FINAL REGULATION ORDER

Amend section 1971.5, 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. Various portions of the regulations that are not modified by the proposed amendments are omitted from the text shown and indicated with "* * * *")

§ 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.

* * * *

"*Deficient Emission Threshold Monitor*" means a component/system monitor certified with a deficiency (in accordance with Cal. Code Regs., title 13, section 1971.1(k)) for not detecting a malfunction before emissions exceeded the malfunction criteria defined in Cal. Code Regs., title 13, sections 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, particulate matter (PM) standard plus 0.02 grams per brake horsepower-hour (g/bhp-hr), PM level of 0.03 g/bhp-hr as measured from an applicable emission test cycle).

"*Deficient In-Use Performance Monitor*" means a component/system monitor certified with a deficiency (in accordance with Cal. Code Regs., title 13, section 1971.1(k)) for not meeting the minimum acceptable in-use monitor performance ratio specified under Cal. Code Regs., title 13, section 1971.1(d)(3.2).

* * * *

"*OBD Emission Testing*" refers to testing conducted to determine compliance with the malfunction criteria in Cal. Code Regs., title 13, section**s** 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.*

(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. For OBD systems that fail to meet requirements of Cal. Code Regs., title 13, section 1971.1 and for which the noncompliance has been granted a deficiency pursuant to the provisions of Cal. Code Regs., title 13, section 1971.1(k), ARB may evaluate engines with such OBD systems to confirm that the details of the noncompliance are the same as those disclosed by the manufacturer at the time the deficiency was granted.

* * * *

(3) *Engine Selection for ARB-Conducted Enforcement Testing*.

(A) Determining the Engine Class.

* * * *

(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~~EMFAC2014, which is incorporated by reference herein.

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(D) Engines to be included in a Test Sample Group.

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(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:

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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:

* * * *

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)b.3. above, or
5. 300 for all other diesel monitors not covered under sections (b)(3)(D)(ii)b.3. and 4. above.

* * * *

(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:

* * * *

d. 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)), ~~H~~have mileage and age that are less than or equal to the certified full useful life mileage and age for the subject engines.

* * * *

(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 any of the following:

(i) ~~a~~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.

(ii) Complete software design description documentation, specifications, and source code of the engine control unit and any other on-board electronic powertrain control unit (e.g., transmission control unit, aftertreatment system control unit). The manufacturer shall provide the descriptions and specifications in English.

(iii) A complete list and description of all control unit variables available for real-time display and data logging, as well as all calibration maps, curves, and constants used in the software.

(iv) A data acquisition device with real-time display and data logging capability of any and all control unit variables used in calibration. These variables shall be provided in the same engineering units used during calibration (e.g., the units as documented in the AECD documentation provided to the Executive Officer). The data acquisition device shall include, but may not be limited to, an engineering and calibration tool used during control unit software development and calibration.

(v) A method to unlock any production or prototype control unit to allow real-time display and data logging of any and all variables used during calibration.

* * * *

(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.

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(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 the following:

1. For deficient emission threshold monitors, the applicable emission level for mandatory recall under section (d)(3)(A)(ii).
2. For all other component/system monitors not mentioned in section (b)(6)(A)(ii)a.1. above, 2.0 times the malfunction criteria (e.g., 4.0 times the standard if the malfunction criterion is 2.0 times the standard).

b. In determining compliance, the Executive Officer shall use only the test cycle and standard determined and identified by the manufacturer at the time of certification in accordance with Cal. Code Regs., title 13, section 1971.1(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 (except as provided for alternate-fueled engines in section (b)(6)(A)(v) below):

a. PM filter monitors on engines subject to the malfunction criteria of Cal. Code Regs., title 13, sections 1971.1(e)(8.2.1)(D) and (~~E~~F) 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 the following
   1. For PM filter monitors that are deficient emission threshold monitors, the applicable emission level for mandatory recall under section (d)(3)(A)(ii).
   2. For PM filter monitors that are not deficient emission threshold monitors, 2.0 times the malfunction criteria (e.g., PM emission level of 0.06 g/bhp-hr if the malfunction criterion is 0.03 g/bhp-hr) on any of the applicable standards (i.e., FTP or SET).

