Attachment A

Proposed 15-Day Modified Regulation Order,
OBD II Regulations
Title 13, California Code of Regulations, Sections 1968.2 and 1968.5

Proposed Revisions to the On-Board Diagnostic System Requirements and Associated Enforcement Provisions for Passenger Cars, Light-Duty Trucks, Medium-Duty Vehicles and Engines, and Heavy-Duty Engines

Attachment A

Proposed 15-Day Modified Regulation Order

This attachment shows the modifications to the originally proposed regulatory language. The originally proposed regulatory language is shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. The suggested modifications to the proposed regulation are shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions. Text that is both ~~single underlined and double strikeout~~ is text that staff proposed to add during the 45-day public notice period but later retracted as part of this 15-day public notice period. Text that is both ~~double underlined and single strikeout~~ is text that staff proposed to delete during the 45-day notice period but later retracted as part of this 15-day notice period. Various portions of the regulations that are not modified by the proposed amendments are omitted from the text shown and indicated by " * * * * ".

Amend sections 1968.2 and 1968.5, title 13, California Code of Regulation (CCR), to read as follows:

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

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(c) *Definitions*.

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"*Auxiliary Emission Control Device (AECD)*" refers to any approved AECD (as defined by 40 CFR 86.082-2 and 86.094-2 as they existed on January 25, 2018 and incorporated by reference herein).

"*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 meets (1) or (2): (1) the need for the AECD is justified in terms of protecting the vehicle against damage or accident, or (2) for 2024 and subsequent model year medium-duty vehicles certified to an engine dynamometer tailpipe emission standard and 2026 and subsequent model year passenger cars, light-duty trucks, and medium-duty vehicles certified to a chassis dynamometer tailpipe emission standard, is related to adaptation or learning (e.g., selective catalytic reduction (SCR) system adaptation). For medium-duty vehicles certified to an engine dynamometer tailpipe emission standard, an AECD that is certified as an NTE deficiency shall not be considered an EI-AECD. An AECD that does not sense, measure, or calculate any

parameter or command or trigger any action, algorithm, or alternate strategy shall not be considered an EI-AECD. An AECD that is activated solely due to any of the following conditions shall not be considered an EI-AECD: (1) operation of the vehicle above 8000 feet in elevation; (2) ambient temperature; (3) when the engine is warming up and is not reactivated once the engine has warmed up in the same driving cycle; (4) failure detection (storage of a fault code) by the OBD system; (5) execution of an OBD monitor; or (6) execution of an infrequent regeneration event.

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"Calculated load value" refers to an indication of the percent engine capacity that is being used and is defined in SAE International (SAE) J1979 "E/E Diagnostic Test Modes", (SAE J1979), incorporated by reference (section (g)(1.4)[1]), or SAE J1979-2 "E/E Diagnostic Test Modes - OBDonUDS", incorporated by reference (section (g)(~~1.4.2~~1.14)). For diesel applications, in lieu of the definitions in SAE J1979 and SAE J1979-2, the calculated load value may alternatively be determined by the ratio of current engine torque to maximum engine torque at current engine speed as defined by suspect parameter number (SPN) 92 of SAE J1939 "Serial Control and Communications Heavy Duty Vehicle Network – Top Level Document" (SAE J1939), incorporated by reference.

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"*Charge sustaining target SOC value*" means the nominal target SOC that the control system is designed to maintain, on average, when operating as a conventional hybrid vehicle after depletion of any grid energy in the battery.

"*Cold start emission reduction strategy (CSERS) monitoring conditions*~~*cold start criteria*~~" is defined as a set of criteria that meet all the following conditions in a single driving cycle:

(1) at least 6 hours of engine-off time before the initial combustion engine start for non-hybrid vehicles, or the continuous time the vehicle is not in a state of "propulsion system active" during the period immediately preceding the start of "propulsion system active" is at least 6 hours for hybrid vehicles,

(2) the ambient temperature is greater than or equal to 20 ~~19.4~~ degrees Fahrenheit (or -6.7 ~~7~~ degrees Celsius), and

(3) the engine coolant temperature is less than or equal to 27 degrees Fahrenheit (or 15 degrees Celsius) higher than the ambient temperature.

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"Engine stall" is defined as a drop in the engine speed to zero revolutions-per-minute (rpm) at idle. For vehicles that employ engine shutoff strategies (e.g., hybrid vehicles or vehicles with a start-stop system that shut off the engine at idle), engine

[1] Unless otherwise noted, all section references refer to section 1968.2 of title 13, CCR.

states where the engine speed is zero rpm due to the vehicle commanding the engine to shut off are not considered "engine stalls."

"*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.

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

"*FTP cycle*". For passenger vehicles, light duty trucks, and medium duty vehicles certified on a chassis dynamometer, FTP cycle refers to the driving schedule in Code of Federal Regulations (CFR) 40, Appendix 1, Part 86, section (a) entitled, "EPA Urban Dynamometer Driving Schedule for Light Duty Vehicles and Light Duty Trucks~~.~~" (i.e., the FTP-72 cycle or LA-4 cycle) as it existed on July 8, 2019 and incorporated by reference herein. For medium duty engines certified on an engine dynamometer, FTP cycle refers to the engine dynamometer schedule in CFR 40, Appendix 1, Part 86, section (f)(1), entitled, "EPA Engine Dynamometer Schedule for Heavy Duty Otto Cycle Engines," or section (f)(2), entitled, "EPA Engine Dynamometer Schedule for Heavy Duty Diesel Engines~~.~~," as those sections existed on January 25, 2018 and incorporated by reference herein.

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"Field reprogrammable" means a control unit or device is capable of supporting a manufacturer service procedure intended to be executed in a dealership or other vehicle service environment (e.g., by over-the-air reprogramming) that results in the downloading of new software and/or calibration data into the control unit or device.

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(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.

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(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).

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(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~~FG), the minimum acceptable in-use monitor performance ratio is:

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(A) 0.260 for secondary air system monitors and other cold start related monitors (except for the diesel cold start emission reduction strategy catalyst warm-up strategy monitor in section (f)(12.2.2) and the gasoline cold start emission reduction strategy cold start catalyst heating monitor in section (e)(11.2.3)) utilizing a denominator incremented in accordance with section (d)(4.3.2)(E) or (d)(4.3.2)(N);

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(D) 0.100 for the diesel cold start emission reduction strategy catalyst warm-up strategy monitor in section (f)(12.2.2);

(E) 0.500 for the gasoline cold start emission reduction strategy cold start catalyst heating monitor in section (e)(11.2.3);

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

(~~D~~FG) For interim years:

(i) through the 2007 model year, for the first three years a vehicle is

certified to the in-use performance ratio monitoring requirements of section (d)(3.2), 0.100 for all monitors specified in sections (d)(3.2.1)(A) through (C) and (~~E~~F) 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;

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(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~~~~E~~F) above;

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

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(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:

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

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

(ii) Cold Start Emission Reduction Strategy (sections (e)(11.2.1), (e)(11.2.2), and (f)(12.2.1))

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

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

* * * *

(N) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator for the cold start emission reduction strategy catalyst warm-up strategy monitor (section (f)(12.2.2)) and the feature/component monitors (sections (e)(11.2.4) and (f)(12.2.3)) shall be incremented if and

only if the CSERS monitoring conditions ~~cold start criteria~~ (as defined in section (c)) have been met.

(O) In addition to the requirements of section (d)(4.3.2)(B) above, the denominator for the cold start emission reduction strategy cold start catalyst heating monitor (section (e)(11.2.3)) shall be incremented if and only if the CSERS monitoring conditions (as defined in section (c)) have been met and idle operation in park or neutral during the first 30 seconds after engine start is greater than or equal to 10 seconds.

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(4.5) Disablement of Numerators and Denominators

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(4.5.5) For 30 percent of 2019, 60 percent of 2020, and 100 percent of 2021 and subsequent model year vehicles, within ten seconds of a malfunction being detected for ~~of~~ any component used to determine if any of the criteria in sections (d)(4.3.2)(C) through (J)~~,~~ ~~and~~ (L)~~, and (M)~~ through (O) are satisfied (e.g., engine cold start), the OBD II system shall disable further incrementing of the corresponding numerator and denominator for each monitor that is affected. When the malfunction is no longer detected (i.e., the pending code is erased through self-clearing or through a scan tool command), incrementing of the corresponding numerators and denominators shall resume within ten seconds.

