport cargos that have originated from a port or rail yard property but have been off-loaded from the equipment (e.g., a trailer or container) that transported the cargo from the originating port or rail yard

or

(D) Vehicles operating off of port or intermodal rail yard properties that transport cargos that are destined for a port or rail yard but will be subsequently transferred into or onto different equipment (e.g., a

trailer or container) before being delivered to a port or intermodal rail yard.

(16) "Drayage Truck Owner" means:

(A) the person registered as the owner of a drayage truck as shown by the Department of Motor Vehicles, or its equivalent in another state, province, or country; or the International Registration Plan.

or

(B) the lessee of the truck, as indicated on the drayage truck's registration pursuant to Vehicle Code section 4453.5.

(17) "Drayage Truck Operator" means the driver of the vehicle or any person, party or entity that controls the operation of a drayage truck.

(18) "Drayage Truck Registry (DTR)" is an ARB database that contains information on all trucks that conduct business at California ports and intermodal rail yards.

(19) "Drayage Truck Registry Number" is a unique identifier issued to the owner of a drayage truck upon registering in the DTR and corresponds to the truck registered.

(20) "DTR Compliant" means that a drayage truck is currently compliant with the requirements of the regulation, including the requirements for the DTR and emission standards.

(21) "Dual-Fuel Engine" means any compression ignition engine that is engineered and designed to operate on a combination of alternative fuels, such as compressed natural gas (CNG) or liquefied petroleum gas (LPG) and diesel fuel or an alternative diesel fuel. These engines have two separate fuel systems, which inject both fuels simultaneously into the engine combustion chamber. A dual-fuel engine is not an alternative-fuel engine.

(22) "Emergency Event" means any situation arising from sudden and reasonably unforeseen natural disaster such as earthquake, flood, fire, or other acts of God, or other unforeseen events beyond the control of drayage truck owners and operators that threatens public health and safety or the reasonable flow of goods movement.

(23) "Emergency Decree" means a determination by the Executive Officer that an emergency event has occurred that requires the immediate

temporary operation of drayage trucks at ports and intermodal rail yard facilities.

(24) "Executive Officer" is the Executive Officer of ARB or his/her authorized representative.

(25) "Gross Vehicle Weight Rating (GVWR)" is as defined in Vehicle Code Section 350.

(26) "Heavy-Duty" is a manufacturer's GVWR of greater than 26,000 pounds.

(27) "Intermodal Rail Yard" is any rail facility owned or operated by a Class I railroad where cargo is transferred from drayage truck to train or vice-versa that:

(A) is within 80 miles of a port;

or,

(B) is located more than 80 miles from the nearest port and having, on or after January 2008, 100 or more average daily drayage truck visits in any one calendar month.

Once a rail yard, identified in (B) above, has 100 or more average daily drayage truck visits in any one month, the rail yard will be considered an intermodal rail yard and will be subject to all provisions of this regulation regardless of the number of future average daily drayage truck visits. Intermodal rail yards include, but are not limited to, the following facilities: Union Pacific (UP) Oakland, Burlington Northern Santa Fe (BNSF) Hobart, LATC Union Pacific, Commerce UP, Richmond BNSF, Commerce Eastern BNSF, ICTF UP, BNSF San Bernardino, Stockton Intermodal BNSF, Lathrop Intermodal UP, and BNSF Oakland.

(28) "International Registration Plan" is a registration reciprocity agreement among states of the United States and provinces of Canada providing for payment of license fees on the basis of total distance operated in all jurisdictions.

(29) "Lessee" has the same meaning as in Vehicle Code section 371.

(30) "Liquid Natural Gas (LNG) Fueled Trucks" are drayage trucks that utilize a heavy-duty pilot ignition engine that is designed to operate using an alternative fuel, except that diesel fuel is used for pilot ignition at an average ratio of no more than one part diesel fuel to ten parts total fuel on

any energy equivalent basis. An engine that can operate or idle solely on diesel fuel at any time does not meet this definition.

(31) "Marine or Port Terminals" means wharves, bulkheads, quays, piers, docks and other berthing locations and adjacent storage or adjacent areas and structures associated with the primary movement of cargo or materials from vessel to shore or shore to vessel including structures which are devoted to receiving, handling, holding, consolidating and loading or delivery of waterborne shipments or passengers, including areas devoted to the maintenance of the terminal or equipment. For the purposes of this regulation, the term includes but is not limited to production or manufacturing areas, warehouses, storage facilities, and private or public businesses or entities located on or surrounded by port property.

(32) "Military Tactical Support Vehicles" is as defined in title 13, CCR, section 1905.

(33) "Motor Carrier" is a business intermediary that contracts with beneficial cargo owners, ship companies, port terminals or Class I railroads, and with owners and operators of drayage trucks that it dispatches for pick-up and delivery of goods that are destined for or originated from ports and/or intermodal rail yards.

(34) "On-road" means a vehicle that is designed to be driven on public highways and roadways and that is registered or is capable of being registered by the California Department of Motor Vehicles (DMV) under Vehicle Code sections 4000 et seq. - or DMV's equivalent in another state, province, or country; or the International Registration Plan. A vehicle covered under ARB's In-Use Off-Road Regulation, title 13, CCR, section 2449 is not an on-road vehicle.

(35) "Oxides of nitrogen (NOx)" means compounds of nitric oxide, nitrogen dioxide, and other oxides of nitrogen. Nitrogen oxides are typically created during combustion processes and are major contributors to smog formation and acid deposition.

(36) "Port" is 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. For purposes of this regulation, port does not include port property that is not related to or primarily used to engage in water-borne commerce. 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.

(37) "Port Authority" means those entities, either public or private, that are responsible for the operation of the ports.

(38) "Port Property" means publicly or privately owned property where a port is located. It is the property that includes the physical boundaries, either contiguous or non-contiguous, of the port and may include other properties owned by the port. For the purposes of this regulation, port property includes privately owned property located within a publicly or privately owned port property's boundaries.

(39) "Rail Yard Authority" means those entities, either public or private, that are responsible for the operation of Class I rail yards.

(40) "Rail Yard Property" means the property constituting the physical boundaries of intermodal rail yards. For the purposes of this regulation, rail yard property also includes privately owned property located within intermodal rail yard boundaries.

(41) “South Coast Air Basin” is the boundary as described in title 17, California Code of Regulations, section 60104.

(42) "Uni-Body Vehicles" are vehicles that do not have a separate tractor and trailer and include but are not limited to:

(A) concrete mixers;

(B) on-road mobile cranes;
(C) on-road construction equipment.

(43) "Vehicle" is as defined in Vehicle Code Section 670.

(44) "Verified Diesel Emission Control Strategy (VDECS)" is an emission control strategy that has been verified pursuant to the "Verification Procedure, Warranty and In-Use Compliance Requirements for In-Use Strategies to Control Emissions from Diesel Engines" in Title 13, California Code of Regulations, commencing with section 2700, and incorporated by reference.

(45) "Yard Truck" means an off-road mobile utility vehicle used to carry cargo containers with or without chassis; also known as a utility tractor rig (UTR), yard tractor, yard goat, yard hustler, or prime mover.

(d) *Requirements and Compliance Deadlines*. Drayage trucks subject to this regulation must meet the following requirements by the compliance deadlines detailed in both Phase 1 AND Phase 2.

(1) *Phase 1*:

(A) By December 31, 2009, all drayage trucks with a GVWR of greater than 33,000 pounds must be equipped with:

1. 1994-2003 model year engine certified to California or federal emission standards and a level 3 VDECS for PM emissions;

or,

2. 2004 or newer model year engine certified to California or federal emission standards;

(B) After December 31, 2011, all drayage trucks with 2004 model year engines with a GVWR of greater than 33,000 pounds must be equipped with a level 3 VDECS for PM emissions.

(C) After December 31, 2012, all drayage trucks with 2005-2006 model year engines with a GVWR of greater than 33,000 pounds must be equipped with a level 3 VDECS for PM emissions.

(D) After December 31, 2011, all drayage trucks with a GVWR 26,001 to 33,000 pounds must be equipped with a level 3 VDECS for PM emissions while operating in the South Coast Air Basin.

(2) *Phase 2*: After December 31, 2013, all drayage trucks must be equipped with a 1994 or newer model year engine that meets or exceeds 2007 model year California or federal emission standards.

