Attachment D

STAFF'S SUGGESTED MODIFICATIONS TO PROPOSED REGULATIONS

Set forth below are additional proposed modifications to sections 1968.2, and 1968.5, title 13, CCR that will be presented to the Board for adoption on September 28, 2006. The original proposed modifications that were made available as part of the 45-Day Notice on August 11, 2006 are shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. The additional proposed modifications made available at the Board Hearing on September 28, 2006 are shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions.

Various portions of the regulations that are not modified by the staff's suggested modifications are omitted from the text shown and indicated by:

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1968.2. Malfunction and Diagnostic System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II)

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(c) *DEFINITIONS*

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"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) 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 which results in an equal or larger cumulative total by the end of the last year of the scheduled phase-in~~; however,~~ and results in all vehicles ~~shall~~ complying with the respective requirements subject to the phase-in ~~within~~ one or two model years following the last year of the scheduled phase-in.

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

~~The Executive Officer shall also consider acceptable any alternate phase-in which results in an equal or larger cumulative total by the end of the last year of the scheduled phase-in and results in all vehicles complying with the respective requirements subject to the phase-in within two model years following the last year of the scheduled phase-in; however,~~ For alternate phase-in schedules resulting in all vehicles complying two model years following the last year of the scheduled phase-in, the compliance volume calculation shall be calculated as described directly above and shall also include a negative calculation for vehicles not complying until one or two model years following the last year of the

scheduled phase-in. The negative calculation shall be calculated by multiplying the percent of vehicles not meeting the new requirements in the final year of the phase-in by negative one and the percent of vehicles not meeting the new requirements in the one year after the final year of the phase-in by negative two (e.g., ~~in the previous example,~~ 10 percent not complying in the final year of the scheduled phase-in would be calculated as (10*(-1 years)) and 5 percent not complying in the one year after the final year of the phase-in would be calculated as (5*(-2 years))~~ and added to the cumulative total~~). The final compliance volume calculation is the sum of the original compliance volume calculation and the negative calculation. As an example, for a 30/60/100 percent scheduled phase-in for the 2010-2012 model year period (for a cumulative total of 310), if the manufacturer's planned alternate phase-in schedule is 40/70/80/90/100 percent for the 2010-2014 model year period, the final compliance volume calculation is (40*3 years) + (70*2 years) + (80*1 year) + (20*(-1 year)) + (10*(-2 years)) = 300, which is less than 310 and thus not an acceptable alternate phase-in schedule.

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"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 are approved by the Executive Officer in accordance with section (d)(3.1.1), and sampling of the signal used for monitoring occurs at a rate no less than two samples per second. If for~~equal to the rate used for~~ ~~engine~~ control purposes, a computer input component is sampled less frequently, the signal of the component may instead be evaluated each time sampling occurs.

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(d) *GENERAL REQUIREMENTS*

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(2) MIL and Fault Code Requirements.

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(2.2) MIL Illumination and Fault Code Storage Protocol.

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

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

~~automatically returns to normal at the beginning of the following driving cycle)~~, the OBD II system may wait and illuminate the MIL only if the condition causing the default or "limp home" mode of operation is again ~~entered~~ detected before the end of the next driving cycle 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.

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(3) Monitoring Conditions.

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(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:

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(D) For introductory years:

(i) through the 2007 model year, for the first ~~two~~ 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~~5~~ model years for vehicles first certified in the 2004 model year and to the 2007, 2008, and 2009~~8~~ 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.

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(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:

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(6) Malfunction Criteria Determination for Diesel Vehicles.

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

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

(6.3.1) ~~,~~the manufacturer shall conduct in-use enforcement testing for compliance with the tailpipe emission standards in accordance with title 13, CCR sections 2136 through 2140. Within six months after OBD II certification of a test group, the manufacturer shall submit a plan for conducting the testing to the Executive Officer for approval. The Executive Officer shall approve the plan upon determining that the testing will be done in accordance with the procedures used by ARB when conducting such testing, that the plan will allow for a valid sample of at least 10 vehicles in the mileage range of 30,000 to 40,000 miles for

comparison to the FTP intermediate (e.g., 50,000 mile) useful life standard and at least 10 vehicles in the mileage range of 90,000 to 100,000 miles for comparison to the FTP full useful life standard, and that copies of all records and data collected during the program will be provided to ARB. The Executive Officer shall also approve other plans upon determining that the plan provides equivalent assurance in verifying vehicles are meeting the tailpipe emission standards within the useful life. The Executive Officer may use the submitted data in lieu of or in addition to data collected pursuant to title 13, CCR section 2139 for purposes of the notification and use of test results described in title 13, CCR section 2140; and.