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

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(11) *Cold Start Emission Reduction Strategy Monitoring*

(11.1) Requirement:

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(11.1.3) For an element~~/~~, feature, or 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) (e.g., idle control system), 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:

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(11.2.2) For 25 percent of 2010, 50 percent of 2011, and 100 percent of 2012 ~~and subsequent through 2025~~ model year vehicles, the OBD II system

shall, to the extent feasible, detect a malfunction if either of the following occurs:

(A) For vehicles not included in the phase-in section (e)(11.2.4)(A), a~~A~~ny 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/component 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) For vehicles not included in the phase-in section (e)(11.2.3), a~~A~~ny failure or deterioration of the cold start emission reduction control strategy while the cold start strategy is active that would cause a vehicle's emissions to be equal to or above the emission thresholds in sections (e)(11.2.2)(B)(i) or (ii) below. For this requirement, the OBD II system shall either monitor 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 vehicle emissions to exceed the emission thresholds in sections (e)(11.2.2)(B)(i) or (ii) below.

(i) For non-Low Emission Vehicle III applications, the threshold is 1.5 times the applicable FTP standards.

(ii) For Low Emission Vehicle III applications, the thresholds are any of the applicable emission thresholds set forth in Table 1 in the beginning of section (e).

(11.2.3) Cold Start Catalyst Heating Monitor: For ~~2026~~ 20 percent of 2026, 50 percent of 2027, and 100 percent of 2028 and subsequent model year vehicles utilizing catalyst heating through combustion inefficiency during idle in park or neutral at cold start, except as provided for in section (e)(11.2.3)(C), the OBD II system shall monitor the commanded (or delivered, if feasible) extra cold start exhaust heat energy directed to the catalyst during idle in park or neutral. The monitor shall begin when the engine starts and the conditions of the CSERS monitoring conditions ~~cold start criteria~~ (as defined in section (c)) are met, and shall continue no

longer than 30 seconds after engine start. Monitoring is not required if the idle operation in park or neutral during the first 30 seconds after engine start is less than 10 seconds.

(A) The OBD II system shall detect a malfunction of the extra cold start exhaust heat energy delivery to the catalyst when any of the following occurs:

(i) The heat energy delivery fails to achieve at least 20 percent of the additional element commanded by the cold start strategy (e.g., if an additional 20 degrees of spark retard are requested to provide additional heat to the catalyst during nominal cold starts on a properly functioning vehicle, the monitor must detect a malfunction if the strategy fails to command at least 4 degrees of additional spark retard). The additional element commanded by the cold start strategy shall be determined by comparing the commanded value of the element in a properly functioning vehicle during ~~an FTP test~~ cold start with the commanded value of the element in a properly functioning fully warmed-up vehicle. A fully warmed-up vehicle shall be defined by driving the vehicle until the engine coolant and/or block temperature achieves the targeted regulated temperature for at least 2 minutes prior to shutting the engine off and then restarting the engine within 60 seconds of shut off.

(ii) The malfunction causes a vehicle's emissions to be equal to or above any of the applicable emission thresholds set forth in Table 1 in the beginning of section (e).

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(C) Vehicles are exempt from the Cold Start Catalyst Heating monitoring requirements in section (e)(11.2.3)(A) if:

(i) Disabling the CSERS would not cause the vehicle to exceed the full useful life emission standards through the demonstration of a cold start FTP test cycle with the CSERS fully disabled (i.e., with the system configured to the fully warmed-up values as if the vehicle was shut off after the engine coolant and/or block temperature achieve the targeted regulated temperature for at least 2 minutes and immediately restarted within 60 seconds), or

(ii) The vehicle does not use increased air, increased fuel flow, and/or combustion efficiency degradation to accelerate aftertreatment heating to reduce cold start emissions (e.g., catalyst is only electrically-heated).

(D) For purposes of meeting the monitoring exemption criterion in section (e)(11.2.3)(C)(i) on vehicles that utilize both electrically heated catalysts monitored in accordance with section (e)(2) and accelerated catalyst heating based on engine operating conditions, the manufacturer is not

required to disable the electrically heated catalyst during the testing but may not increase electric heating beyond the levels of a properly functioning emission control system.

(11.2.4) Individual Feature/Component Monitoring:

(A) For ~~2026~~ 20 percent of 2026, 50 percent of 2027, and 100 percent of 2028 and subsequent model year vehicles, the OBD II system shall detect a malfunction if any of the following components and features does not properly respond to the commanded action while the CSERS monitoring conditions ~~cold start criteria~~ (as defined in section (c)) are met:

(i) Fuel Pressure;

(ii) Idle Speed Control;

(iii) Variable Valve Timing/Lift;

(iv) Split/Multiple Injections (missing pulses);

(v) Charge motion control, intake runner, or swirl control valves; or

(vi) Electronic wastegate position

(B) If the setpoint of a component/feature is different between cold start conditions and non-cold start conditions, for purposes of section (e)(11.2.4)(A), "properly respond" is defined as when the feature/component responds:

(i) by a robustly detectable amount; ~~and~~

(ii) in the direction of the desired command; and

(iii) above and beyond what the feature/component would achieve on start-up without the cold start strategy active (e.g., if the cold start strategy commands a higher fuel pressure~~idle engine speed~~, a fault must be detected if there is no detectable amount of fuel pressure~~engine speed~~ increase above what the system would achieve without the cold start strategy active).

(C) For the idle speed control monitor in section (e)(11.2.4)(A)(ii), to meet the requirements in sections (e)(11.2.4)(A) and (B), the OBD II system shall detect a malfunction of the idle speed control when any of the following occurs while the CSERS monitoring conditions (as defined in section (c)) are met:

(i) The idle speed control system cannot achieve the target idle speed within 300 rpm below the target speed, or

(ii) The idle speed control system cannot achieve the target idle speed within the smallest engine speed tolerance range required by the OBD II system to enable any other monitor (e.g., the Cold Start Catalyst Heating monitor (section (e)(11.2.3)).

(~~C~~D) For features/components where feedback from a sensor is not available to monitor for proper response, the monitor may verify the final commanded action in lieu of verifying actual delivered action.

(11.2.5) For 2023 through 2025 model year vehicles, the manufacturer may meet the requirements in sections (e)(11.2.3) and (e)(11.2.4) above in lieu of meeting the requirements in section (e)(11.2.2). For non-Low Emission Vehicle III applications, the emission threshold for the requirement in section (e)(11.2.3)(A)(ii) is 1.5 times the applicable FTP standards.

(11.2.6) For the phase-in schedules described in sections (e)(11.2.3) and (e)(11.2.4)(A) above, the manufacturer 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 2028 and subsequent model year vehicles shall comply with the requirements.

(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).

(11.3.1) For the Cold Start Catalyst Heating monitor (section (e)(11.2.3), manufacturers may request Executive Officer approval to disable monitoring required under section (e)(11.2.3)(A) during certain conditions (e.g., low ambient temperatures) where robust detection of malfunctions is not possible (i.e., to avoid false passes and false indications of malfunctions). The Executive Officer shall approve the request upon determining that the manufacturer has submitted data or an engineering evaluation which demonstrate that a properly operating system cannot be distinguished from a malfunctioning system and that the disablement is limited only to those conditions in which it is technically necessary when using the best available monitoring technologies.

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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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(B) The idle speed control system shall be monitored for proper functional response to computer commands. For strategies based on deviation from target idle speed, a malfunction shall be detected when ~~either~~any of the following conditions occur:

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(iii) For 20 percent of 2026, 50 percent of 2027, and 100 percent of 2028 and subsequent model year vehicles without manual transmissions (i.e., any transmission that relies on the vehicle operator to independently control clutch engagement/disengagement and gear selection), an engine stall (as defined in section (c)) occurs ~~(where an "engine stall" refers to a drop in the engine revolutions-per-minute (rpm) to zero rpm)~~ within 20 seconds after engine start at the beginning of a driving cycle ~~when fuel level is 15 percent or more of the nominal capacity of the fuel tank~~.

a. Manufacturers are required to store different fault codes for stalls detected while the CSERS monitoring conditions ~~cold start criteria~~ (as defined in section (c)) are met and stalls detected while the CSERS monitoring conditions ~~cold start criteria~~ are not met.

b. The manufacturer may use an alternate phase-in schedule as defined in section (c) in lieu of the required phase-in schedule for the engine stall monitor in section (e)(15.2.2)(B)(iii) if the alternate phase-in schedule provides for equivalent compliance volume as defined in section (c) with the exception that 100 percent of 2028 and subsequent model year vehicles shall comply with the requirements.

c. Monitoring is not required when the fuel level is equal to or less than 15 percent of the nominal capacity of the fuel tank.