(3) *Drayage Truck Owner Requirements*

(A) Drayage truck owners shall:

1. meet all applicable requirements and deadlines set forth in Phases 1 and 2 above;

2. if an aftermarket level 3 VDECS is installed, be able to demonstrate that:

a. the VDECS has been verified by ARB for use with the engine and vehicle, as described in the Executive Order for the VDECS;

b. use of the vehicle must be consistent with the conditions of the Executive Order for the VDECS;

c. the VDECS is installed in a verified configuration;

d. the engine met the engine manufacturer's operational specifications prior to the VDECS installation;

e. the VDECS label is visible;

f. the level 3 VDECS is mounted in a safe and secure manner on the vehicle consistent with provisions in (3)(A)(2)(c) above, and the fixed position of the level 3 VDECS does not obscure vehicle rear view or side mirror visibility in any way.

g. all emission control devices are functioning properly and maintained per manufacturer's specifications;

h. in the event of a failure or damage of an aftermarket level 3 VDECS or an OEM equivalent diesel emissions control system while the device is still under warranty, it has taken prompt action to repair or replace the device by the manufacturer or authorized dealer with the same level of VDECS or OEM equivalent diesel emissions control system within 45 days of first noticing or being notified of the failure or damage to the device.

i. it has adhered to the terms and conditions in the aftermarket manufacturer or OEM warranty governing the use of the device.

j. if the failure or damage to the level 3 VDECS or OEM equivalent diesel emissions control system occurs after expiration of the warranty period, it has taken prompt action to personally repair or replace the failed or damaged device with the same level VDECS or OEM equivalent diesel emissions control system available for the engine within 90 days of first noticing

or being notified of the failure or damage to the device.

k. it has not misused, dismantled, or tampered with any components of the level 3 VDECS or OEM equivalent diesel emissions control system, except for purposes of recommended periodical maintenance by an authorized agent, or when it is necessary to detach the device to service the vehicle.

3. register with the DTR, according to subsection (e);

4. be able to demonstrate that the drayage truck operator has been informed about the information required under subsection (d)(5)(A)(4) for the dispatching motor carrier and instructed to provide such information to any enforcement personnel listed in subsection (i), upon request.

(B) Phase 1 compliance deadline extension:

1. Drayage truck owners may apply for a one-time, one-year, per-truck Phase 1 compliance deadline extension. The compliance deadline application must be either electronically filed or postmarked by June 1, 2009. To receive the Phase 1 compliance deadline extension, a drayage truck owner must demonstrate all of the following:

a. the engine installed on his/her current truck is a California or federally certified 1994 - 2003 model year engine;

b. the truck was registered with the DTR prior to June 1, 2009;

c. no Level 3 diesel emission control technology verified by ARB for use on that combination of truck and engine was available at the time the extension was filed.

2. Compliance extension applications shall be submitted to ARB at:

CALIFORNIA AIR RESOURCES BOARD
DRAYAGE TRUCK PHASE 1 EXTENSION, SSD
P.O. BOX 2815
SACRAMENTO, CA, 95812

or electronically through ARB's drayage truck website; http://www.arb.ca.gov/drayagetruck

3. If after the one-year extension ARB verified technology is still unavailable, the truck owner must comply with the regulation within 90 days of the expiration of the extension by replacing the existing heavy duty truck and/or engine with a truck or engine that meets or exceeds the Phase 1 requirements.

(4) *Drayage Truck Operator Requirements*

(A) Drayage truck operators shall, upon request~~,~~:

1. provide the dispatching motor carrier's contact information as detailed in subsection (d)(5)(A)(4) to authorized enforcement personnel as set forth in subsection (i)~~.~~;

2. identify and provide documentation on the origin and destination of the cargo, chassis, and intermodal equipment (container etc,) to authorized enforcement personnel as set forth in subsection (i). Documentation can include a Delivery Receipt, Pick Up Receipt, Equipment Interchange Receipt (J-1), Release Number, Bill of Lading or other documentation that identifies the origin and destination of the cargo and pick up / termination destination of the chassis and intermodal equipment.

(5) *Motor Carrier Requirements*

(A) Each motor carrier shall:

1. provide a copy of this regulation or an ARB approved summarized version to each drayage truck owner that it contracts with for deliveries to ports and intermodal rail yards;

2. only dispatch drayage trucks that meet emission standards and compliance deadlines set forth in Phases 1 and 2 in subsection (d);

3. only dispatch drayage trucks to ports and intermodal rail yards that are registered and in good standing with the Drayage Truck Registry (DTR) and are DTR compliant;

4. demonstrate that it has only dispatched drayage trucks whose operators have been informed to provide the motor carrier information listed below, upon request, to enforcement personnel, as listed in subsection (i).

a. the motor carrier's business name;

b. contact person's name;

c. motors carrier's street address, city, state, and zip code;

d. contact person's business phone number.

5. keep a record of all dispatched drayage trucks to a port or intermodal rail yard containing the information set forth in (a) through (d) below for a minimum of five years from the dispatch date. Dispatch records are to be made available to enforcement personnel within 72 hours of an official written or oral request.

a. truck dispatch date and time;

b. bill of lading or tracking number;

c. truck license plate number and issuing state;

d. Drayage Truck Registry number.

(6) *Marine or Port Terminals and Intermodal Rail Yard Requirements*

(A) Starting September 30, 2009, marine or port terminals and intermodal rail yards shall collect the following information for each drayage truck subject to this regulation that enters the facility that is not DTR compliant as determined by information contained within the Drayage Truck Registry.

1. Dispatching motor carrier:

    a. business name of dispatching motor carrier;

    b. contact person's name;

    c. street address, city, state, zip code of the dispatching motor carrier;

    d. phone number of the dispatching motor carrier;

    e. bill of lading or tracking number.

2. Drayage truck:

    a. entry date and time;

    b. registered owner's name;

    c. operator's name;

    d. operator's license number;

    e. drayage truck's license plate number and state of issuance;

    f. drayage truck's vehicle identification number (VIN).

All information collected in subsection (d)(6) shall be kept for a period of not less than five years from the truck entry date and is to be made available to enforcement personnel within 72 hours of an official written or oral request.

(B) Marine or port terminals and intermodal rail yards shall report the information collected in subsection (A) above to their respective authorities according to schedule (A) below and in a format acceptable to their respective authority.

Schedule A: Terminal and Intermodal Rail Yard Reporting Schedule

Date Truck Enters Terminal or Intermodal Rail Yard	Date by which Information is to be Reported to Port or Rail Authority
January 1 – March 31	April 15
April 1 – June 30	July 15
July 1 – September 30	October 15
October 1 – December 31	January 15

(7) *Port Authorities and Rail Yard Authorities Requirements*

(A) Port and rail yard authorities shall respectively report the information collected by the port terminals and intermodal rail yards, as detailed in subsection (d)(6), to, and in a manor and format prescribed by, ARB according to Schedule B below. ARB reporting parameters are detailed on ARBs website http://www.arb.ca.gov/drayagetruck

Schedule B: Port and Rail Yard Authority Reporting Schedule

Date by which Information is to be Reported to the California Air Resources Board
May 15
August 15
November 15
February 15

(B) Port and rail yard authorities shall ensure their respective terminals and/or intermodal rail yards abide by all Schedule A reporting deadlines.

(C) Rail yard authorities operating rail yards located greater than 80 miles from the nearest port with less than 100 average daily drayage truck visits for each calendar month starting January 2008, must complete and submit quarterly verification reports according to Schedule B and in a format approved by ARB.

The first quarterly verification report shall include average daily drayage truck visits for each calendar month starting with the effective date of the regulation and submitted to ARB according to schedules A and B above. Subsequent quarterly verification reports shall include average daily drayage truck visits for the three calendar months prior to each reporting date. Quarterly verification

reports shall include, but are not limited to, the following information;

1. reporting rail yard authority contact information;

2. rail yard name and address;

3. average daily drayage truck visits by calendar month.

Quarterly verification applications and additional guidelines can be obtained by contacting ARB at:

CALIFORNIA AIR RESOURCES BOARD
RAIL YARD DAILY TRUCK VERIFICATION, SSD
P.O. BOX 2815
SACRAMENTO, CA, 95812

or electronically through ARB's drayage truck website; http:// www.arb.ca.gov/drayagetruck

(e) *Drayage Truck Registry Requirements.*

(1) Truck Owner Requirements

(A) Owners of all drayage trucks doing business at a port or intermodal rail yard prior to September 30, 2009 and intending to continue operations after that date must register with the DTR database by September 30, 2009.

(B) Drayage trucks intending to begin operations at a port or intermodal rail yard after September 30, 2009 must be registered with the DTR database prior to commencing operations.

(C) Owners of all drayage trucks covered by the regulation and doing business at a port or intermodal rail yard must provide the following information to ARB or its designee by mail to the address in subsection (e)(2) or electronically through ARB's DTR website http:// www.arb.ca.gov/drayagetruck. The information shall include but may not be limited to:

1. truck owner name, address, and contact information (e.g. phone number, email address, fax number);

2. engine make, model, and model year;

3. vehicle identification number (VIN);

4. vehicle license number and state of issuance;

5. compliance status, which shall include:

a. identifying whether the drayage truck has complied with the requirements of Phases 1 and 2, set forth in subsection (d) above;

b. if so, how was compliance achieved (e.g. new compliant truck or description of the level 3 VDECS that was used), who did the installation work, and when was it completed;

c. if not, identifying when the drayage truck is scheduled to come into compliance under Phases 1 or 2.

(D) After filing the initial application, the drayage truck owner shall within 30 days of bringing a truck into compliance with Phase 1 or Phase 2, update the DTR with the vehicle's compliance status information and any other changes to the vehicle's ownership, DMV registration status, or participation status in IRP.

(2) *Mailing Address for Filing Initial Applications and Updates*. Drayage truck owners shall submit DTR applications and any updated information to ARB at:

CALIFORNIA AIR RESOURCES BOARD
C/O DRAYAGE TRUCK REGISTRY, SSD
P.O. BOX 2815
SACRAMENTO, CA, 95812

(3) Failure to register with the DTR or submittal of false information is a violation of state law and subject to civil or criminal penalty.