(6.3.2) the certification shall be conditioned upon the manufacturer agreeing that, for any test group(s) determined to be noncompliant in accordance with title 13, CCR section 2140 or title 13, CCR section 1968.5, the Executive Officer shall determine the excess emissions caused by the noncompliance and the manufacturer shall fund a program(s) that will offset any such excess emissions.

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(e) *MONITORING REQUIREMENTS FOR GASOLINE/SPARK-IGNITED ENGINES*

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(3) MISFIRE MONITORING

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(3.3) Monitoring Conditions:

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

(A) From no later than the end of the second crankshaft revolution after engine start,

(B) While under positive torque conditions ~~D~~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.

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(6) FUEL SYSTEM MONITORING

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(6.2) Malfunction Criteria:

(6.2.1) The OBD II system shall detect a malfunction of the fuel delivery system ~~(including feedback control based on a secondary oxygen sensor)~~ when:

(A) ~~t~~The fuel delivery system is unable to maintain a vehicle's emissions at or below 1.5 times any of the applicable FTP standards; or

(B) If equipped, the feedback control based on a secondary oxygen or exhaust gas sensor is unable to maintain a vehicle's emissions (except as a result of a malfunction specified in section (e)(6.2.1)(C)) at or below 1.5 times any of the applicable FTP standards; or

(C) Except as required in section (e)(6.2.6), for 25 percent of all 2011 model year vehicles, 50 percent of all 2012 model year vehicles, 75 percent of all 2013 model year vehicles, and 100 percent of all 2014 model year vehicles, an air-fuel ratio cylinder imbalance (e.g., the air-fuel ratio in one or more cylinders is different than the other cylinders due to a cylinder specific malfunction such as an intake manifold leak at a particular cylinder, fuel injector problem, an individual cylinder EGR runner flow delivery problem, an individual variable cam lift malfunction such that an individual cylinder is operating on the wrong cam lift profile, or other similar problems) occurs in one or more cylinders such that the fuel delivery system is unable to maintain a vehicle's emissions at or below: 4.0 times the applicable FTP standards for PC/LDT SULEV II vehicles and 3.0 times the applicable FTP standards for all other vehicles for the 2011 through 2013 model years ~~vehicles~~; and 1.5 times the applicable FTP standards for all 2014 and subsequent model year vehicles. In lieu of using 1.5 times the applicable FTP standards for all 2014 model year applications, for the 2014 model year only, a manufacturer may continue to use 4.0 times the applicable FTP standards for PC/LDT SULEV II vehicles and 3.0 times the applicable FTP standards for ~~any~~other applications previously certified in the 2011, 2012, or 2013 model year to 4.0 times or 3.0 times the applicable FTP standards and carried over to the 2014 model year.

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(6.4) MIL Illumination and Fault Code Storage: For malfunctions described under section (6.2.1)(C) (i.e., air-fuel ratio cylinder imbalance malfunctions), general requirements for MIL illumination and fault code storage are set forth in section (d)(2). For all other fuel system malfunctions, the MIL illumination and fault code storage requirements are set forth in sections (e)(6.4.1) through (6.4.6) below.