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(f) *Monitoring Requirements for Diesel/Compression-Ignition Engines*.

For non-Low Emission Vehicle III applications (e.g., Low Emission Vehicle applications and Low Emission Vehicle II applications), the emission thresholds are specified in the monitoring sections in section (f) below. For Low Emission Vehicle III applications, wherever an emission threshold for a malfunction on a diagnostic is required in section (f), the emission thresholds shall be set in accordance with Table 2 and Table 3 below:

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Table 3

LEV-III OBD II Diesel PM Filter Filtering Performance Monitor Threshold					
Exhaust Standards		**PM Filter Filtering Performance Monitor Threshold**			
Vehicle Type	**Vehicle Emission Category**	**NMOG+ NOx Mult.** [1]	**CO Mult.** [1]	**PM Mult.**	**PM THD (mg/mi)**
Passenger Cars, Light-Duty Trucks, and Chassis Certified MDPVs	LEV160	1.50	1.50	N/A	Up to and including the 2025 model year: 17.50 Option 1[5]: 2026-~~2029~~2028MY: 17.50 2029+MY: 10.00 Option 2[5]: 2026+MY: 10.00
	ULEV125				
	ULEV70	2.00			
	ULEV50				
	SULEV30	2.50	2.50		
	SULEV20[4]				
2016MY-2018MY Chassis Certified MDVs (except MDPVs)	All MDV Emission Categories	N/A	N/A	1.75[2]	17.50[3]
2019+MY Chassis Certified MDVs (except MDPVs) 8,500-10,000 lbs. GVWR	All MDV Emission Categories	1.50	1.50	1.50[2]	~~Pre-2029MY~~Up to and including the 2028MY: 17.50[3] 2029+MY: 14.00
2019+MY Chassis Certified MDVs (except MDPVs) 10,001-14,000 lbs. GVWR	All MDV Emission Categories	1.50	1.50	1.50[2]	17.50[3]

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(1) Non-Methane Hydrocarbon (NMHC) Converting Catalyst Monitoring

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(1.2) Malfunction Criteria:

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(1.2.4) Catalyst System Aging and Monitoring

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(B) For 2025 and subsequent model year vehicles from test groups selected for monitoring system demonstration in section (h):

(i) In addition to the information described above in section (f)(1.2.4)(A), the catalyst system aging and monitoring plan described above in section (f)(1.2.4)(A) shall also include the timeline for submitting the information and data described under section (f)(1.2.4)(B)(ii) below. The manufacturer may include several dates in the timeline ~~may include several dates~~ for data submission for new emission control system designs where the manufacturer has not achieved sufficient in-use aging to demonstrate real world deterioration prior to certification of the OBD II system.

(ii) Information and data to support methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning engine operating conditions in sections (f)(1.2.4)(A) ~~must~~shall be submitted to the Executive Officer and shall ~~at a minimum~~ include an analysis of the potential failure modes and effects, highlighting the most likely cause of failure, comparison of laboratory aged versus real world aged catalysts, and include the following for a laboratory-aged catalyst and ~~a minimum of~~ three field returned catalysts (data for all field-returned catalysts that are collected for this aging correlation analysis must be submitted to the Executive Officer):

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(C) The Executive Officer may waive the requirements for the submittal of the plan and data under sections (f)(1.2.4)(A) and (B) above for a test group if the plan and data have been submitted for a previous model year, the aging method has not changed from the previous model year, and the calibrations and hardware of the NMHC catalyst monitor, the engine, and the emission control system for the current model year have not changed to the extent aging mechanisms are affected from the previous model year.

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(2) Oxides of Nitrogen (NOx) Converting Catalyst Monitoring

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(2.2) Malfunction Criteria:

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(2.2.4) Catalyst System Aging and Monitoring

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(B) For 2025 and subsequent model year vehicles from test groups selected for monitoring system demonstration in section (h):

(i) In addition to the information described above in section (f)(2.2.4)(A), the catalyst system aging and monitoring plan described above in section (f)(2.2.4)(A) shall also include the timeline for submitting the information and data described under section (f)(2.2.4)(B)(ii) below. The manufacturer may include several dates in the timeline ~~may include several dates~~ for data submission for new emission control system designs where the manufacturer has not achieved sufficient in-use aging to demonstrate real world deterioration prior to certification of the OBD II system.

(ii) Information and data to support methods established by the manufacturer to represent real world catalyst deterioration under normal and malfunctioning engine operating conditions in section (f)(2.2.4)(A) ~~must~~shall be submitted to the Executive Officer and shall ~~at a minimum~~ include an analysis of the potential failure modes and effects, highlighting the most likely cause of failure, comparison of laboratory aged versus real world aged catalysts, and include the following for a laboratory-aged catalyst and ~~a minimum of~~ three field-returned catalysts (data for all field-returned catalysts that are collected for this aging correlation analysis must be submitted to the Executive Officer):

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(iii) The Executive Officer shall approve the catalyst aging method upon finding the data passes each of the following "pass" criteria below. If the manufacturer is not able to locate at least one catalyst to be evaluated under pass criteria 1 through 3 below, the manufacturer may propose to include an additional catalyst described in another pass criterion (e.g., if a catalyst described in pass criterion 2 cannot be located, the manufacturer may use an additional catalyst described in either pass criterion 1 or 3 instead)= as representative of the missing catalyst.

a. Pass criterion 1: High mileage or field-returned parts with FTP emission results from section (f)(2.2.4)(B)(ii)~~b~~a. that are less than the OBD emission threshold (i.e., parts degraded by less than 2 sigma below the catalyst monitor malfunction threshold) are passing the NOx catalyst conversion efficiency monitor without MIL illumination. If the vehicle is certified with a NOx catalyst monitor deficiency for not detecting a malfunction before emissions exceed the malfunction criteria, the emission levels at which the malfunction was detected when the OBD system was approved by the Executive Officer will be used in place of the OBD thresholds specified in the regulation.

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(C) The Executive Officer may waive the requirements for the submittal of the plan and data under sections (f)(2.2.4)(A) and (B) above for a test group if the plan and data have been submitted for a previous model year, the aging method has not changed from the previous model year, and the calibrations and hardware of the NOx catalyst monitor, the engine, and the emission control system for the current model year have not changed to the extent aging mechanisms are affected from the previous model year.

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(5) Exhaust Gas Sensor Monitoring

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(5.2) Malfunction Criteria:

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(5.2.2) NOx and PM sensors:

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(D) Monitoring capability: To the extent feasible, the OBD II system shall detect a malfunction of the sensor when the sensor output voltage, resistance, impedance, current, amplitude, activity, offset, or other characteristics are no longer sufficient for use as an OBD II system monitoring device (e.g., for catalyst, EGR, PM filter, SCR, or NOx adsorber monitoring). The dependent monitor (e.g., catalyst, EGR, SCR, or NOx adsorber monitor) for which the sensor is used as an OBD II system monitoring device must make a robust diagnostic decision (e.g., avoid false passes of a best performing unacceptable catalyst and false fails of a nominal catalyst) with a deteriorated but passing exhaust gas sensor.

(i) For the NOx sensor on 2025 and subsequent model year vehicles, the manufacturer shall test each applicable failure mode of the NOx sensor (e.g., sensor offset high failure mode, sensor gain low failure mode) with the component/system for the dependent monitor set at the best performing unacceptable level (e.g., with a best performing unacceptable catalyst). For each applicable NOx sensor failure mode, the manufacturer shall~~, at a minimum,~~ collect one data point with the sensor performance set at the sensor monitor malfunction threshold, at least three data points with the sensor performance set above the sensor malfunction threshold, and at least three data points with the sensor performance set below the sensor malfunction threshold. The spacing between the data points shall be set at two sigma and calculated using the variance of the applicable NOx sensor monitor output (i.e., the variance calculated from the NOx sensor monitor result distribution for the malfunction threshold sensor for the sensor failure mode under consideration). The manufacturer shall also submit

test data and/or engineering analysis demonstrating the NOx sensor monitor robustness against false-pass and false-fail decisions. The robustness data/analysis shall include test results from a wide range of sensor monitor enable conditions and may include data/analysis previously collected during development of the sensor monitor. For each applicable NOx sensor failure mode, the manufacturer shall perform tests of all the required data points without sending a scan tool code clear command between each data point test (e.g., for testing of the sensor offset high failure mode, the manufacturer shall perform tests of all seven data points without sending a code clear command in-between each test). The manufacturer shall send a scan tool code clear command between testing of each applicable NOx sensor failure mode (e.g., collect all seven data points for testing of the sensor offset high failure mode, then send a code clear command before testing of the sensor gain high failure mode). The NOx sensor monitor is deemed compliant if, during testing of each applicable sensor failure mode, all the following are met:

* * * *

c. The dependent monitor (e.g., catalyst monitor) makes a fail decision during testing for each data point (except the data point at the sensor monitor malfunction threshold) in the passing region of the sensor monitor,

d. Either the dependent monitor or the sensor monitor makes a fail decision during testing at the data point at the sensor monitor malfunction threshold,

~~d~~e. The MIL illuminates and is commanded on for a malfunction of the NOx sensor at least once during testing of each applicable NOx sensor failure mode, and

~~e~~f. The MIL illuminates and is commanded on for a malfunction of the dependent component (e.g., catalyst) at least once during testing of each applicable NOx sensor failure mode.