(f) *Annual Port or Rail Yard Exemption.*

(1) *Annual Exemption*. An annual exemption may be granted, under limited circumstances, by the ARB Executive Officer to ports or rail yards. An exemption may cover a clearly defined portion or the entirety of a port or rail yard. The Executive Officer will exempt a port or rail yard that is able to demonstrate one or more of the following:

(A) port or rail yard land is not typically used for truck traffic and its primary function or location does not include or attract drayage trucks covered under this regulation (e.g. a shoreline animal sanctuary);

(B) the overwhelming majority of trucks accessing the port or rail yard are exempted under this regulation (e.g. a port where only dedicated auto transports are in service).

(2) *The Exemption Request*

(A) a port or rail yard requesting an exemption shall mail the request to:

CALIFORNIA AIR RESOURCES BOARD
PORT / RAIL YARD EXEMPTION, SSD
P.O. BOX 2815
SACRAMENTO, CA, 95812

or may send it electronically to ARBs' website http:// www.arb.ca.gov/drayagetruck using the request form available on the site.

(B) the request must be completed and submitted annually (via the same website or address listed above) no later than January 1 of the year prior to the exemption year (e.g. a 2010 year exemption application must be completed and submitted by January 1, 2009);

(C) the request will be approved or disapproved by the Executive Officer no later than July 1, of the year prior to the exemption year. The Executive Officer will then issue an exemption to be valid for the specified port or rail yard for the specified exemption year.

(g) *Penalties*. Any person who fails to comply with the performance requirements of this regulation, who fails to submit any information, report, or statement required by this regulation, or who knowingly submits any false statement or representation in any application, report, statement, or other document filed, maintained, or used for the purposes of compliance with this regulation may be subject to civil or criminal penalties under sections 39674, 39675, 42400, 42400.1, 42400.2, 42402~~,~~.2, and 43016 of the Health and Safety Code. In

assessing penalties, the Executive Officer will consider factors, including but not limited to the willfulness of the violation, the length of time of noncompliance, whether compliance was attempted, and the magnitude of noncompliance.

(h) *Right of Entry*. For the purpose of inspecting on-road vehicles covered in this regulation, and their records to determine compliance with these regulations, an agent or employee of ARB, upon presentation of proper credentials, has the right to enter any facility (with any necessary safety clearances) where on-road vehicles are located or on-road vehicle records are kept.

(i) *Enforcement.* Enforcement of this section may be carried out by authorized representatives of ARB, port and rail yard authorities; peace officers as defined in California Penal Code, Title 3, chapter 4.5, sections 830 et seq. and their respective law enforcement agencies; and authorized representatives of air pollution control or air quality management districts.

(j) *Sunset*. Provisions of section 2027 shall sunset on December 31, 2022. Starting January 1, 2023, drayage trucks are subject to the provisions of section 2025 (Regulation to Reduce Emissions of Diesel Particulate Matter, Oxides of Nitrogen and Other Criteria Pollutants, from In-Use Heavy-Duty Diesel-Fueled Vehicles).

(k) *Relationship to Other Law*. Nothing in this section allows drayage trucks to operate in violation of other applicable law, including, but not limited to:

(1) California Vehicle Code;

(2) California Health and Safety Code;

(3) division 3, title 13, California Code of Regulations;

(4) any applicable ordinance, rule, or requirement as stringent as, or more stringent than, than the requirements of subsection (d) of this regulation.

(l) *Severability*. If any subsection, paragraph, subparagraph, sentence, clause, phrase, or portion of this regulation 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 the regulation.

Note: Authority cited: Sections 39002, 39003, 39500, 39600, 39601, 39602, 39602.5, 39650, 39658, 39659, 39666, 39667, 39674, 39675, 41511, 42400, 42400.1, 42400.2, 42402.2, 42410, 43000, 43000.5, 43013, 43016, 43018, 43023 and 43600, Health and Safety Code. Reference: Sections 39002, 39003, 39500, 39600, 39601, 39602, 39602.5, 39650, 39658, 39659, 39666, 39667, 39674, 39675, 41511, 42400, 42400.1, 42400.2, 42402.2, 42410, 43000, 43000.5, 43013, 43016, 43018, 43023 and 43600, 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.

* * * *

(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 ~~for 2001~~ 2009 through 2016 ~~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(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.

* * * *

NOTE: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 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

* * * *

(c) *Written Instructions.*

* * * *

(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 ~~for 2001~~ 2009 through 2016 ~~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(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.

* * * *

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.

§ 2020. Purpose and Definitions of Diesel Particulate Matter Control Measures.
13 CA ADC § 2020
BARCLAYS OFFICIAL CALIFORNIA CODE OF REGULATIONS

Barclays Official California Code of Regulations Currentness
Title 13. Motor Vehicles
Division 3. Air Resources Board
Chapter 1. Motor Vehicle Pollution Control Devices
Article 4. Diesel Particulate Matter Control Measures (Refs & Annos)

13 CCR § 2020

§ 2020. Purpose and Definitions of Diesel Particulate Matter Control Measures.

(a) Purpose. Diesel particulate matter was identified in 1998 as a toxic air contaminant. According to California law, an airborne toxic control measure using the best available control technology shall, therefore, be employed to reduce the public's exposure to diesel particulate matter.

(b) Definitions. For the purposes of the rules specified in article 4, the following definitions apply:
“Alternative fuel” means natural gas, propane, ethanol, methanol, gasoline (when used in hybrid electric buses only), hydrogen, electricity, fuel cells, or advanced technologies that do not rely on diesel fuel. “Alternative fuel” also means any of these fuels used in combination with each other or in combination with other non-diesel fuels.

“Commercially available” means available for purchase and installation at a reasonable cost.

“Heavy-duty pilot ignition engine” means an engine designed to operate using an alternative fuel, except that diesel fuel is used for pilot ignition at an average ratio of no more than one part diesel fuel to ten parts total fuel on an energy equivalent basis. An engine that can operate or idle solely on diesel fuel at any time does not meet this definition.

“Level” means one of three categories of Air Resources Board-verified diesel emission control strategies: Level 1 means the strategy reduces engine diesel particulate matter emissions by between 25 and 49 percent, Level 2 means the strategy reduces engine diesel particulate matter emissions by between 50 and 84 percent, and Level 3 means the strategy reduces engine diesel particulate matter emissions by 85 percent or greater, or reduces engine emissions to less than or equal to 0.01 grams diesel particulate matter per brake horsepower-hour.

“Municipality” means a city, county, city and county, special district, or a public agency of the State of California, and any department, division, public corporation, or public agency of this State, or two or more entities acting jointly.

“Owner” means the same as in title 13, California Code of Regulations, section 2180.1(a)(25).

“Transit agency” means a public entity responsible for administering and managing transit services. Public transit agencies can directly operate transit service or contract out for all or part of the total transit service provided.

“Terminal” means any place or places where a vehicle is regularly garaged or maintained, or from which it is operated or dispatched, which may include a private business or residence.

“Verified” means that a diesel emission control strategy or system has received approval from the Executive Officer according to the “Verification Procedure for In-Use Strategies to Control Emissions from Diesel Engines” in title 13, California Code of Regulations, commencing with section 2700, and incorporated by reference.

“Warranty Period” means the same as in title 13, California Code of Regulations, section 2707.

Note: Authority cited: Sections 39600 and 39601, Health and Safety Code. Reference: Sections 39002, 39003, 39650-39675, 43000, 43013, 43018, 43101, 43102, 43104, 43105 and 43700, Health and Safety Code.

HISTORY

1. New article 4 (sections 2020-2021.2) and section filed 7-20-2004; operative 7-20-2004 pursuant to Government Code section 11343.4 (Register 2004, No. 30). For prior history of article 4, see Register 83, No. 3).

2. Amendment of subsection (b) (repealer of definition of “Retirement” or “Retire” and new definition of “Transit agency”) filed 1-31-2006; operative 1-31-2006 pursuant to Government Code section 11343.4 (Register 2006, No. 5).

3. Change without regulatory effect amending subsection (b) (definition of “Owner”) filed 8-12-2009 pursuant to section 100, title 1, California Code of Regulations (Register 2009, No. 33).

4. Amendment of subsection (b) (definitions of “Municipality” and “Owner”) filed 12-3-2009; operative 1-2-2010 (Register 2009, No. 49).

This database is current through 7/29/22 Register 2022, No. 30

13 CCR § 2020, 13 CA ADC § 2020

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Title 13. Motor Vehicles
Division 3. Air Resources Board
Chapter 1. Motor Vehicle Pollution Control Devices
Article 4.3. Innovative Clean Transit (Refs & Annos)

13 CCR § 2023

§ 2023. Innovative Clean Transit Regulations Applicability and Scope.

(a) Applicability.

(1) Except as provided in sections 2023(a)(2), these Innovative Clean Transit regulations, title 13, article 4.3, California Code of Regulations, apply to a transit agency that owns, operates, leases, rents, or contracts with another entity to operate buses in California.