b. Monitors on engines and engine ratings previously certified to Cal. Code Regs., title 13, section 1971.1(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 the following:
   1. For deficient emission threshold monitors, the applicable emission level for mandatory recall under section (d)(3)(A)(ii).
   2. For all other component/system monitors not mentioned in section (b)(6)(A)(iii)b.1. above, 2.0 times the malfunction criteria (e.g., 4.0 times the standard if the malfunction criterion is 2.0 times the standard) on any of the applicable standards (i.e., FTP or SET).

c. Monitors on engines not covered under sections (b)(6)(A)(iii)a. and b. above shall be considered nonconforming if the emission test results indicate that 50 percent or more of the engines in the test sample group do not properly illuminate the MIL when emissions exceed the following:
   1. For deficient emission threshold monitors, any of the applicable following thresholds: (1) 20 percent of the NMHC, CO, or NOx emission standard above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, (2) 20 percent of the PM malfunction criterion (e.g., 0.0060 g/bhp-hr if the PM malfunction criterion is 0.03 g/bhp-hr) above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, or (3) the applicable emission level for mandatory recall under section (d)(3)(A)(ii).
   2. For all other component/system monitors not mentioned in section (b)(6)(A)(iii)c.1. above, the malfunction criteria on any of the applicable standards (i.e., FTP or SET).

(iv) For 2019 and subsequent model year engines (except as provided for alternate-fueled engines in section (b)(6)(A)(v) below), 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 following:

a. For deficient emission threshold monitors, any of the applicable following thresholds: (1) 20 percent of the NMHC, CO, or NOx emission standard above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, (2) 20 percent of the PM malfunction criterion (e.g., 0.0060 g/bhp-hr if the PM malfunction criterion is 0.03 g/bhp-hr) above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, or (3) the applicable emission level for mandatory recall under section (d)(3)(A)(ii).

b. For all other component/system monitors not mentioned in section (b)(6)(A)(iv)a. above, the malfunction criteria on any of the applicable standards (i.e., FTP or SET).

(v) For alternate-fueled 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 following:

a. For 2018 through 2021 model year engines:

1. For deficient emission threshold monitors, the applicable emission level for mandatory recall under section (d)(3)(A)(ii).

2. For all other component/system monitors not mentioned in section (b)(6)(A)(v)a.1. above, 2.0 times the malfunction criteria on any of the applicable standards (i.e., FTP or SET).

b. For 2022 and subsequent model year engines:

1. For deficient emission threshold monitors, any of the applicable following thresholds: (1) 20 percent of the NMHC, CO, or NOx emission standard above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, (2) 20 percent of the PM malfunction criterion (e.g., 0.0060 g/bhp-hr if the PM malfunction criterion is 0.03 g/bhp-hr) above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, or (3) the applicable emission level for mandatory recall under section (d)(3)(A)(ii).

2. For all other component/system monitors not mentioned in section (b)(6)(A)(v)b.1. above, the malfunction criteria on any of the applicable standards (i.e., FTP or SET).

(vi) 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 with monitors 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.

(iii) 2024 through 2027 model year engines with monitors certified to a ratio of 0.300 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 0.177 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 0.200 for the same monitor.

(iv) 2028 and subsequent model year engines with monitors certified to a ratio of 0.300 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 0.265 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 0.300 for the same monitor.

(C) All Other OBD Testing.

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(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~~SAE International (SAE) 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);

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(7) *Executive Officer Notification to the Manufacturer Regarding Determination of Nonconformance*.

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(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~~ sections (b)(7)(C)(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.).

* * * *

(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. The Executive Officer may waive the testing requirements of section (c) for a specific model year if the following are met:

(A) All engines of the specific model year of concern are direct carry-overs of previous model year engines that were tested in accordance with section (c) (i.e., have OBD system calibrations and emission-related software and hardware that are substantially similar to the previous model year engines such that testing of the “direct carry-over” engine under section (c)(3) will provide the same results as testing of the previous model year engine);

(B) All monitors have been tested in accordance with section (c) on the previous model year engines specified in section (c)(1)(A) above;

(C) The manufacturer tested an engine in accordance with section (c) that is one model year before the specific model year of concern; and

(D) The manufacturer did not use the provisions in section (c)(4)(E)(iii) to reduce the number of additional test engines during testing of any of the previous model year engines specified in section (c)(1)(A) above.