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(7) ~~OXYGEN~~ EXHAUST GAS SENSOR MONITORING

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(7.2) Malfunction Criteria:

(7.2.1) Primary Sensors:

(A) The OBD II system shall detect a malfunction prior to any failure or deterioration of the oxygen sensor voltage, response rate, amplitude, or other characteristic(s) (including drift or bias corrected for by secondary sensors) that would cause a vehicle's emissions to exceed 1.5 times any of the applicable FTP standards. For response rate (see section (c)), the OBD II system shall detect asymmetric malfunctions (i.e., malfunctions that primarily affect only the lean-to-rich response rate or only the rich-to-lean response rate) and symmetric malfunctions (i.e., malfunctions that affect both the lean-to-rich and rich-to-lean response rates). As defined in section (c), response rate includes delays in the sensor to initially react to a change in exhaust gas composition as well as delays during the transition from a rich-to-lean (or lean-to-rich) sensor output. For 25 percent of 20~~09~~10, 50 percent of 201~~0~~1, and 100 percent of 201~~1~~2 and subsequent model year vehicles, the manufacturer shall submit data and/or engineering analysis to demonstrate that the calibration method used ensures proper detection of all symmetric and asymmetric response rate malfunctions as part of the certification application.

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(7.3) Monitoring Conditions:

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(7.3.2) Secondary Sensors

(A) Manufacturers shall define monitoring conditions for malfunctions identified in sections (e)(7.2.2)(A)~~,~~ ~~(B),~~ and (C) (e.g., proper sensor activity) in accordance with sections (d)(3.1) and (d)(3.2) (i.e., minimum ratio requirements). For all 2010 and subsequent model year vehicles meeting the monitoring requirements of section (e)(7.2.2)(C)(i) or (ii), for purposes of tracking and reporting as required in section (d)(3.2.2), all monitors used to detect malfunctions identified in sections (e)(7.2.2)(A) and (C) shall be tracked separately but reported as a single set of values as specified in section (d)(5.2.2).

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(11) COLD START EMISSION REDUCTION STRATEGY MONITORING

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(11.2.2) For 25 percent of 2010, 50 percent of 2011, and 100 percent of 2012 and subsequent model year vehicles, the OBD II system shall, to the extent feasible, detect a malfunction if either of the following occurs:

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(17) EXCEPTIONS TO MONITORING REQUIREMENTS

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(17.8) Whenever the requirements in section (e) of this regulation require monitoring "to the extent feasible", the manufacturer shall submit its proposed monitor(s) for Executive Officer approval. The Executive Officer shall approve the proposal upon determining that the proposed monitor(s) meets the criteria of "to the extent feasible" by considering the best available monitoring technology to the extent that it is known or should have been known to the manufacturer and given the limitations of the manufacturer's existing hardware, the extent and degree to which the monitoring requirements are met in full, the limitations of monitoring necessary to prevent significant errors of commission and omission, and the extent to which the manufacturer has considered and pursued alternative monitoring concepts to meet the requirements in full. The manufacturer's consideration and pursuit of alternative monitoring concepts shall include evaluation of other modifications to the proposed monitor(s), the monitored components themselves, and other monitors that use the monitored components (e.g., altering other monitors to lessen the sensitivity and reliance on the component or characteristic of the component subject to the proposed monitor(s)).

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(f) *MONITORING REQUIREMENTS FOR DIESEL/COMPRESSION-IGNITION ENGINES*

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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:

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(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 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 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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(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:

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(B) For medium-duty vehicles (including MDPVs) certified to an engine dynamometer tailpipe emission standard:

(i) 1.5 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 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 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 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 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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(17) EXCEPTIONS TO MONITORING REQUIREMENTS

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(17.1.5) For 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 ~~a~~ manufacturer-proposed medium-duty ~~-~~chassis dynamometer-based malfunction ~~criterion that is equivalent to that~~ 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 ~~equivalent~~ malfunction criterion, ~~and~~

(B) ~~that~~ the ~~criterion~~ 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 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.

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(17.7) Whenever the requirements in section (f) of this regulation require monitoring "to the extent feasible", the manufacturer shall submit its proposed monitor(s) for Executive Officer approval. The Executive Officer shall approve the proposal upon determining that the proposed monitor(s) meets the criteria of "to the extent feasible" by considering the best available monitoring technology to the extent that it is known or should have been known to the manufacturer and given the limitations of the manufacturer's existing hardware, the extent and degree to which the monitoring requirements are met in full, the limitations of the monitoring necessary to prevent significant errors of commission and omission, and the extent to which the manufacturer has considered and pursued alternative monitoring concepts to meet the requirements in full. The manufacturer's consideration and pursuit of alternative monitoring concepts shall include evaluation of other modifications to the proposed monitor(s), the monitored components themselves, and other

monitors that use the monitored components (e.g., altering other monitors to lessen the sensitivity and reliance on the component or characteristic of the component subject to the proposed monitor(s)).