(2) These regulations do not apply to any of the following:

(A) Vehicles that operate on rails, trolleybuses, or school buses, even if operated by a transit agency;

(B) Caltrans, Caltrain, Amtrak, or any local school district.

(b) Definitions. For the purposes of the regulations in this Article 4.3, the following definitions apply:

(1) “Active Bus” means a bus in a particular fleet at year-end that is available to operate in revenue service, including a spare bus and a bus temporarily out of service for routine maintenance and minor repairs. A bus in storage, an emergency contingency vehicle, a bus removed from the active bus fleet and awaiting sale, or a bus out of service for an extended period of time for major repairs is not considered an active bus.

(2) “Air Basin” has the same meaning as defined in section 39012 of the Health and Safety Code.

(3) “Annual Maximum Service” means the number of buses in revenue service that are operated during the peak season of the year, on the week and day that maximum service is provided, but excludes demand response buses. Annual maximum service excludes the following:

(A) An atypical day, on which the transit agency provides extra service to meet demands for special events such as conventions, parades, or public celebrations, or operates significantly reduced service because of unusually bad weather (e.g., snowstorms, hurricanes, tornadoes, earthquakes) or major public disruptions (e.g., terrorism); or

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(B) One-time special events.

(4) “Articulated Bus” is a 54-foot to 60-foot bus with two connected passenger compartments.

(5) “Battery Electric Bus” means a bus that has an all-electric propulsion system and relies only on batteries to store electricity received from an external power source of the vehicle. It has no internal combustion engine in the powertrain for the vehicle.

(6) “Bus” means a rubber-tire vehicle designed to transport passengers by road with gross vehicle weight rating (GVWR) greater than 14,000 pounds, but does not include a trolleybus as specified in section 2023(a)(2)(A).

(7) “Bus Purchase” or “Purchase” means the transit agency has identified, committed and encumbered funds and executes one of the following:

(A) A written “Notice to Proceed” executed by a transit agency to a bus manufacturer to begin production of a bus either:

1. Under a previously-entered purchase contract; or

2. To execute a contract option;

or,

(B) If no Notice to Proceed is issued, a written purchase agreement between a transit agency and a bus manufacturer that specifies the date when the bus manufacturer is to proceed with the work to manufacture the bus; or

(C) A signed written lease agreement between a transit agency and a bus manufacturer or sales representatives for a new bus to be placed in revenue service for a contract term of five years or more.

(8) “Bus Testing Report” means the complete test report for a bus model required by title 49 of the Code of Federal Regulations (CFR) section 665.13. These bus tests are also commonly called “Altoona Testing”.

(9) “Bus Type” means a bus body configuration, including a bus, articulated bus, over-the-road bus, double-decker bus, and cutaway buses.

(10) “CalEnviroScreen” means a mapping tool that is developed by the Office of Environmental Health Hazard Assessment (OEHHA) at the request of the California Environmental Protection Agency (CalEPA) to identify California's most pollution-burdened and vulnerable communities based on geographic, socioeconomic, public health, and environmental hazard criteria. The CalEnviroScreen is available for public use at https://oehha.ca.gov/calenviroscreen.

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(11) “CARB” is the same as California Air Resources Board.

(12) “Compressed Natural Gas” or “CNG” has the same meaning as specified in the Low Carbon Fuel Standard Regulation, title 17, California Code of Regulations, section 95481(a)(27).

(13) “Conventional Internal Combustion Engine Bus” means a bus with an internal combustion engine (ICE) propulsion system or a combination of an internal combustion engine with an electric propulsion system commonly referred to as a hybrid powertrain.

(14) “Conversion to a Zero-Emission Bus” means converting a conventional internal combustion engine bus to a zero-emission bus as defined in section 2023(b)(54).

(15) “Criteria Pollutants” or “Criteria Air Pollutants” are air pollutants for which air quality criteria have been issued by the Administrator of the United States Environmental Protection Agency under title 42 of the, U.S.C. section 7408.

(16) “Curb Weight” has the same meaning as defined in title 49 of Code of Federal Regulations, section 571.3.

(17) “Cutaway Bus” means a vehicle in which a bus body designed to transport passengers is mounted on the chassis of a van or light- or medium-duty truck chassis, and that has a GVWR greater than 14,000 pounds but not more than 26,000 pounds. The original van or light- or medium- duty truck chassis may be reinforced or extended. A cutaway bus may accommodate some standing passengers.

(18) “Date In-Service” means the date a purchased bus is brought into revenue service.

(19) “Demand Response” has the same meaning as defined in title 49 of the Code of Federal Regulations, section 604.3(g).

(20) “Diesel” has the same meaning as defined in title 13, California Code of Regulations, sections 2281 and 2282.

(21) “Double-Decker” means a high-capacity bus that has two levels of seating, one over the other, connected by one or more stairways. Total bus height is usually 13 to 14.5 feet, and typical passenger seating capacity ranges from 40 to 80 people.

(22) “Emergency” has the same meaning as defined in title 49 of U.S.C., section 5324(a)(2).

(23) “Emergency Contingency Vehicle” is a revenue vehicle removed from an active bus fleet for local emergencies after this revenue vehicle has reached the end of its normal minimum useful life.

(24) “Engine Family Name” or “EFN” is an identifier, which is unique to an engine of a specific model year, build, and manufacturer, and can be found on the emission control label located on the engine.

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(25) “Executive Officer” means the Executive Officer of the California Air Resources Board (CARB) or his/her designee.

(26) “FTA” is the Federal Transit Administration.

(27) “Fuel Cell Electric Bus” or “FCEB” means an electric bus that uses both a hydrogen fuel cell stack and a battery for propulsion. The fuel cell stack generates electricity on board to charge the battery that powers the on board motor. It has no internal combustion engine in the powertrain. A fuel cell electric bus relies on its hydrogen tank and fuel cell stack on board for its energy supply.

(28) “Gradeability” means a vehicle's ability to climb slopes.

(29) “Gross Vehicle Weight Rating” or “GVWR” has the same meaning as defined in California Vehicle Code, section 350, subdivision (a).

(30) “Large Transit Agency” means either:

(A) A transit agency that operates either in the South Coast or the San Joaquin Valley Air Basin and operates more than 65 buses in annual maximum service; or

(B) A transit agency that does not operate in the South Coast or San Joaquin Valley Air Basin and has at least 100 buses in annual maximum service in an urbanized area with a population of at least 200,000 as last published by the Bureau of Census before December 31, 2017.

(31) “Low-NOx Engine” has the same meaning as defined in title 13 of the California Code of Regulations, section 2208(c)(18).

(32) “Manufacture Year” means the year of original manufacture of the vehicle. It is not necessarily the same as the model year.

(33) “Metropolitan Planning Organization” or “MPO” has the same meaning as defined in 49 U.S.C. section 5303(b)(2).

(34) “Minimum Useful Life” means the minimum years of service or accumulations of miles at which a transit agency is allowed to retire its federally funded bus without penalty under the terms of federal funding requirements.

(35) “New Bus” means a bus, the equitable or legal title to which has never been transferred to a first entity who in good faith purchases the bus for purposes other than resale.

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(36) “New Entrant” means a transit agency that is newly established or is created through a merger of two or more transit agencies on or after December 31, 2017.

(37) “Notice to Proceed” means a written direction to a bus manufacturer to commence production of a bus as provided in a contract.

(38) “NOx” means oxides of nitrogen.

(39) “NOx Exempt Areas” means the following counties and air basins: Alpine, Amador, Butte, Calaveras, Colusa, Del Norte, Eastern Kern (portion of Kern County within the Eastern Kern Air Pollution Control District), Glenn, Humboldt, Inyo, Lake, Lassen, Mariposa, Mendocino, Modoc, Mono, Monterey, Nevada, Northern Sonoma (as defined in title 17, California Code of Regulations, section 60100(e)), Plumas, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz, Shasta, Sierra, Siskiyou, Northern Sutter (portion of Sutter County that is north of the line that extends from the south east corner of Colusa County to the southwest corner of Yuba County), the portion of El Dorado that is within the Lake Tahoe Air Basin (as defined in title 17, California Code of Regulations, section 60113), the portion of Placer that is East of Highway 89 or within the Lake Tahoe Air Basin, Trinity, Tehama, Tuolumne, and Yuba.

(40) “Orange County Bus Cycle” means a chassis dynamometer test developed by West Virginia University based on real bus operating data from the Orange County Transportation Authority. The test is based on Society of Automotive Engineers (SAE) International Recommended Practice for Measuring Fuel Economy and Emissions of Hybrid-Electric and Conventional Heavy-Duty Vehicles J2711_200209 (September 20, 2002), available at: https://www.sae.org/standards/content/ j2711_200209/, which is incorporated by reference.

(41) “Over-The-Road Bus” means a bus characterized by an elevated passenger deck located over a baggage compartment. They are customarily used for long-distance bus services or connecting outlying areas with central cities with limited stops. Over-The-Road buses are also commonly called Coaches or Motor Coaches.

(42) “Regional Transportation Planning Organization” has the same meaning as defined in 49 U.S.C. section 5303(b)(5).