~~f~~(ii) Notwithstanding, if the manufacturer data do not satisfy sections (f)(5.2.2)(D)(i)a., b., c., e., or f. ~~through e.~~ above due to a result being in the 2 percent tail of a normal distribution or do not satisfy section (f)(5.2.2)(D)(i)d., the manufacturer may submit additional data points at the same sensor performance level to support the demonstration of compliance.

(~~ii~~iii) The Executive Officer may waive the requirements for the submittal of the data under section (f)(5.2.2)(D)(i) above for a test group if the data have been submitted for a previous model year and the calibrations of the NOx sensor monitor and dependent monitor

for the current test group have not changed from the previous model year.

(~~iii~~iv) The manufacturer may meet the requirements in section (f)(5.2.2)(D)(i) above on 2023 and 2024 model year vehicles.

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(8) NOx Adsorber Monitoring

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(8.2) Malfunction Criteria:

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(8.2.4) Adsorber System Aging and Monitoring

(A) For purposes of determining the NOx adsorber system malfunction criteria in section (f)(8.2.1) for NOx adsorber systems that consist of more than one NOx adsorber (e.g., two or more adsorbers in series), the manufacturer shall submit a system aging and monitoring plan to the Executive Officer for review and approval. The plan shall include the description and location of each component, the monitoring strategy for each component and/or combination of components, and the method for determining the malfunction criteria of section (f)(8.2.1) including the deterioration/aging process. Executive Officer approval of the plan shall be based on the representativeness of the aging to real world NOx adsorber system component deterioration under normal and malfunctioning engine operating conditions, the effectiveness of the method used to determine the malfunction criteria of section (f)(8.2.1), the ability of the component monitor(s) to pinpoint the likely area of malfunction and ensure the correct components are repaired/replaced in-use, and the ability of the component monitor(s) to accurately verify that each NOx adsorber system component is functioning as designed and as required in section (f)(8.2.1).

(B)~~(8.2.5)~~ For 2025 and subsequent model year vehicles from test groups selected for monitoring system demonstration in section (h):

(i)~~(A)~~ In addition to the information described above in section (f)(8.2.4)(A), the adsorber system aging and monitoring plan described above in section (f)(8.2.4)(A) shall also include the timeline for submitting the information and data described under section (f)(8.2.4)(B)(ii) below. The manufacturer may include several dates in the timeline ~~may include several dates~~ for data submission for new emission control system designs where the manufacturer has not achieved sufficient in-use aging to demonstrate real world deterioration prior to certification of the OBD II system.

(ii)~~(B)~~ Information and data to support methods established by the manufacturer to represent real world NOx adsorber system deterioration under normal and malfunctioning engine operating

conditions in section (f)(8.2.4)(A) ~~must~~shall be submitted to the Executive Officer and shall ~~at a minimum~~ include an analysis of the potential failure modes and effects, highlighting the most likely cause of failure, comparison of laboratory aged versus real world aged adsorbers, and include the following for a laboratory-aged adsorber and ~~a minimum of~~ three field-returned NOx adsorbers (data for all field-returned adsorbers that are collected for this aging correlation analysis must be submitted to the Executive Officer):

a. ~~(i)~~ Emissions data and all data required by sections (g)(4.1) through (g)(4.9), (g)(5), and (g)(6) from the FTP, HWFET, and US06 cycles,

b. ~~(ii)~~ Modal data during the FTP, HWFET, and US06 cycles,

c. ~~(iii)~~ NOx adsorber desorption performance as a function of NOx adsorber temperature and NOx adsorber system active/intrusive injection quantity and flow rate, and

d. ~~(iv)~~ All data required by sections (g)(4.1) through (g)(4.9), (g)(5), and (g)(6) from all adsorbers collected from a wide range of monitoring conditions.

(iii) ~~(C)~~ The Executive Officer shall approve the adsorber aging method upon finding the data passes each of the following "pass" criteria below. If the manufacturer is not able to locate at least one adsorber to be evaluated under pass criteria 1 through 3 below, the manufacturer may propose to include an additional adsorber described in another pass criterion (e.g., if an adsorber described in pass criterion 2 cannot be located, the manufacturer may use an additional adsorber described in either pass criterion 1 or 3 instead) as representative of the missing adsorber.

a. ~~(i)~~ Pass criterion 1: High mileage or field-returned parts with FTP emission results from section (f)(8.2.4~~5~~)(B)(ii)a. that are less than the OBD emission threshold (i.e., parts degraded by less than 2 sigma below the adsorber monitor malfunction threshold) are passing the NOx adsorber capability monitor without MIL illumination. If the vehicle is certified with a NOx adsorber monitor deficiency for not detecting a malfunction before emissions exceed the malfunction criteria, the emission levels at which the malfunction was detected when the OBD system was approved by the Executive Officer will be used in place of the OBD thresholds specified in the regulation.

b. ~~(ii)~~ Pass criterion 2: Field-returned parts that have an adsorber capability averaged over the FTP test that is representative of the manufacturer's durability demonstration part (i.e., parts degraded within 2 sigma of the adsorber monitor malfunction threshold) meet the following: 1) the NOx adsorber capability monitor illuminates the MIL during the applicable cycle (i.e., the FTP cycle,

Unified cycle, or alternate monitoring conditions approved under section (d)(3.1.3)) and emissions are below the emission threshold, and 2) the data and analysis show robust detection of NOx adsorber capability malfunctions during conditions meeting the applicable cycle (i.e., the FTP cycle, Unified cycle, or alternate monitoring conditions approved under section (d)(3.1.3)) and all other monitoring conditions. This testing can be done on road or on a dynamometer. If the vehicle or engine is certified with a NOx adsorber monitor deficiency for not detecting a malfunction before emissions exceed the malfunction criteria, the emission levels at which the malfunction was detected when the OBD system was approved by the Executive Officer will be used in place of the OBD thresholds specified in the regulation.

c. ~~(iii)~~ Pass criterion 3: Field-returned parts that have an adsorber capability averaged over the FTP test that is worse than the best performing unacceptable adsorber capability (i.e., degraded by more than 2 sigma from the adsorber monitor malfunction threshold) or have catastrophically failed meet the following: 1) the NOx adsorber capability monitor illuminates the MIL during the applicable cycle (i.e., the FTP cycle, Unified cycle, or alternate monitoring conditions approved under section (d)(3.1.3)), and 2) the data and analysis show robust detection during of NOx adsorber capability malfunctions during conditions meeting the applicable cycle (i.e., the FTP cycle, Unified cycle, or alternate monitoring conditions approved under section (d)(3.1.3)) and all other monitoring conditions. This testing can be done on road or on a dynamometer. If the vehicle or engine is certified with a NOx adsorber monitor deficiency for not detecting a malfunction before emissions exceed the malfunction criteria, the test cycle adsorber capability of the manufacturer's deficient durability demonstration part for section (h)(4) testing will be used for this assessment.

(C) ~~(8.2.6)~~ The Executive Officer may waive the requirements for the submittal of the plan and data under sections (f)(8.2.4)(A) and (B) ~~and (f)(8.2.5)~~ above for a test group if the plan and data have been submitted for a previous model year, the aging method has not changed from the previous model year, and the calibrations and hardware of the NOx adsorber monitor, the engine, and the emission control system for the current model year have not changed to the extent aging mechanisms are affected from the previous model year.