(2) *Engine Selection for Manufacturer Self-Testing*.

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(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:

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c. Have mileage that is between 70 to ~~80~~ 100 percent of the certified full useful life mileage and an age of less than the certified full useful life age for the subject engines.

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(iii) Upon request of the manufacturer, the Executive Officer may approve an alternate engine selection criterion in lieu of a criterion described in sections (c)(2)(A) and (c)(2)(C)(i) above.

a. The manufacturer may request Executive Officer approval to procure an engine that has mileage that is below 70 percent of the certified full useful life mileage in lieu of the criterion in section (c)(2)(C)(i)c. above. The Executive Officer shall approve the use of the engine upon determining that the manufacturer-submitted plan demonstrates that the engine will produce equivalent results to an engine with mileage that is between 70 to 100 percent of the certified full useful life mileage. The plan may involve the manufacturer operating the vehicle to accumulate more mileage on the engine, requesting a extension in the deadline set forth in section (c)(3)(A) below to allow for more mileage accumulation on the engine, and/or providing data showing operating hours-to-mileage equivalency. The plan may not involve the manufacturer operating the engine on a dynamometer to accumulate operating hours for the purposes of showing operating hours-to-mileage equivalency.

b. The manufacturer may request Executive Officer approval to procure an engine that is of the same model year but of a different rating than the specific rating selected under section (c)(2)(A) above. The Executive Officer shall approve the use of the engine upon determining that the engine is identical to the engine selected under section (c)(2)(A) with respect to the emissions control system hardware, and the manufacturer's plan to re-rate the engine to the rating selected under section

(c)(2)(A) will result in worst-case emissions with respect to re-rating up or re-rating down.

c. If a manufacturer is unable to procure the test engine necessary for testing under section (c)(3), the manufacturer may request Executive Officer approval to procure an engine meeting alternate criteria in lieu of the criteria under section (c)(2)(C)(i). The manufacturer shall submit information to the Executive Officer detailing the method(s) used by the manufacturer when trying to procure the engine (including the number of vehicle owners contacted and the procurement incentives, if any), the total California and federal (if applicable) sales volumes of the engine family and specific rating selected for testing, the total California and federal (if applicable) sales volumes for different model year engines that are direct carryovers of this engine family and rating, and the proposed alternate criteria. The Executive Officer shall approve the request upon determining based on the information that the manufacturer has taken all reasonable steps to try to procure an engine meeting the criteria under section (c)(2)(C)(i) and that testing of an engine meeting the alternate criteria will provide the same results as testing of an engine meeting the criteria under section (c)(2)(C)(i).

(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). Prior to conducting any testing under section (c)(3), the engine manufacturer shall notify the Executive Officer of the sales volume, the applicable running changes, and the applicable field fixes for each engine group with a unique OBD system calibration within the selected test engine rating. The Executive Officer will then select the specific OBD system calibration that the manufacturer shall use on the test engine during testing 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~~ 15 Executive Officer-selected component~~s~~/system~~s~~ monitors and all deficient emission threshold monitors according to the certification demonstration testing requirements of Cal. Code Regs.,

title 13, sections 1971.1(i)(3), ~~and~~ (i)(4), (i)(5.1.2), and (i)(5.1.3). For the Executive Officer-selected 15 monitors, 8 monitors will be tested by all manufacturers for that specific model year, and 7 monitors will be specific to each manufacturer. Of the 15 monitors, the Executive Officer shall select 2 monitors that the manufacturer is required to test on both the FTP cycle and SET cycle to verify which emission test cycle and standard is more stringent in accordance with Cal. Code Regs., title 13, section 1971.1(d)(6.1.1). The Executive Officer shall inform the manufacturer of the 15 monitors to test when the Executive Officer informs the manufacturer of the engine(s) to be tested under section (c)(2)(A).

(i) The manufacturer may carry over the value used to represent the frequency of regenerations that was determined by the manufacturer at the time of certification in accordance with Cal. Code Regs., title 13, section 1971.1(d)(6.2).

(ii) If invalid PM emission test results are obtained during emission testing of a monitor that has no PM malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1(e) through (g), the manufacturer is not required to rerun the emission test for the monitor for the sole purpose of obtaining valid PM emission test results.