(43) “Renewable Diesel” or “Renewable Hydrocarbon Diesel” has the same meaning as defined in title 17, California Code of Regulations, section 95481(a)(123).

(44) “Renewable Natural Gas” or “Biomethane” or “RNG” has the same meaning as defined in title 17, California Code of Regulations, section 95481(a)(20).

(45) “Repower” means to replace an older engine with a newer model engine that has reduced emissions.

(46) “Revenue Service” means the status of a bus being available to the general public for the purpose of carrying passengers.

(47) “Revenue Vehicle” means a bus that is available to operate in revenue service carrying passengers.

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(48) “School Bus” has the same meaning as defined in California Vehicle Code, section 545.

(49) “Small Transit Agency” means a transit agency that is not a large transit agency.

(50) “Spare Bus” means a revenue vehicle that is maintained by the transit agency to preserve scheduled service operations during periods of:

(A) routine and unplanned maintenance; or

(B) unexpected vehicle breakdowns or accidents.

(51) “Transit Agency” has the same meaning as defined in title 13, California Code of Regulations, section 2020(b). A transit agency does not mean a correctional facility, airport, college or university, national park, tour bus service providers, or an entity that provide shuttle services solely for patrons of its organization.

(52) “Trolleybus” means a rubber-tired, electrically powered passenger vehicle operated on city streets drawing power from overhead wires using trolley poles.

(53) “Urbanized Area” has the same meaning as defined in 23 U.S.C. section 101(a)(34).

(54) “Zero-Emission Bus” or “ZEB” means a bus with zero tailpipe emissions and is either a battery electric bus or a fuel cell electric bus.

(55) “Zero-Emission Passenger Miles” means the number of miles traveled by passengers determined by multiplying the number of passengers who board zero-emission vehicles, other than buses with a GVWR greater than 14,000 pounds, by the length of their trips.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. Renumbering and amendment of portions of former section 1956.2 to new section 2023 filed 1-31-2006; operative 1-31-2006 pursuant to Government Code section 11343.4 (Register 2006, No. 5).

2. New article 4.3 (sections 2023-2023.11) and repealer and new section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.1

§ 2023.1. Zero-Emission Bus Requirements.

(a) Zero-Emission Bus Purchase Requirements.

(1) In any given calendar year, transit agencies must purchase or operate a minimum number of zero-emission buses as determined by the following schedules:

(A) For a large transit agency:

1. Starting January 1, 2023, twenty-five percent of the total number of new bus purchases in each calendar year must be zero-emission buses;

2. Starting January 1, 2026, fifty percent of the total number of new bus purchases in each calendar year must be zero-emission buses; and

3. Starting January 1, 2029, all new bus purchases must be zero-emission buses.

(B) For a small transit agency:

1. Starting January 1, 2026, twenty-five percent of the total number of new bus purchases in each calendar year must be zero-emission buses; and

2. Starting January 1, 2029, all new bus purchases must be zero-emission buses.

(2) If the calculated required minimum number of zero-emission buses as set forth in section 2023.1(a) in a given calendar year does not result in a whole number, the number must be rounded to the nearest integer.

(3) The zero-emission bus purchase requirements set forth in section 2023.1(a) apply only to the total number of new bus purchases in a calendar year. The following are not considered to be new bus purchases for the purposes of calculating the minimum number of zero-emission buses required in a given calendar year:

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(A) Purchase of used buses;

(B) Conversion of conventional internal combustion engine buses to zero-emission buses; and

(C) Purchase of a cutaway bus, over-the-road bus, double-decker, or articulated bus, until the latter of either January 1, 2026 or until the criteria specified in section 2023.1(c) have been met.

(4) The required minimum number of zero-emission buses in section 2023.1(a) can be achieved with any combination of new zero-emission bus purchases and zero-emission buses already present in the fleet, less any available zero-emission bus bonus or zero-emission mobility credits, as provided in sections 2023.3 and 2023.5. The number of zero-emission buses in the fleet include all of the following zero-emission buses regardless of how and when they are acquired:

(A) Any zero-emission bus from a previous purchase that has been delivered;

(B) Any leased zero-emission bus that has been delivered; and

(C) Any zero-emission bus that is converted from a conventional internal combustion engine bus and is an active bus.

A zero-emission bus identified in section 2023.1(a)(4)(A) through (C) may only be used once in accounting for the required minimum number of zero-emission buses in section 2023.1(a)(1).

(5) If a transit agency cancels a Notice to Proceed at any time before the bus delivery date, the purchase will be considered invalid and will not count towards required total new bus purchases.

(6) Starting January 1, 2023, a transit agency must retain a newly purchased zero-emission bus for at least five years starting from the date of being placed in the active bus fleet to satisfy the zero-emission bus purchase requirements.

(7) Annual compliance with the zero-emission bus purchase requirements is determined as of December 31 of each calendar year.

(b) Discharge of the Initial Zero-Emission Bus Purchase Requirements. The zero-emission bus purchase requirements in section 2023.1(a) for calendar year 2023 and 2024 are discharged if the following circumstances exist:

(1) The zero-emission bus purchase requirements for calendar year ending December 31, 2023, are discharged if California transit agencies collectively have at least eight hundred and fifty (850) zero-emission buses purchased or in active bus fleets by December 31, 2020, based on the reporting data for the end of calendar year 2020.

(2) If the 2023 zero-emission bus purchase requirement is discharged as a result of the implementation of section 2023.1(b)(1), then the zero-emission bus purchase requirements for calendar year ending December 31, 2024, are discharged if

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California transit agencies collectively have at least one-thousand two hundred fifty (1,250) zero-emission buses purchased or in active bus fleet by December 31, 2021, based on the reporting data for the end of calendar year 2021.

(3) Zero-Emission Bus Bonus Credits as specified in section 2023.3 cannot be used to meet the requirements of sections 2023.1(b)(1) and (2).

(c) Zero-Emission Cutaway, Over-The-Road, Double-Decker, and Articulated Bus Purchase Requirements. Purchases of cutaway, over-the-road, double-decker, or articulated buses are subject to the zero-emission bus purchase requirements as specified in section 2023.1(a) on or after January 1, 2026, if the cutaway, over-the-road, double-decker, or articulated bus type has a model that has passed the bus testing procedure and obtained a Bus Testing Report as described in section 2023(b)(8) for a given weight class.

(d) Zero-Emission Bus Rollout Plan Requirements. A transit agency must submit a Zero-Emission Bus Rollout Plan (Rollout Plan) to the Executive Officer that meets the following requirements.

(1) Rollout Plans must include all of the following components:

(A) A goal of full transition to zero-emission buses by 2040 with careful planning that avoids early retirement of conventional internal combustion engine buses;

(B) Identification of the types of zero-emission bus technologies a transit agency is planning to deploy, such as battery electric or fuel cell electric bus;

(C) A schedule for construction of facilities and infrastructure modifications or upgrades, including charging, fueling, and maintenance facilities, to deploy and maintain zero-emission buses. This schedule must specify the general location of each facility, type of infrastructure, service capacity of infrastructure, and a timeline for construction;

(D) A schedule for zero-emission and conventional internal combustion engine bus purchases and lease options. This schedule for bus purchases must identify the bus types, fuel types, and number of buses;

(E) A schedule for conversion of conventional internal combustion engine buses to zero-emission buses, if any. This schedule for bus conversion must identify number of buses, bus types, the propulsion systems being removed and converted to;

(F) A description on how a transit agency plans to deploy zero-emission buses in disadvantaged communities as listed in the latest version of CalEnviroScreen (https://oehha.ca.gov/calenviroscreen);

(G) A training plan and schedule for zero-emission bus operators and maintenance and repair staff; and

(H) Identification of potential funding sources.

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(2) Each transit agency's governing body must approve the Rollout Plan through the adoption of a resolution, and submit the Rollout Plan and a copy of the resolution to the Executive Officer according to the following schedule:

(A) A large transit agency must submit its governing body approved Rollout Plan along with its approval to the Executive Officer by July 1, 2020;

(B) A small transit agency must submit its governing body approved Rollout Plan along with its approval to the Executive Officer by July 1, 2023.

(3) Transit agencies that are collectively complying with the requirements of Joint Zero-Emission Bus Groups as set forth in section 2023.2 may submit one joint Rollout Plan in lieu of an individual transit agency Rollout Plan along with governing body approval from each participating transit agency. The joint Rollout Plan must be submitted to the Executive Officer based on the submittal date of the largest transit agency in the Joint Group, as set forth in section 2023.1(d)(2).

(e) New Entrant. A new entrant must meet the following requirements:

(1) It must submit a compliance report by March 31 following its existence and every year thereafter as specified in section 2023.8; and

(2) It must submit a Rollout Plan within 18 months of its existence.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. Renumbering and amendment of portions of former section 1956.2 to new section 2023.1 filed 1-31-2006; operative 1-31-2006 pursuant to Government Code section 11343.4 (Register 2006, No. 5).

2. New subsections (a)(4)-(a)(5)(C) filed 9-7-2006; operative 10-7-2006 (Register 2006, No. 36).

3. Amendment of subsections (b)(6) and (c)(5) filed 10-15-2007; operative 11-14-2007 (Register 2007, No. 42).

4. Repealer and new section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.2

§ 2023.2. Compliance Option for Joint Zero-Emission Bus Groups.