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(9) Particulate Matter (PM) Filter Monitoring

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(9.2) Malfunction Criteria:

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(9.2.4) Catalyzed PM Filter:

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(B) Feedgas generation:

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(iii) For OBD II systems that have a catalyzed PM filter NMHC conversion monitor or are exempt from the catalyzed PM filter NMHC conversion monitoring requirements in accordance with ~~that fulfills the requirements of~~ section (f)(9.2.4)(A), the manufacturer is not required to meet ~~may use the catalyzed PM filter NMHC conversion monitor (i.e., is not required to have a specific feedgas generation performance monitor) to fulfill~~ the feedgas generation performance monitoring requirements of sections (f)(9.2.4)(B)(i) and (f)(9.2.4)(B)(ii).

* * * *

(12) *Cold Start Emission Reduction Strategy Monitoring*

(12.1) Requirement:

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(12.1.2) For an element~~/~~, feature, or component associated with the cold start emission reduction control strategy under section (f)(12) that is also required to be monitored elsewhere in section (f) (e.g., fuel injection timing), the manufacturer shall use different diagnostics to distinguish faults detected under section (f)(12) (i.e., faults associated with the cold start strategy) from faults detected under sections other than section (f)(12) (i.e., faults not associated with the cold start strategy).

(12.2) Malfunction Criteria:

(12.2.1) For 2010 and subsequent ~~through 2025~~ model year vehicles, t~~T~~he OBD II system shall, to the extent feasible, detect a malfunction if either of the following occurs:

(~~12.2.1~~A) For vehicles not included in the phase-in specified in section (f)(12.2.3)(A), a~~A~~ny 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~~i) by a robustly detectable amount by the monitor; and

(~~B~~ii) in the direction of the desired command; and

(~~C~~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);

(~~12.2.2~~B) For vehicles not included in the phase-in specified in section (f)(12.2.2), a~~A~~ny failure or deterioration of the cold start emission reduction control strategy while the cold start strategy is active that would cause a vehicle's NMHC, CO, NOx, or PM emissions to exceed:

(~~A~~i) For passenger cars, light-duty trucks, and MDPVs certified to a chassis dynamometer tailpipe emission standard:

~~(i)~~a. For non-Low Emission Vehicle III applications:

~~a~~1. 2.5 times the applicable FTP standards for 2010 through 2012 model year vehicles; and

~~b~~2. 1.5 times the applicable FTP NMHC, CO, or NOx standards or 2.0 times the applicable FTP PM standard for 2013 ~~and subsequent through 2025~~ model year vehicles not included in the phase-in specified in section (f)(12.2.2).

~~(ii)~~b. For Low Emission Vehicle III applications, any of the applicable NMOG+NOx, CO, or PM emission thresholds set forth in Table 2 in the beginning of section (f).

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

~~(i)~~a. 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 through 2025~~ model year vehicles not included in the phase-in specified in section (f)(12.2.2).

(~~12.2.3~~C) For section (f)(12.2.~~2~~1)(B):

(~~A~~i) For 2010 through 2012 model year vehicles, the OBD II system shall either monitor the combined effect of the elements of the system as a whole or the individual elements (e.g., increased engine speed, increased engine load from restricting an exhaust throttle) for failures that cause emissions to exceed the applicable emission levels specified in section (f)(12.2.~~2~~1)(B).

(~~B~~ii) For 2013 ~~and subsequent through 2025~~ model year vehicles not included in the phase-in specified in section (f)(12.2.2), to the extent feasible (without adding hardware for this purpose), the OBD II system shall monitor the ability of the system to achieve the desired effect (e.g., strategies used to accelerate catalyst light-off by increasing catalyst inlet temperature shall verify the catalyst inlet temperature actually achieves the desired temperatures within an

Executive Officer approved time interval after starting the engine) for failures that cause emissions to exceed the applicable emission levels specified in section (f)(12.2.~~2~~1)(B). For strategies where it is not feasible to be monitored as a system, the OBD II system shall monitor the individual elements/components (e.g., increased engine speed, increased engine load from restricting an exhaust throttle) for failures that cause emissions to exceed the applicable emission levels specified in section (f)(12.2.~~2~~1)(B).

(12.2.2) Catalyst warm-up strategy (CWS) monitor: For 20 percent of 2026, 50 percent of 2027, and 100 percent of 2028 and subsequent model year vehicles, the OBD II system shall monitor the CWS while the CSERS monitoring conditions ~~cold start criteria~~ (as defined in section (c)) are met by measuring the inlet temperature and/or energy to the first NOx reducing element (e.g., SCR) and comparing it with a modeled inlet temperature and/or energy to the first NOx reducing element.

* * * *

(12.2.3) Individual components/features:

(A) For ~~2026~~ 20 percent of 2026, 50 percent of 2027, and 100 percent of 2028 and subsequent model year vehicles, the OBD II system shall detect a malfunction if any of the following components and features does not properly respond to the commanded action while the CSERS monitoring conditions ~~cold start criteria~~ (as defined in section (c)) are met:

* * * *

(12.2.4) For the phase-in schedules described in sections (f)(12.2.2) and (f)(12.2.3)(A) above, the manufacturer 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 2028 and subsequent model year vehicles shall comply with the requirements.

* * * *

(g) *Standardization Requirements*

(1) Reference Documents:

The following SAE International and International Organization for Standardization (ISO) documents are incorporated by reference into this regulation:

* * * *

(1.4) SAE J1979 "E/E Diagnostic Test Modes", August 2014 (SAE J1979).

(1.4.1) SAE J1979-DA, "Digital Annex of E/E Diagnostic Test Modes", ~~May 2019~~ April 2021.

~~(1.4.2) SAE J1979-2, "E/E Diagnostic Test Modes: OBDonUDS", April 2021 (SAE J1979-2)~~

* * * *

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

(1.14) SAE J1979-2, "E/E Diagnostic Test Modes: OBDonUDS", April 2021 (SAE J1979-2).

* * * *

(3) Communications to a Scan Tool:

Manufacturers shall use one of the following standardized protocols for communication of all required emission related messages from on-board to off-board network communications to a scan tool meeting SAE J1978 specifications:

* * * *

(3.4) ISO 15765-4. This protocol shall be allowed on any 2003 and subsequent model year vehicle and required on all 2008 and subsequent model year vehicles. All required emission-related messages using this protocol shall use a 500 kbps baud rate.

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(3.4.2) For vehicles using SAE J1979-2, except as provided in sections (g)(3.4.2)(A)~~, (g)(3.4.2)(B),~~ through (g)(3.4.2)(F) and (g)(4.7.4)(~~B~~A), the OBD II system may ~~not~~ respond with a negative response code (NRC) in response to a request message from a scan tool in accordance with the specifications in SAE J1979-2.

~~(A) The OBD II system may respond with NRC $22, $31, $72, or $78 in response to a Service $14 (i.e., clear/reset emission-related diagnostic information) request message from a scan tool.~~

~~(B) The OBD II system may respond with NRC $78 in response to a request message for tracking data specified in sections (g)(6.3) through (g)(6.5) and (g)(6.12) from a scan tool.~~

(A) The OBD II system may not respond with NRC $13 in response to a functional or physical request message from a scan tool with an invalid request message format.

(B) The OBD II system may not respond with NRC $21 in response to a functional or physical request message from a scan tool for Service $22.

(C) The OBD II system may not respond with NRC $72 in response to a functional or physical request message from a scan tool for Service $14 unless the OBD II system detects a malfunction and stores a fault code for a malfunction of the on-board computer memory in conjunction with responding with NRC $72.

(D) The OBD II system may not respond with NRC $78 in response to a functional or physical request message from a scan tool for Service $19 subfunction $42 or $55 unless the NRC $78 is for data not available and conditions correct, in which case the OBD II system may not respond more than once with NRC $78.

(E) If the OBD II system responds with NRC $78 in response to a functional or physical request message from a scan tool for Service $14, the OBD II system may not respond more than once with NRC $78.

(F) The OBD II system may not respond with NRC $78 in response to a functional or physical request message from a scan tool for Service $22 except when tracking data specified in sections (g)(6.3) through (g)(6.5) and (g)(6.12) are requested or the calibration verification number (CVN) is requested in accordance with section (g)(4.7.4)(B).