(iii) A manufacturer required to test engines from 2 or more engine ratings under section (c)(2)(B)(ii) above may request Executive Officer approval to utilize alternative test procedures (e.g., less frequently calibrated emission analyzers) instead of official test procedures to obtain the emission test data required in section (c)(3) for all but 1 of the required test engines. The Executive Officer shall approve the request upon determining that 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 established pursuant to Cal. Code Regs., title 13, sections 1971.1(e) through (g) when emission tests are performed in accordance with official test procedures. Additionally, the manufacturer shall report to the Executive Officer any testing issues or failures (e.g., failed calibration checks) that occurred during or immediately after the testing.

(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 section (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).

(G) In lieu of the 15 monitors required to be tested under section (c)(3)(C) above, the manufacturer may request Executive Officer approval to test 8 monitors, specifically those selected by the Executive Officer to be tested by all manufacturers for that specific model year. The Executive Officer shall approve the request upon determining that the manufacturer has demonstrated all the following conditions:

(i) During testing for at least 3 consecutive model years under section (c), no additional testing was required under section (c)(4)(A),

(ii) There are no deficient emission threshold monitors for the model years under which condition (i) above was met,

(iii) There are no deficient emission threshold monitors for the model year in which the manufacturer is requesting the reduced testing,

(iv) There are no deficient in-use performance monitors for the model years under which condition (i) above was met,

(v) The in-use monitoring performance data collected under Cal. Code Regs., title 13, section 1971.1(l)(3) do not meet the nonconformance criteria specified under section (b)(6)(B) for the model years under which condition (i) above was met, and

(vi) The emission warranty claims are below 4% for the model years in which condition (i) above was met and for the model year in which the manufacturer is requesting the reduced testing.

(4) *Additional Testing*.

(A) No further testing is required ~~I~~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 following~~malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1(e) through (g), no further testing is required.~~:

(i) For deficient emission threshold monitors, all of the applicable following thresholds: (1) 20 percent of the NMHC, CO, or NOx emission standard above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, (2) 20 percent of the PM malfunction criterion (e.g., 0.0060 g/bhp-hr if the PM malfunction criterion is 0.03 g/bhp-hr) above the emission level at which a malfunction was detected when the OBD system was approved by the Executive Officer, or (3) the applicable emission level for mandatory recall under section (d)(3)(A)(ii).

(ii) For all other component/system monitors not mentioned in section (c)(4)(A)(i) above, the malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1(e) through (g).

(B) Except as provided for in section (c)(4)(F) below, the engine manufacturer shall conduct further testing on additional engines ~~I~~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 any of the applicable levels specified in section (c)(4)(A)(i) or (ii) above~~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. Upon request of the manufacturer, the Executive Officer may extend the six-month deadline upon finding that the manufacturer has demonstrated good cause for the requested extension.

(ii) The engine manufacturer shall only be required to test the component/system monitor(s) for which the OBD emission test results in section (~~b~~c)(3) exceeded the ~~malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1(e) through (g)~~applicable levels specified in section (c)(4)(A)(i) or (ii) above.

(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 the OBD system properly illuminates the MIL for the tested component/system monitor(s) before emissions exceed all of the ~~malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1(e) through (g)~~applicable levels specified in section (c)(4)(A)(i) or (ii) above on three or more of the additional test engines.

(D) Except as provided for in section (c)(4)(F) below, ~~F~~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 any of the

~~malfunction criteria defined in Cal. Code Regs., title 13, sections 1971.1(e) through (g)~~applicable levels specified in sections (c)(4)(A)(i) and (ii) above 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. Upon request of the manufacturer, the Executive Officer may extend the six-month deadline upon finding that the manufacturer has demonstrated good cause for the requested extension.

(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 except as provided below.

(i) The manufacturer may procure an engine that is a "direct carry-over" of the engine of concern. The manufacturer shall request Executive Officer approval of the "direct carry-over" engine. The Executive Officer shall approve the request based on manufacturer-submitted information and/or engineering evaluation demonstrating that the "direct carry-over" engine (1) is one model year before or after the engine of concern, and (2) has OBD system calibrations and emission-related software and hardware that are substantially similar to the engine of concern such that testing of the "direct carry-over" engine under section (c)(4) will provide the same results as testing of the engine of concern.