(a) Two or more transit agencies may choose to form a Joint Zero-Emission Bus Group (Joint Group) to comply with the requirements of section 2023.1 collectively. A Joint Group must meet at least one of the following eligibility criteria:

(1) All participating transit agencies are located within the same service area of a Metropolitan Planning Organization or Regional Transportation Planning Organization;

(2) All participating transit agencies are located within the same Air Basin;

(3) All participating transit agencies are located within the same Air Quality Management District, Air Pollution Control District, or Air Resources District; or,

(4) All participating transit agencies share infrastructure.

(b) Procedure to form a Joint Group.

(1) A group of transit agencies forming a Joint Group must provide the Executive Officer a notice at least one year before the Joint Group takes effect. The notice must include all of the following information:

(A) A list of all participating transit agencies;

(B) A statement of intent to form the Joint Group from a responsible official for each participating transit agency;

(C) The proposed start year and if known the end date of the Joint Group;

(D) A description on which criteria specified in section 2023.2(a) are met to form a Joint Group.

(2) The Executive Officer will approve the joint agreement if,

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(A) At least one of the criteria set forth in section 2023.2(a) has been met, and

(B) The notice required by section 2023.2(b)(1) has been provided.

(3) The Executive Officer will assign a Joint Group Number to the group to be used by each participating transit agency for the purpose of annual reporting as specified in section 2023.8.

(c) Joint Group Compliance Requirements.

(1) Members of a Joint Group collectively may submit one joint Rollout Plan in lieu of individual transit agency Rollout Plans, along with the approval from each transit agency's governing body as set forth in section 2023.1(d)(3).

(2) Subject to section 2023.3(c), members of a Joint Group must collectively purchase and operate at least the same total number of zero-emission buses annually as each transit agency would be required to purchase and operate individually as set forth in section 2023.1(a).

(3) A Joint Group that is requesting a deferral from zero-emission bus purchase requirements as described in section 2023.4 must explain why the compliance requirements cannot be met by each member of the Joint Group.

(4) If a Joint Group fails to comply with the zero-emission bus requirements set forth in section 2023.1 in a given year, each transit agency will be evaluated for compliance individually.

(5) If the largest transit agency in a Joint Group is a large transit agency, this transit agency must have the required minimum number of zero-emission buses as a percentage of its total new bus purchases in that calendar year as set forth in section 2023.1(a).

(d) Changes to a Joint Group. In case of a change in membership, all participating transit agencies, including the new or departing transit agency, must collectively submit a request to change membership to the Executive Officer explaining the change and its expected effective date. The member change request must be signed by the responsible official of each participating transit agency, including the new or departing transit agency, and must be submitted to the Executive Officer along with the governing body approval of each participating transit agency, for such a change.

(e) All transit agencies participating in a Joint Group must individually meet the reporting and record-keeping requirements of sections 2023.8 and 2023.9.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

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HISTORY

1. New section filed 1-31-2006; operative 1-31-2006 pursuant to Government Code section 11343.4 (Register 2006, No. 5).

2. Repealer and new section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.3

§ 2023.3. Zero-Emission Bus Bonus Credits.

(a) A transit agency may earn Zero-Emission Bus Bonus Credits (Bonus Credits) for each early acquisition of a zero-emission bus as determined based on the following criteria:

(1) Each fuel cell electric bus that was in the fleet as of January 1, 2018 receives two Bonus Credits;

(2) Each fuel cell electric bus placed in service between January 1, 2018 and December 31, 2022 receives one Bonus Credit;

(3) Each battery electric bus that was in the fleet as of January 1, 2018 receives one Bonus Credit;

(4) Each electric trolleybus placed in service between January 1, 2018, and December 31, 2019, receives one-tenth of a Bonus Credit that will expire by December 31, 2024.

(b) Unless as specified in section 2023.3(a)(4), transit agencies that have Bonus Credits can use them in any subsequent year until December 31, 2028 to meet the required minimum number of zero-emission buses as set forth in section 2023.1(a)(4).

(1) Each Bonus Credit may only be used once to meet the zero-emission bus purchase requirements set forth in section 2023.1(a)(4);

(2) All Bonus Credits will expire on December 31, 2028, which is when the one hundred percent zero-emission bus purchase requirement begins.

(c) A Bonus Credit cannot be transferred to another transit agency, but may be used by transit agencies participating in a Joint Group to comply with zero-emission bus purchase requirements collectively as set forth in section 2023.2(c)(2).

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

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HISTORY

1. Renumbering of former section 1956.3 to section 2023.3, including amendment of section and Note filed 1-31-2006; operative 1-31-2006 pursuant to Government Code section 11343.4 (Register 2006, No. 5).

2. Amendment filed 10-15-2007; operative 11-14-2007 (Register 2007, No. 42).

3. Repealer and new section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

This database is current through 6/3/22 Register 2022, No. 22

13 CCR § 2023.3, 13 CA ADC § 2023.3

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13 CCR § 2023.4

§ 2023.4. Provisions for Exemption of a Zero-Emission Bus Purchase.

(a) It is the intent of this section to ensure transit service is not adversely affected. Transit agencies may request an exemption from the zero-emission bus requirements set forth in section 2023.1. The Executive Officer will grant an exemption upon request, if the specified criteria in section 2023.4(c) are met.

(b) A request for exemption for a particular calendar year's compliance obligation must be submitted to the Executive Officer by November 30th of that year.

(c) A request for exemption must demonstrate as provided below that at least one of the following circumstances exists beyond the transit agency's control:

(1) Delay in bus delivery is caused by setback of construction of infrastructure needed for the zero-emission bus. A transit agency may request an exemption from the requirements of section 2023.1(a)(4) if it cannot finalize the zero-emission bus infrastructure within two years of the initial bus purchase and in time to operate the purchased buses after delivery due to circumstances beyond the transit agency's control.

(A) For purposes of this section, zero-emission bus infrastructure includes charging stations, hydrogen stations, and maintenance facilities; and circumstances beyond the transit agency's control may include:

1. Delays in installing zero-emission bus infrastructure that would require the transit agency to purchase new rights-of-way or construct new facilities,

2. Change of a general contractor,

3. Delays obtaining power from a utility,

4. Delays obtaining construction permits,

5. Discovery of archeological, historical, or tribal cultural resources under the California Environmental Quality Act, or

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6. Natural disaster.

(B) A transit agency must submit a request for exemption to the Executive Officer by submitting the following documentation:

1. A letter from its governing body, and,

2. A letter from the licensed contractor performing the work, related utility, building department, or other organizations involved in the project explaining the reasons for delay and estimating the completion date of the project.

(C) The transit agency may request an exemption from the zero-emission bus purchase requirements in section 2023.1(a) if the transit agency can provide documentation that demonstrates the needed infrastructure cannot be completed within the two-year extension period or in time to operate the purchased buses after delivery, whichever is later.

(D) A transit agency may purchase conventional internal combustion engine buses instead of zero-emission buses once the Executive Officer grants the exemption.

(2) When available zero-emission buses cannot meet a transit agency's daily mileage needs.

A transit agency may submit a request for exemption from the zero-emission bus purchase requirements in section 2023.1(a) if no battery electric bus can meet the daily mileage needs of any similar bus type in the fleet by submitting documentation to show that the miles travelled between charges of all available depot charging battery electric buses cannot meet the transit agency's daily operational needs for any bus in the existing fleet.

(A) The request for exemption must include the following information:

1. An explanation of why the exemption is needed including:

a. How zero-emission buses that have already been purchased or placed in service were suitable, and

b. Why the daily mileage range of any available depot charging battery electric bus is insufficient to meet the service needs of any conventional internal combustion engine bus in the transit agency's fleet of the same bus type;

2. A current monthly mileage report for each bus type in the fleet to show the daily usage for all of the buses of that type;

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3. A copy of the zero-emission bus request for proposal and resulting bids showing rated battery capacity that is available for each of the buses when new; and

4. If available, measured energy use data from zero-emission buses operated on daily assignments in the transit agency's service which includes, but is not limited to, battery degradation, air conditioning, passenger loading, grades, and driving behavior that shows typical energy usage over one month or more of regular revenue service.

(B) The Executive Officer will grant an exemption if the transit agency's required range cannot be met based on its battery electric bus energy use data. If energy use data is not available for the transit agency, the tested energy use on the Orange County Bus Cycle described in section 2023(b)(40) will be used to determine the energy use per mile. If the minimum required range is higher than eighty (80) percent of the range on available battery electric buses (using the largest available battery pack), the transit agency will be granted an exemption from the zero-emission bus purchase requirement.

(C) A transit agency may purchase internal combustion engine buses instead of zero-emission buses once the Executive Officer grants the exemption.

(3) A transit agency may request an exemption if available zero-emission buses do not have adequate gradeability performance to meet the transit agency's daily needs for any bus in its fleet.