(4) Required Emission Related Functions:

The following standardized functions shall be implemented in accordance with the specifications in SAE J1979 or SAE J1979-2, whichever is applicable, to allow for access to the required information by a scan tool meeting SAE J1978 specifications:

(4.1) Readiness Status:

* * * *

(4.1.2) For vehicles using SAE J1979-2:

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(B) The readiness status for each component/system readiness bit listed below shall immediately indicate "complete" if any of the following conditions occur: (1) except for misfire (sections (g)(4.1.2)(B)(iii) and (g)(4.1.2)(B)(~~xix~~xviii)), all the respective supported monitors listed below for each component/system have fully executed and determined that the component or system is not malfunctioning, (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, or (3) for misfire (sections (g)(4.1.2)(B)(iii) and (g)(4.1.2)(B)(~~xix~~xviii)), 4,000 fueled engine revolutions have occurred and all the respective supported monitors have fully executed and determined that there is no misfire malfunction:

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(xi) Gasoline Cold Start Emission Reduction Strategy: sections (e)(11.2.2), (e)(11.2.3), and (e)(11.2.4)

~~(xii) Gasoline A/C System Component: section (e)(12.2.1)~~

(~~xiii~~xii) Gasoline VVT System: sections (e)(13.2.1), (e)(13.2.2), and (e)(13.2.3)

(~~xiv~~xiii) Gasoline DOR System: sections (e)(14.2.1) and (e)(14.2.2)

(~~xv~~xiv) Gasoline Comprehensive Component: input component rationality fault diagnostics, output component/system functional checks, sections (e)(15.2.3)(A)(i) through (iii), (e)(15.2.3)(B)(i)b., (e)(15.2.3)(B)(ii)b., and (e)(15.2.3)(C) through (F)

(~~xvi~~xv) Gasoline Other Emission Control or Source System: (e)(16)

(~~xvii~~xvi) Diesel NMHC Converting Catalyst: sections (f)(1.2.2) and (f)(1.2.3)(A)

(~~xviii~~xvii) Diesel NOx Converting Catalyst: sections (f)(2.2.2), (f)(2.2.3)(A), and (f)(2.2.3)(C)

(~~xix~~xviii) Diesel Misfire: sections (f)(3.2.1) and (f)(3.2.2)

(~~xx~~xix) Diesel Fuel System: sections (f)(4.2.1), (f)(4.2.2), and (f)(4.2.3)

(~~xxi~~xx) Diesel Exhaust Gas Sensor: sections (f)(5.2.1)(A)(i), (f)(5.2.1)(A)(iv), (f)(5.2.1)(B)(i), (f)(5.2.1)(B)(iv), (f)(5.2.2)(A), (f)(5.2.2)(D), (f)(5.2.3)(A), and (f)(5.2.4)(A)

(~~xxii~~xxi) Diesel EGR System: sections (f)(6.2.1), (f)(6.2.2), (f)(6.2.3), (f)(6.2.4), (f)(6.2.5), (f)(6.2.6)

(~~xxiii~~xxii) Diesel Boost Pressure Control System: sections (f)(7.2.1), (f)(7.2.2), (f)(7.2.3), (f)(7.2.4), and (f)(7.2.5)

(~~xxiv~~xxiii) Diesel NOx Adsorber: sections (f)(8.2.1) and (f)(8.2.2)

(~~xxv~~xxiv) Diesel PM Filter: sections (f)(9.2.1), and (f)(9.2.5)

(~~xxvi~~xxv) Diesel CV System: sections (f)(10.2.2) and (f)(10.2.3)

(~~xxvii~~xxvi) Diesel Engine Cooling System: sections (f)(11.2.2)(C) and (f)(11.2.2)(D)

(~~xxviii~~xxvii) Diesel Cold Start Emission Reduction Strategy: sections (f)(12.2.1), (f)(12.2.2), and (f)(12.2.3)

(~~xxix~~xxviii) Diesel VVT System: sections (f)(13.2.1), (f)(13.2.2), and (f)(13.2.3)

~~(xxx) Diesel A/C System Component: section (f)(14.2.1)~~

(~~xxxi~~xxix) Diesel Comprehensive Component: input component rationality fault diagnostics, output component/system functional checks, sections (f)(15.2.3)(A)(i) through (iii), (f)(15.2.3)(B)(i)b., (f)(15.2.3)(B)(ii)b., and (f)(15.2.3)(C) through (F)

(~~xxxii~~xxx) Diesel Other Emission Control or Source System: (f)(16)

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(4.3) Freeze Frame.

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(4.3.2) For vehicles using SAE J1979-2:

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(B) "Freeze frame" conditions ~~must~~shall include the fault code which caused the data to be stored and all of the signals required in section (g)(4.2.1)(A) except number of stored confirmed fault codes, OBD requirements to which the engine is certified, MIL status, and absolute throttle position in accordance with (g)(~~4.3.3~~4.3.2)(C). Freeze frame conditions shall also include all of the signals required on the vehicle in sections (g)(4.2.1)(B), (g)(4.2.2)(A) through (g)(4.2.2)(A)(i), (g)(4.2.2)(B)(i) through (g)(4.2.2)(B)(ii)a., (g)(4.2.2)(F)(i) ~~and (ii)~~, (g)(4.2.3)(A) through (g)(4.2.3)(D), and (g)(4.2.3)(F) that are used for diagnostic or control purposes in the specific diagnostic or emission-critical powertrain control unit that stored the fault code except: oxygen sensor output, air/fuel ratio sensor output, catalyst temperature, evaporative system vapor pressure, glow plug lamp status, PM sensor output, NOx sensor output, monitor status since last engine shut off, distance traveled while MIL activated, distance traveled since fault memory last cleared, number of warm-up cycles since fault memory last cleared, DEF sensor output, commanded DEF dosing, DEF usage for the current driving cycle, and DEF dosing rate.

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(4.4) Fault Codes

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(4.4.6) Permanent fault codes:

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(D) Permanent fault codes may not be erased when the control module containing the permanent fault codes is reprogrammed unless the following occur:

(i) For vehicles using SAE J1979 and not included in the phase-in specified in section (g)(4.4.6)(D)(ii) below, the readiness status (refer to section (g)(4.1)) for all monitored components and systems is set to "not complete" in conjunction with the reprogramming event.

(ii) For 30 percent of 2019, 60 percent of 2020, and 100 percent of 2021 and subsequent model year vehicles using SAE J1979, the readiness bits (refer to section (g)(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.

(iii) For vehicles using SAE J1979-2, the readiness bits (refer to section (g)(4.1)) for all monitored components and systems in the module containing the permanent fault code are set to "not complete" in conjunction with the reprogramming event.

* * * *

(4.8) Vehicle Identification Number:

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(4.8.2) If the VIN is reprogrammable:

(A) For 2012 and subsequent model year vehicles not included in the phase-in specified in section (g)(4.8.2)(B) below, all emission-related diagnostic information (i.e., all information required to be erased in accordance with SAE J1979 specifications when a Mode/Service $04 clear/reset emission-related diagnostic information command is received) shall be erased in conjunction with the reprogramming of the VIN.

(B) For 30 percent of 2019, 60 percent of 2020, and 100 percent of 2021 and subsequent model year vehicles using SAE J1979, ~~if the VIN is reprogrammable,~~ in conjunction with reprogramming of the VIN, the OBD II system shall erase all emission-related diagnostic information identified in section (g)(4.10.1) in all control modules that reported supported readiness for a readiness bit other than the comprehensive components readiness bit.

(C) For vehicles using SAE J1979-2, in conjunction with reprogramming of the VIN, the OBD II system shall erase all emission-related diagnostic information identified in section (g)(4.10.1) in the control module that was reprogrammed.

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(6) *Vehicle Operation and Control Strategies Tracking Requirements:*

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(6.6) Numerical Value Specifications:

(6.6.2) For each counter specified in section (g)(6.3) through (g)(6.5):

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(C) The counters shall be made available to a generic scan tool in accordance with the SAE J1979 or SAE J1979-2 specifications, whichever is applicable, and may be rescaled when displayed, if required by the SAE specifications (e.g., seconds to hours, minutes, and seconds).

(6.6.3) For each parameter specified in section (g)(6.14)):

(A) For parameters stored in the data type described in section (g)(6.14.4)(A):

(i) Each number shall be reset to zero when any of the following occur:

a. A scan tool command to clear fault codes is received;

b. An NVRAM reset occurs (e.g., reprogramming event);or

c. If the numbers are stored in KAM, when KAM is lost due to an interruption in electrical power to the control module (e.g., battery disconnect).