(ii) The manufacturer may request to utilize alternative test procedures (e.g., less frequently calibrated emission analyzers) instead of official test procedures to obtain the emission test data required in section (c)(4). The Executive Officer shall approve the request upon determining that 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 established pursuant to Cal. Code Regs., title 13, sections 1971.1(e) through (g) when emission tests are performed in accordance with official test procedures. Additionally, the manufacturer shall report to the Executive Officer any testing issues or failures (e.g., failed calibration checks) that occurred during or immediately after the testing.

(iii) If a manufacturer is unable to procure the required number of test engines specified under section (c)(4)(B)(i) or (c)(4)(D)(i), the manufacturer may request Executive Officer approval to reduce the number of test engines the manufacturer is required to test. The

manufacturer shall submit information to the Executive Officer detailing the method(s) used by the manufacturer when trying to procure the engine (including the number of vehicle owners contacted and the procurement incentives, if any), the total California and federal (if applicable) sales volumes of the engine family and specific rating selected for testing, the total California and federal (if applicable) sales volumes for different model year engines that are direct carryovers of this engine family and rating, and the proposed number of test engines. The Executive Officer shall approve the request upon determining that:

a. The manufacturer has taken all reasonable steps to try to procure the required number of additional test engines based on the information above, and

b. The proposed number of test engines provides for a sufficient finding of conformance/nonconformance by the Executive Officer based on the degree of compliance/noncompliance on the tested engines (e.g., how much the emissions exceeded the required malfunction criteria for noncompliant monitors, the number of test engines that passed or failed the tests).

(F) The engine manufacturer may waive the additional testing requirements described under sections (c)(4)(B) and/or (c)(4)(D) for a monitor if:

(i) The manufacturer acknowledges that the OBD system does not properly illuminate the MIL for the monitor before emissions exceed the applicable emission levels specified in section (c)(4)(A)(i) or (ii) above,

(ii) The manufacturer acknowledges that the OBD system is considered nonconforming according to the criteria of section (b)(6)(A), and

(iii) The Executive Officer has approved a plan submitted by the manufacturer to correct the nonconformance issue.

* * * *

(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:~~,~~

a. For monitors subject to the nonconformance criteria of section (b)(6)(B)(ii) and (b)(6)(B)(iv), 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.

b. For monitors subject to the nonconformance criteria of section (b)(6)(B)(iii), 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 0.066 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 0.066.

(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 (except as provided for alternate-fueled engines in section (d)(3)(A)(ii)d. below):

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)(D) and (~~E~~F) (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 (except as provided for alternate-fueled engines in section (d)(3)(A)(ii)d. below), 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).

d. For alternate-fueled engines:

1. For 2018 through 2021 model year engines, 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).

2. For 2022 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).

* * * *

(viii) For monitors of VVT systems with discrete operating states (e.g., two step valve train systems) that are not required to detect a malfunction prior to exceeding the threshold but are required to detect all failures that exceed the 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 cannot detect and illuminate the MIL for a malfunction of the 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) and (viii) 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~~ section (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.

* * * *

(xiii) The degree to which the identified nonconformance differs from a deficiency that was granted by ARB (in accordance with Cal. Code Regs., title 13, section 1971.1(k)) based on the details disclosed by the manufacturer at the time of certification.

(xiv) The degree to which a calibration error or other calibration feature adversely impacts the accuracy of the NOx mass values that are calculated by the OBD system under Cal. Code Regs., title 13, section 1971.1(h)(4.2) and (h)(5.3).

* * * *

(6) *Notice to Manufacturer for an Ordered Remedial Action*.

* * * *

(B) For remedial actions other than the assessment of monetary penalties, the notice must:

* * * *

(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~~Emissions Certification and Compliance Division , ~~9528~~ 9480 Telstar Avenue, Suite 4, El

Monte, California 91731 (or the mailing address indicated in the notice), within the time limit specified in the notice. The Executive Officer may grant the manufacturer an extension of time for good cause.

* * * *

(e) *Requirements for Implementing Remedial Actions.*

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(6) *Record Keeping and Reporting Requirements*.

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(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~~Emissions Certification and Compliance Division, ~~9528~~ 9480 Telstar Avenue, Suite 4, El Monte, California 91731 (or the mailing address indicated in the notice in section (d)(6)). For each recall campaign, the quarterly report must contain the following:

* * * *

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