(A) The transit agency must provide the following information to the Executive Officer:

1. Documentation that shows no other buses in the fleet can meet the transit agency's gradeability requirements and that the available zero-emission buses of that bus type cannot be placed into service anywhere else in the fleet;

2. Topography information including the measurement of the grade(s) where the zero-emission buses would be placed in service along with the explanation of which bus types currently provide these services;

3. A description of the bus types that currently serve the route(s) in question, and data showing the performance of conventional internal combustion engine buses of the same bus type that includes the passenger load, bus speed and grade of slope measured when operating on the route(s) the zero-emission buses would be placed in service;

4. An explanation of why the gradeability of all available zero-emission buses are insufficient to meet the transit agency's service needs;

5. A copy of the zero-emission bus request for proposal, specifying the transit agency's required gradeability and minimum sustained speed, and the resulting bids; and

6. If available, empirical data including but not limited to grades, passenger loading, and speed data from available zero-emission buses operated on the same grade to show that available zero-emission buses are unable to meet the same speed requirements under the same operating conditions as the same type of conventional bus in the transit agency's fleet.

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(B) A transit agency may purchase internal combustion engine buses instead of zero-emission buses once the Executive Officer grants the exemption.

(4) When a required zero-emission bus type for the applicable weight class based on gross vehicle weight rating (GVWR) is unavailable for purchase.

(A) A transit agency may request an exemption from an immediate zero-emission bus purchase requirement in section 2023.1(a) if no zero-emission buses are available as described below.

(B) A zero-emission bus type is considered unavailable for purchase if any of the following circumstances exists:

1. The zero-emission bus has not passed the complete Bus Testing and not obtained a Bus Testing Report as described in section 2023(b)(8);

2. The zero-emission bus cannot be configured to meet applicable requirements of the Americans with Disabilities Act; or

3. The physical characteristics of the zero-emission bus would result in a transit agency violating any federal, state, or local laws, regulations, or ordinances.

(C) The request for exemption must include the following information:

1. A summary of all bus body-types, vehicle weight classes being purchased with their GVWR, chassis (if applicable), and the reasons why existing zero-emission buses are unavailable for purchase;

2. Current fleet information showing how many zero-emission buses of that bus type are already in service and how many are on order and a demonstration that any available zero-emission bus that would meet the purchase requirement has been purchased and that the zero-emission bus purchase requirement cannot be met with other zero-emission bus purchases in that year;

3. If the zero-emission bus type and vehicle weight class to be purchased cannot be adequately equipped to meet applicable Americans with Disabilities Act requirements, then the transit agency must submit documentation to show what Americans with Disabilities Act requirement cannot be met and why the manufacturer cannot meet it by submitting information from the manufacturer; and

4. If the zero-emission bus would result in a transit agency violating any federal, state, or local law, regulation, or ordinance, then the transit agency must submit a letter from its governing body that details how the physical characteristics of the zero-emission bus would violate such federal, state, or local law, regulation or ordinance and how the violation would be avoided with the purchase of a combustion engine bus of the same type. This letter must include all relevant citations to state and federal regulatory code sections.

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(D) The Executive Officer will grant an exemption from the requirements to purchase zero-emission buses if the criteria of section 2023.4(c)(4)(B) are met and the information required by section 2023.4(c)(4)(C) has been provided.

(E) A transit agency may purchase conventional internal combustion engine buses instead of such unavailable zero-emission buses for that bus purchase once the exemption is granted.

(5) When a required zero-emission bus type cannot be purchased by a transit agency due to financial hardship. A transit agency may request an exemption from the zero-emission bus purchase requirements in section 2023.1(a) due to financial hardship.

(A) Financial hardship would be granted if a fiscal emergency is declared under a resolution by a transit agency's governing body following a public hearing, a transit agency can demonstrate that it cannot offset the incremental cost of purchasing all available zero-emission buses when compared to the cost of the same type of conventional bus, or a transit agency can demonstrate that it cannot offset the managed, net electricity cost for depot charging battery electric buses when compared to the fuel cost of the same type of conventional internal combustion engine buses.

(B) The request for exemption must include the following documentation:

1. Either a resolution by a transit agency's governing body declaring a fiscal emergency; or

2. Documentation showing a transit agency cannot offset the initial capital cost of purchasing zero-emission buses, including:

a. A letter from a transit agency's governing body declaring the transit agency in good faith has applied for all available funding and financing options that could be used to offset the higher capital costs of zero-emission buses and associated infrastructure;

b. Documentation to show the transit agency has been denied financing, or financing options are not available; and

c. Documentation to show the transit agency cannot offset the higher incremental costs of available zero-emission buses.

(C) The Executive Officer will grant an exemption from the requirement to purchase zero-emission buses until the next bus purchase.

(D) A transit agency may purchase conventional internal combustion engine buses instead of zero-emission buses once the Executive Officer grants the exemption.

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Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. Renumbering of former section 1956.4 to section 2023.4, including amendment of section heading, section and Note, filed 1-31-2006; operative 1-31-2006 pursuant to Government Code section 11343.4 (Register 2006, No. 5).

2. Change without regulatory effect amending subsection (e)(2)(c) filed 6-16-2006 pursuant to section 100, title 1, California Code of Regulations (Register 2006, No. 24).

3. New subsection (b)(4) filed 9-7-2006; operative 10-7-2006 (Register 2006, No. 36).

4. Amendment filed 10-15-2007; operative 11-14-2007 (Register 2007, No. 42).

5. Repealer and new section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.4, 13 CA ADC § 2023.4

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13 CCR § 2023.5

§ 2023.5. Zero-Emission Mobility Option.

(a) A transit agency may opt to use a Zero-Emission Mobility Program in lieu of making a zero-emission bus purchase to meet the required minimum number of zero-emission buses as set forth in section 2023.1(a)(4) if such program meets the following requirements:

(1) The program provides zero-emission mobility services by using bicycles, scooters, or other zero-emission vehicles with a GVWR of 14,000 pounds or less, or any combination of these;

(2) The program must be either directly operated by the transit agency or operated by a contractor to the transit agency;

(3) The transit agency must be able to track and record zero-emission passenger miles for each zero-emission vehicle.

(4) A transit agency must achieve the following zero-emission passenger miles per year to be eligible to receive each mobility credit:

(A) A large transit agency must achieve at least 320,000 zero-emission passenger miles per year;

(B) A small transit agency must achieve at least 180,000 zero-emission passenger miles per year.

(b) Procedure to opt-in and opt-out of a Zero-Emission Mobility Option.

(1) To opt into a Zero-Emission Mobility Option, a transit agency must submit a request to opt-in to the Executive Officer with the following information to prove it is meeting the requirements set forth in section 2023.5(a):

(A) A description of the types of vehicles, including their GVWR and types of propulsion systems;

(B) Documentation to show who will operate these services; and

(C) A description of the method of collecting accurate zero-emission passenger miles per vehicle.

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(2) A transit agency may choose to opt out from the Zero-Emission Mobility Option at any time with the submittal of a request to opt-out to the Executive Officer with expected date of program termination.

(c) Calculation and issuance of mobility credits.

(1) Provided the criteria set forth in section 2023.5(a) has been met and the information required by section 2023.5(b) has been submitted to the Executive Officer, a transit agency that opts into a Zero-Emission Bus Mobility Option may receive one credit that is equivalent to operation of one zero-emission bus in the fleet based on the following calculations:

(A) When a bicycle is used in a Zero-Emission Mobility Option, a multiplier of three (3) shall apply when quantifying zero-emission passenger miles from a bicycle.

(B) The zero-emission mobility credit is calculated by dividing the total zero-emission passenger miles in each calendar year achieved by the Zero-Emission Mobility program by 320,000 passenger miles per year for a large transit agency or by 180,000 passenger miles per year for a small transit agency;

(C) For each calendar year, if a transit agency maintains at least the same zero-emission passenger miles as required in section 2023.5(a)(4) then the mobility credits will continue to count as zero-emission buses in the fleet.

(D) If the calculated number of mobility credits as set forth in section 2023.5(c)(1)(B) does not result to a whole number, the number must be rounded to the nearest integer to determine the number of credits.

(d) Use of mobility credits.

(1) Each calculated credit as set forth in section 2023.5(c)(1)(B) will be treated the same as operating one zero-emission bus in the fleet in a given calendar year.

(2) Each mobility credit earned annually by a transit agency may be counted the same as having a zero-emission bus by the transit agency in its fleet when calculating the required minimum number of zero-emission buses in the following year of achieving passenger miles as set forth in section 2023.1(a)(4).

(e) Reporting. Any transit agency that opts into the Zero-Emission Mobility Option must report annually to show the total zero-emission passenger miles achieved in the previous calendar year. A transit agency using the Zero-Emission Mobility Option must meet the reporting and record keeping requirements set forth in section 2023.9(c) for zero-emission passenger miles.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

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HISTORY

1. New section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.5, 13 CA ADC § 2023.5

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13 CCR § 2023.6

§ 2023.6. Low-NOx Engine Purchase Requirements.