(ii) The OBD II system shall store each number within 10 seconds after all counters in section (g)(6.14.2) have stopped tracking in each driving cycle.

(B) For parameters stored in the data type described in section (g)(6.14.4)(B):

(i) 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.

(ii) The OBD II system shall store each number within 600 seconds after the end of a driving cycle.

(C) The parameters shall conform to the standardized format specified in SAE J1979 or SAE J1979-2, whichever is applicable.

* * * *

(6.12) NOx Emission Tracking Requirements:

* * * *

(6.12.3) Each parameter in each array in section (g)(6.12.2) shall be stored in a series of bins that are defined as indicated below. References to "rated power" mean the engine's rated net brake power.

* * * *

(F) "Bin 15" stores data only when the engine is operating within the NOx NTE control area and ~~no exclusions apply~~ none of the NTE exclusion criteria are satisfied. For 2026 and subsequent medium-duty vehicles certified to a chassis dynamometer tailpipe emission standard, Bin 15 shall be set to zero at all times.

* * * *

(6.14) Cold Start Emission Reduction Strategy Tracking Requirements

(6.14.1) For purposes of section (g)(6.14), the following terms shall be defined as follows:

(A) "Catalyst cold start tracking ~~light-off~~ temperature threshold" is defined as when the SCR catalyst ~~inlet~~ temperature that is directly measured or estimated for purposes of enabling DEF dosing reaches 180 degrees

Celsius~~ at which the SCR catalyst NOx conversion efficiency reaches 50 percent~~;

(B) "FTP catalyst cold start tracking~~light-off~~ time" is defined as the time from engine start until the ~~SCR catalyst inlet temperature reaches the~~ catalyst cold start tracking~~light-off~~ temperature threshold is achieved on an FTP cycle;

(C) "Engine output energy", in units of Joules (J) or Watts (W)*s, is defined by integrating brake engine power output over time, with:

"Brake engine power output" = 2π x (brake engine torque) x (engine RPM)/60 in units of W, and

"Brake engine torque" = (engine reference torque) x [(indicated torque) – (friction torque)].

(D) "Specified FTP engine output energy" is defined as the accumulated engine output energy measured from engine start until the ~~SCR catalyst inlet temperature reaches the~~ catalyst cold start tracking ~~light-off~~ temperature threshold is achieved on an FTP cycle.

(E) "~~Post-diesel oxidation catalyst (DOC) heat energy~~Pre-SCR heat energy" is defined as the heat energy flow prior to the SCR~~through the DOC~~ over time, with:

"Heat energy flow prior to the SCR~~through the DOC~~" = (heat capacity of exhaust gas (C_p)] x (exhaust mass flow ($m_{exhaust}$)) x (temperature difference between SCR inlet~~DOC outlet~~ and ambient) /1000.

(6.14.2) For 20 percent of 2026, 50 percent of 2027, and 100 percent of 2028 and subsequent model year vehicles equipped with diesel engines, manufacturers shall implement software algorithms to individually track and report in a standardized format the following parameters. During driving cycles where the CSERS monitoring conditions ~~cold start criteria~~ (as defined in section (c)) are met at engine start, each parameter shall start ~~accumulating/incrementing~~tracking from engine start until the conditions described below for each parameter are met:

(A) Heat energy release tracker #1 (kiloJoules (kJ)): ~~accumulate~~track pre-SCR ~~post- DOC~~ heat energy (in units of kJ) until the FTP catalyst cold start tracking ~~light-off~~ time is achieved.

(B) Heat energy release tracker #2 (kJ): ~~accumulate~~track pre-SCR ~~post-DOC~~ heat energy until the specified FTP engine output energy is achieved.

(C) Heat energy release tracker #3 (kJ): ~~accumulate~~track pre-SCR ~~post-DOC~~ heat energy until the~~ on-road~~ catalyst cold start tracking~~light-off~~ temperature threshold is achieved.

(D) Engine output energy tracker #1 (kJ): ~~accumulate~~track engine output energy until the FTP catalyst cold start tracking ~~light-off~~ time is achieved.

(E) Engine output energy tracker #-2 (kJ): ~~accumulate~~track engine output energy until the ~~on-road~~ catalyst cold start tracking~~light-off~~ temperature threshold is achieved.

(F) EGR mass flow tracker #-1 (kilograms (kg)): ~~accumulate~~track EGR mass flow until the FTP catalyst cold start tracking~~light-off~~ time is achieved.

(G) EGR mass flow tracker #-2 (kg): ~~accumulate~~track EGR mass flow until the specified FTP engine output energy is achieved.

(H) EGR mass flow tracker #-3 (kg): ~~accumulate~~track EGR mass flow until the ~~on-road~~ catalyst cold start tracking ~~light-off~~ temperature threshold is achieved.

(I) Timer #1 e~~E~~ngine energy output accumulated time~~timer~~ (seconds): ~~increment~~track time until the specified FTP engine output energy is achieved.

(J) Timer #2 c~~C~~atalyst cold start tracking accumulated time ~~Light-Off Timer~~ (seconds): ~~increment~~track time until the catalyst cold start tracking ~~light-off~~ temperature threshold is achieved.

* * * *

(8) Data Reporting Requirements for Over-the-Air Reprogramming

(8.1) For all 2024 and subsequent model year vehicles, if any of the data required to be stored and made available pursuant to sections (g)(5) and (g)(6) would be erased by an over-the-air reprogramming of any control module, the manufacturer shall collect all lifetime data stored in the vehicle pursuant to these sections using the over-air-network prior to their erasure.

(~~8.2~~8.1.1) The manufacturer shall submit a report to the Executive Officer containing the average value and standard deviation of each collected parameters for each affected certified test group. For vehicles using SAE J1979, the report shall meet the specifications of ~~as specified in,~~ "Data Record Reporting Procedures for Over-the-Air Reprogrammed Vehicles and Engines", dated August 16, 2018, and hereby incorporated by reference. For vehicles using SAE J1979-2, the report shall meet the specifications of "Data Record Reporting Procedures for Over-the-Air Reprogrammed Vehicles and Engines Using SAE J1979-2", dated ~~June 1, 2021~~December 15, 2021, and hereby incorporated by reference. The manufacturer shall submit the report within 75 calendar days of the availability of the calibration/software update to affected vehicles. The manufacturer shall submit a separate report for each unique calibration/software update.

* * * *

(i) *Certification Documentation*

* * * *

(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:

* * * *

(2.14) A cover letter identifying all concerns and deficiencies applicable to the equivalent previous model year test group, the changes and/or resolution of each concern or deficiency for the current model year test group, and all other known issues that apply to the current model year test group (e.g., concerns or deficiencies of another test group that also apply to this test group, issues found during demonstration testing under section (h), issues found during production vehicle evaluation testing under section (j) from a previous model year).

* * * *

(j) *Production Vehicle Evaluation Testing.*

(1) Verification of Standardized Requirements.

* * * *

(1.3) Test Equipment: For the testing required in section (j)(1), manufacturers shall utilize an off-board device to conduct the testing. Prior to conducting testing, manufacturers are required to request and receive Executive Officer approval of the off-board device that the manufacturer will use to perform the testing. Except as provided for in section (j)(1.3.1) below, ~~T~~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 specifically for ~~the~~ SAE J1699-3 testing ~~committee and available through www.sourceforge.net~~ and SAE J2534 compliant hardware configured specifically for SAE J1699-3 testing.

* * * *

(1.4) Required Testing (i.e., "static" testing portion of SAE J1699-3:

* * * *

(1.4.2) The testing shall further verify that the vehicle can properly communicate to any SAE J1978 scan tool:

* * * *

(B) The MIL command status while the MIL is commanded off and while the MIL is commanded on in accordance with SAE J1979 or SAE J1979-2, whichever is applicable, and section (g)(4.2) while the engine is running,

and in accordance with SAE J1979 or SAE J1979-2, whichever is applicable, and sections (d)(2.1.2) during the MIL functional check and, if applicable, (g)(4.1.31)(H) or (g)(4.1.2)(EF) during the MIL readiness status check while the engine is off;

* * * *

(1.5) Reporting of Results: The manufacturer shall submit to the Executive Officer all information described in sections (j)(1.5.1), (j)(1.5.2), and (j)(1.5.4) in one report for each model year. The report shall be one single file for each model year and shall include the information for all testing completed in that specific model year. The manufacturer shall update the report for each new test within the deadlines described below.