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(g) *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~~:~~. Upon request by a manufacturer, the Executive Officer may approve use of a subsequently revised finalized version of any of the SAE and ISO documents listed below if use of the revised document does not adversely affect the purposes, intent, and effectiveness of this regulation.

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(1.10) SAE J1939 ~~APR00~~March 2005 -"Recommended Practice for a Serial Control and Communications Vehicle Network" and the associated subparts included in SAE HS-1939, "Truck and Bus Control and Communications Network Standards Manual", 200~~1~~5 Edition (SAE J1939).

(1.10.1) SAE J1939-73 "Application Layers - Diagnostics", September 2006.

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(4) Required Emission Related Functions:

The following standardized functions shall be implemented in accordance with the specifications in SAE J1979 to allow for access to the required information by a scan tool meeting SAE J1978 specifications:

(4.1) Readiness Status: In accordance with SAE J1979 specifications, the OBD II system shall indicate "complete" or "not complete" since the fault memory was last cleared for each of the installed monitored components and systems identified in sections (e)(1) through (e)(8), ~~(e)(13),~~ (e)(15), (f)(1) through (f)(4), (f)(6), (f)(8), and (f)(15) for all vehicles, (f)(5), (f)(7), and (f)(9) ~~and, additionally~~ for 2010 and subsequent model year diesel vehicles, ~~(f)(5), (f)(7), (f)(9),~~ and (e)(13) and (f)(13) for vehicles meeting the VVT monitoring test results requirements specified in section (g)(4.5.4)(C) since the fault memory was last cleared. All components or systems that are monitored continuously shall always indicate "complete". Those components or systems that are not subject to continuous monitoring shall immediately indicate "complete" upon the respective diagnostic(s) being fully executed and determining that the component or system is not malfunctioning. A component or system shall also indicate "complete" if after the requisite number of decisions necessary for determining MIL status have been fully executed, the monitor indicates a malfunction for the component or system. The status for each of the monitored components or systems shall indicate "not complete" whenever fault memory has been cleared or erased by a means other than that allowed

in section (d)(2). Normal vehicle shut down (i.e., key off, engine off) may not cause the status to indicate “not complete”.

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(4.5) Test Results

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(4.5.4) Additionally, for vehicles using ISO 15765-4 (see section ~~(f)~~(g)(3.4)) as the communication protocol:

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(E) All test results and test limits shall always be reported and the test results shall be stored until updated by a more recent valid test result or the fault memory of the OBD II system computer is cleared. For monitors with multiple pass/fail criteria (e.g., a purge flow diagnostic that can pass upon seeing a rich shift, lean shift, or engine speed change), on 30 percent of 2009, 60 percent of 2010, and 100 percent of 2011 and subsequent model year vehicles, only the test results used in the most recent decision shall be reported with valid results and limits while test results not used in the most recent decision shall report values of zero for the test results and limits (e.g., a purge flow monitoring event that passed based on seeing a rich shift shall report the results and the limits of the rich shift test and shall report values of zero for the results and limits of the lean shift and engine speed change tests).

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(4.7) Software Calibration Verification Number

(4.7.1) All 2005[2] and subsequent model year vehicles shall use an algorithm to calculate a calibration verification number (CVN) that verifies the on-board computer software integrity in diagnostic or emission critical electronically reprogrammable powertrain control units. The CVN shall be made available through the standardized data link connector in accordance with the SAE J1979 specifications. The CVN shall be capable of being used to determine if the emission-related software and/or calibration data are valid and applicable for that vehicle and CAL ID. For 50 percent of 2010 and 100 percent of 2011 and subsequent model year vehicles, one CVN shall be made available for each CAL ID made available and each CVN shall be output to a generic scan tool in the same order as the CAL IDs are output to the scan tool to allow the scan tool to match each CVN to the corresponding CAL ID.