(a) Starting January 1, 2020, when new conventional internal combustion engine bus or hybrid bus purchases are made, transit agencies must purchase buses with Low-NOx engines if Low-NOx engines are available that meet both of the following criteria for the bus type and propulsion system type being purchased:

(1) The engine or hybrid propulsion system paired with the engine must have been commercially available for purchase or lease for at least two years; and

(2) The engine or hybrid propulsion system paired with the engine must be certified to the lowest level of NOx emissions per title 13 of the California Code of Regulations, section 2208(c)(18), at the time of purchase and suitable for the bus and fuel type of the engine being purchased.

(b) The Low-NOx engine purchase requirements apply to the purchase of all new conventional internal combustion engine buses, except buses that will be dispatched from areas defined as NOx Exempt Areas as described in section 2023(b)(39).

(c) Any Low-NOx engine purchases prior to January 1, 2020, including any voluntary Low-NOx engine repower, may be counted once towards meeting the requirements set forth in section 2023.6 (a) through (b).

(d) A transit agency that is subject to Low-NOx engine purchase requirements must report annually as set forth in section 2023.8(g) and keep records of all conventional internal combustion engine bus purchases as required in section 2023.9(d).

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. New section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.6, 13 CA ADC § 2023.6

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Article 4.3. Innovative Clean Transit (Refs & Annos)

13 CCR § 2023.7

§ 2023.7. Requirements to Use Renewable Fuels.

(a) Starting January 1, 2020, a large transit agency must purchase only renewable diesel or renewable natural gas when renewing fuel purchase or delivery contracts for diesel or natural gas. A small transit agency is exempt from this requirement.

(b) A large transit agency that is subject to the requirements set forth in section 2023.7(a) must meet the reporting and record keeping requirements set forth in sections 2023.8(h) and 2023.9(e) for all new and renewed fuel purchase or delivery contracts.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. New section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.7, 13 CA ADC § 2023.7

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13 CCR § 2023.8

§ 2023.8. Reporting Requirements for Transit Agencies.

(a) Commencing March 31, 2021, and continuing every year thereafter through March 31, 2050, each transit agency must annually submit by March 31 to the Executive Officer a compliance report meeting the requirements of this section for the prior calendar year.

(b) The initial report must be submitted by March 31, 2021, and must include the number and information of active buses in the transit agency's fleet as of December 31, 2017.

(c) Each transit agency must report the following information annually:

(1) Transit agency information.

(A) Name of the transit agency;

(B) Transit agency mailing address;

(C) National Transit Database (NTD) identification number;

(D) Name of related Metropolitan Planning Organization (MPO) or Regional Transportation Planning Agency;

(E) Air district;

(F) Air basin;

(G) Joint Group Number (if applicable as set forth in section 2023.2(b)(3));

(H) Name of the contact person;

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(I) Contact person's e-mail address;

(J) Contact person's title; and

(K) Phone number.

(2) Information on each bus purchased, owned, operated, leased, or rented by a transit agency, including the following:

(A) Information on vehicle.

1. Vehicle identification number (VIN);

2. License plate;

3. Transit agency's vehicle ID;

4. Ownership type (owned, leased, rented);

5. Make;

6. Model;

7. Bus type;

8. Bus length;

9. Chassis (if applicable);

10. Bus fuel type;

11. GVWR;

12. Manufacture year;

13. Propulsion technology type;

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14. Vehicle status (active, emergency contingency, or retired);

15. Date in-service; and

16. Bus retired date.

(B) Information on engine and propulsion system.

1. Engine manufacturer;

2. Engine model;

3. Engine model year;

4. Engine family name;

5. Engine cylinder displacement size (liters);

6. Battery rated capacity or energy level (kWh);

7. Bus charging strategy type (on-route, in depot, or combination);

8. Fuel cell system manufacturer;

9. Fuel system model; and

10. Fuel system rated power (kW).

(C) Information on bus purchases. Quantity of zero-emission and conventional internal combustion engine buses purchased in the calendar year and their status as new or used, effective date of a Notice to Proceed, and actual or expected bus delivery date; and

(D) Information on converted buses. Quantity of buses fully converted to zero-emission from conventional internal combustion engine buses in each calendar year.

(d) Each transit agency subject to the requirements of section 2023.2 must report the same information as required under sections 2023.8(a) through 2023.8(c) using the assigned Joint Group Number.

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(e) CARB will calculate the number of bonus credits set forth in section 2023.3(a) based on the required information in section 2023.8(c).

(f) Each transit agency that opts into a Zero-Emission Mobility Option as set forth in section 2023.5 must report the following information:

(1) Total accumulated annual zero-emission passenger miles provided by scooters and other vehicles with a GVWR of 14,000 pounds or less;

(2) Total accumulated annual zero-emission passenger miles provided by bicycles; and

(3) CARB will calculate the number of mobility credits annually according to the requirement of section 2023.5(c) and reported total accumulated annual zero-emission passenger miles.

(g) Each transit agency subject to the requirements for purchase of Low-NOx engines in section 2023.6 must submit an annual report identifying the general location a conventional internal combustion engine bus is dispatched from, the NOx Certification Standard, and the NOx Executive Order number.

(h) Each transit agency subject to requirements to use renewable fuels as set forth in section 2023.7 must submit an annual report identifying fuel types used, quantity of renewable and non-renewable fuel purchased, and fuel contract number and its effective date and expected or actual end date.

(i) A report that does not contain all required information in sections 2023.8(c) through (h) will not be considered complete. A report will be considered to be complete as of the date that all required information is submitted.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. New section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.8, 13 CA ADC § 2023.8

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13 CCR § 2023.9

§ 2023.9. Record Keeping Requirements.

(a) Each transit agency subject to the reporting requirements of section 2023.8 must maintain copies of the information reported under section 2023.8, as well as the records described in subsections (b) through (e) in this section, and retain such records as required below in subsection (g).

(b) Each transit agency must maintain records of all purchased, leased, rented, or operated conventional internal combustion engine buses, zero-emission, and fully converted buses to zero-emission buses, for the purpose of demonstrating compliance with the requirements of sections 2023.1 through 2023.4 and section 2023.6. Transit agencies must keep records of the following:

(1) Every Notice to Proceed sent to bus manufacturers or sales representatives for the purpose of purchasing buses;

(2) Bus purchase contracts that Notice to Proceeds are based upon;

(3) Any lease agreements with bus manufacturers or sales representatives;

(4) Documentation to show ownership transfer for purchase of used buses;

(5) Documentation to show when a conventional internal combustion engine bus is fully converted to a zero-emission bus;

(6) Copy of vehicle's registration;

(7) Proof of bus delivery date.

(c) A transit agency that has opted-in to a Zero-Emission Mobility Option must keep records of zero-emission passenger miles generated by scooters, bicycles and other eligible zero-emission vehicles.

(d) Each transit agency subject to requirements of section 2023.6 must maintain bus purchase contracts of conventional internal combustion engine buses, including the ones with Low-NOx engines, to demonstrate compliance.

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(e) Each large transit agency must maintain records of all fuel contracts that are executed on and after January 1, 2020, to demonstrate compliance with the requirements specified in section 2023.7.

(f) Audit of Records. A transit agency must make the records required under section 2023.9(b)-(e) available to CARB within 10 calendar days of its request for an audit to verify the accuracy of the reported information.

(g) Record Retention. A transit agency shall maintain the records required under section 2023.9(b)-(e) for each bus, zero-emission passenger miles, and fuel contracts that are subject to the reporting requirements of section 2023.8 and record keeping requirements of section 2023.9(b) through (e) for three (3) years after the bus is retired, ownership is transferred, or the fuel contract is expired.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. New section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

This database is current through 6/3/22 Register 2022, No. 22

13 CCR § 2023.9, 13 CA ADC § 2023.9

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13 CCR § 2023.10

§ 2023.10. Authority to Suspend, Revoke, or Modify.

(a) If the Executive Officer finds that any zero-emission bus bonus or mobility credit was obtained based on false information, the Executive Officer may revoke the credit. Each revoked credit is equivalent to one required zero-emission bus the agency has failed to purchase. A transit agency with a deficit in the number of required zero-emission buses is considered to be in violation of zero-emission bus requirements as set forth in section 2023.1.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. New section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.10, 13 CA ADC § 2023.10

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13 CCR § 2023.11

§ 2023.11. Severability.

(a) If any subsection, paragraph, subparagraph, sentence, clause, phrase, or portion of the Innovative Clean Transit Regulations in this article 4.3 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 these Innovative Clean Transit Regulations.

Note: Authority cited: Sections 38501, 38510, 38560, 39002, 39003, 39500, 39600, 39601, 39667, 40000, 43000.5, 43013, 43018, 43100, 43101, 43102, 43104, 43105, 43106, 43701(b), 43801 and 43806, Health and Safety Code. Reference: Sections 38501, 38510, 38560, 39002, 39003, 39017, 39027, 39500, 39600, 39601, 39650, 39655, 39667, 40000, 43000.5, 43013, 43018, 43101, 43104, 43105, 43701(b), 43801 and 43806, Health and Safety Code; Sections 233, 350, 545 and 28114, Vehicle Code; section 5303, title 49, United States Code; and Code of Federal Regulations, title 49, section 665.13.

HISTORY

1. New section filed 8-13-2019; operative 10-1-2019 (Register 2019, No. 33).

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13 CCR § 2023.11, 13 CA ADC § 2023.11

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