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(4.9) ECU Name: ~~For all 2010 and subsequent model year vehicles, t~~The name of each electronic control unit that responds to an SAE J1978 scan tool with a unique address or identifier shall be communicated in a standardized format

in accordance with SAE J1979 (i.e., ECUNAME in Service/Mode $09, InfoType $0A). Except as specified for vehicles with more than one engine control unit, communication of the ECU name in a standardized format is required on 50 percent of 2010, 75 percent of 2011, and 100 percent of 2012 and subsequent model year vehicles. For vehicles with more than one engine control unit (e.g., a 12 cylinder engine with two engine control units, each of which controls six cylinders), communication of the ECU name is required on all 2010 and subsequent model year vehicles.

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(h) *MONITORING SYSTEM DEMONSTRATION REQUIREMENTS FOR CERTIFICATION*

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(5) Testing Protocol:

(5.1) Preconditioning: The manufacturer shall use an applicable ~~FTP~~ cycle (FTP, SET, or Unified Cycle~~, if approved~~) for preconditioning test vehicles prior to conducting each of the above emission tests. Upon determining that a manufacturer has provided data and/or an engineering evaluation that demonstrate that additional preconditioning is necessary to stabilize the emission control system, the Executive Officer shall allow the manufacturer to perform a single additional preconditioning cycle, identical to the initial preconditioning cycle, or a Federal Highway Fuel Economy Driving Cycle, following a ten minute (20 minutes for medium duty engines certified on an engine dynamometer) hot soak after the initial preconditioning cycle. The manufacturer may not require the test vehicle to be cold soaked prior to conducting preconditioning cycles in order for the monitoring system testing to be successful.

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(5.2.3) The test vehicle shall then be operated over the ~~cold start and hot start exhaust tests of the~~ applicable exhaust emission ~~FTP~~ test. If monitoring is designed to run during the Unified Cycle~~ is approved~~, a second Unified Cycle may be conducted prior to the ~~FTP~~ exhaust emission test.

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(k) *DEFICIENCIES*

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(7) For 2007 through 2009 model year light-duty and 2007 through 2012 medium-duty diesel vehicles, in cases where one or more of the deficiencies is for the aftertreatment monitoring requirements of sections (f)(1), (2), (8), or (9) and the deficient monitor is properly able to detect all malfunctions prior to emissions exceeding twice the required monitor threshold (e.g., before emissions exceed 10 times the standard for NMHC if the threshold is 5.0 times the standard for NMHC), the specified fines shall apply to the fourth and subsequently identified deficiencies in lieu of the third and subsequently identified deficiencies. If none of

the deficiencies are for the requirements of sections (f)(1), (2), (8), or (9) or if the deficient aftertreatment monitor exceeds twice the required monitor threshold, the specified fines shall apply to the third and subsequently identified deficiencies. In all cases, the exception that fines shall apply to all monitoring system deficiencies wherein a required monitoring strategy is completely absent from the OBD system still applies.

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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.

(b) *Testing Procedures*

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(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:

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(B) OBD II Ratio Testing.
(i) For monitors on 2004 through ~~2008~~ 2014 model year vehicles certified to a ratio of 0.100 in accordance with title 13, CCR section 1968.2(d)(3.2.1)(D) and on 2007 through 2012 model year vehicles for the first three years the vehicles are certified to the in-use performance ratio monitoring requirements of sections (d)(3.2)(A) through (C), 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.

(ii) For monitors on ~~2006~~ 2007 and subsequent model year vehicles that have been certified for more than three years to the ratios in title 13, CCR sections 1968.2(d)(3.2.1)(A) through (C), the data collected from the vehicles in the test sample indicate either that 66.0 percent or more of the vehicles in the test sample group have an in-use monitor performance ratio of less than the required minimum ratio defined in title 13, CCR section 1968.2(d)(3.2.1) for the same monitor or that the average in-use monitor performance ratio for one or more of the monitors in the motor vehicle class is less than the required minimum ratio defined in title 13, CCR section 1968.2(d)(3.2.1) as defined by determining the average in-use monitor performance ratio for one or more of the monitors in the test sample group is less than:

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