(1.5.1) The manufacturer shall notify the Executive Officer within one month of identifying any vehicle that does not meet the requirements of section (j)(1.4). The manufacturer shall submit the test log file, information about ~~a written report of~~ the problem(s) identified, and all information required in section (j)(1.5.4), and propose corrective action (if any) to remedy the problem(s) to the Executive Officer for approval. Factors to be considered by the Executive Officer in approving the proposed corrective action shall include the severity of the problem(s), the ability of the vehicle to be tested in an I/M program, the ability of service technicians to access the required diagnostic information, the impact on equipment and tool manufacturers, and the amount of time prior to implementation of the proposed corrective action.

(1.5.2) Within three months of any passing testing conducted pursuant to section (j)(1), a manufacturer shall submit all information required in section (j)(1.5.4)~~a report of the results~~ and the test log file 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.

(1.5.4) Manufacturers shall include the following information in the report for each test described in sections (j)(1.5.1) and (j)(1.5.2):

(A) Test log filename

(B) Date the test log file was submitted to CARB

(C) Date test was conducted

(D) Manufacturer

(E) Model year

(F) OBD II group (if applicable)

(G) Test group

(H) Vehicle model

(I) Vehicle configuration description (i.e., vehicle configuration that results in a unique calibration for the same test group and vehicle model)

(J) Fuel type (i.e., gasoline, diesel, or alternate fuel)

(K) Powertrain type (i.e., conventional, mild hybrid electric, strong hybrid electric, or plug-in hybrid electric vehicle)

(L) Start of normal production date for vehicle model's calibration

(M) Calibration subgroup identifier (i.e., identifier used to indicate either the calibration is a unique calibration or calibration is part of a calibration group in accordance with section (j)(1.2))

(N) SAE J1699 build revision number

(O) Number of warnings

(P) Number of failures

(Q) For each warning identified in section (j)(1.5.1) or (j)(1.5.2):

(i) Warning message

(ii) Description/explanation of warning

(iii) SAE J1699 test number

(R) For each failure identified in section (j)(1.5.1):

(i) Failure message

(ii) One of the following failure classifications:

a. Mandatory recall failure (i.e., failures that meet the criteria for mandatory recall under title 13, CCR section 1968.5(c)(3)(A)(vii)),

b. Section 1968.2 standardization failure (i.e., failures due to the OBD II system not complying with the standardization requirements of section 1968.2),

c. SAE J1699 specification failure (i.e., failures incorrectly identified by the SAE J1699 software),

d. Operator/user error failure, or

e. Other failure (e.g., incorrect failure due to the vehicle not meeting the requirement based on an alternative phase-in)

(iii) Description/explanation of failure

(iv) SAE J1699 test number

(S) For each warning and failure identified, any additional notes, including but not limited to, corrective actions taken (e.g., running changes, field fixes, future model year updates) and titles and dates of presentations describing the issues/failures for a test.

(2) Verification of Monitoring Requirements.

* * * *

(2.3) Evaluation requirements:

(2.3.1) Except as provided for ~~emissions neutral diagnostics~~ in sections (j)(2.3.1)(A) and (j)(2.3.1)(B) below, the evaluation shall demonstrate the ability of the OBD II system on the selected production vehicle to detect a malfunction, illuminate the MIL, and store confirmed and permanent fault codes when a malfunction is present, and the monitoring conditions have been satisfied for each individual diagnostic required by title 13, CCR section 1968.2. During testing under section (j)(2), the manufacturer shall also verify the ability of the OBD II system to erase permanent fault codes stored during testing for each unique pathway within the software that manages the erasing of permanent fault codes.

* * * *

(B) For test vehicles selected in accordance with section (j)(2.2.3) above (i.e., vehicles from test groups not selected for monitoring system demonstration testing under section (h)), in lieu of testing each individual diagnostic required by title 13, CCR section 1968.2, the manufacturer shall test the following diagnostics:

(i) All diagnostics covered by the requirements set forth in title 13, CCR sections 1968.2(e)(1) through (e)(8), (e)(11) through (e)(14), (e)(16), (f)(1) through (f)(9), (f)(12), (f)(13), (f)(14), and (f)(16), and

(ii) 400 diagnostics that are not described in section (j)(2.3.1)(B)(i) above. The manufacturer shall select the diagnostics at random, and the diagnostics may not include diagnostics that are exempted from testing in accordance with section (j)(2.3.~~6~~5).

~~(2.3.2) The evaluation shall verify that malfunctions detected by non-MIL illuminating diagnostics of components used to enable any other OBD II system diagnostic (e.g., fuel level sensor) will not inhibit the ability of other OBD II system diagnostics to properly detect malfunctions.~~

(2.3.~~3~~2) On vehicles so equipped, the evaluation shall verify that the software used to track the numerator and denominator for purposes of determining in-use monitoring frequency correctly increments as required in section (d)(4) (i.e., the "dynamic" testing portion of SAE J1699-3).

(2.3.~~4~~3) Malfunctions may be mechanically implanted or electronically simulated but internal on-board computer hardware or software changes may not be used to simulate malfunctions. Emission testing to confirm that the malfunction is detected before the appropriate malfunction threshold (e.g., 1.5 times the applicable standards) is exceeded is not required. For an emissions neutral diagnostic located within a control unit meeting the automotive safety integrity level C or D specifications, the manufacturer

may request Executive Officer approval to modify the evaluation procedure or conduct an engineering evaluation in lieu of a physical evaluation if the standard evaluation would result in unsafe or hazardous conditions.

(2.3.~~5~~4) Manufacturers shall submit a proposed test plan for Executive Officer approval prior to evaluation testing being performed. The test plan shall identify the method used to induce a malfunction in each diagnostic, including the permanent fault code storage/erasure test procedure, and the method in which the 400 diagnostics in section (j)(2.3.1)(B)(ii) were selected. The Executive Officer shall approve the plan upon determining that the requirements of section (j)(2) are satisfied, that the method used to select the 400 diagnostics in section (j)(2.3.1)(B)(ii) results in a random selection of diagnostics and does not purposely exclude specific diagnostics other than those mentioned under section (j)(2.3.1)(B)(i), and that the permanent fault code storage/erasure test procedure meets the following:

* * * *

(2.3.~~6~~5) 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~~6) For evaluation of test vehicles selected in accordance with section (j)(2.2.2), manufacturers are not required to demonstrate diagnostics that were previously demonstrated prior to certification as required in section (h).

(2.4) Reporting of Results:

(2.4.1) Manufacturers shall submit a report of the results of all testing conducted pursuant to section (j)(2) to the Executive Officer for review. This report shall identify the method used to induce a malfunction in each diagnostic, the MIL illumination status, and the confirmed fault code(s) stored. The report shall also include all the information described in section (j)(2.4.2)~~a summary of any problems identified during testing (e.g., a monitor that is unable to detect a fault, a monitor that is unable to store a fault code or illuminate the MIL when a fault is detected)~~.

(2.4.2) Manufacturers shall include the following information in the report for each test described in section (l)(2.4.1):

(A) Report of the results filename

(B) Manufacturer

(C) Model year

(D) OBD II group (if applicable)

(E) Test group

(F) Vehicle model

(G) Fuel type (i.e., gasoline, diesel, or alternate fuel)

(H) Powertrain type (i.e., conventional, mild hybrid electric, strong hybrid electric, or plug-in hybrid electric vehicle)

(I) Start of normal production date for vehicle model

(J) Number of diagnostics tested in accordance with section (j)(2.3.1) or (j)(2.3.1)(B)

(K) Number of emissions neutral diagnostics tested in accordance with section (j)(2.3.1)(A)

(L) Number of problems identified during testing conducted in accordance with sections (j)(2.3.1) or (j)(2.3.1)(B), and (j)(2.3.1)(A)

(M) For each problem identified:

(i) Fault code (SAE J2012 or manufacturer-defined) or emissions neutral diagnostics name and (if applicable) code

(ii) Fault code description or, if applicable, emissions neutral diagnostic code description

(iii) Method used to induce malfunction

(iv) Fail reason (e.g., monitor is unable to detect a fault, monitor is unable to store a fault code or illuminate the MIL when a fault is detected, unable to erase permanent fault codes, unable to activate the applicable emissions neutral default action)

(v) Description/explanation of problem

(N) Number of diagnostics exempted from testing in accordance with section (j)(2.3.5)

(O) For each problem identified, any additional notes, including but not limited to, corrective actions taken (e.g., running changes, field fixes, future model year updates) and titles and dates of presentations describing the issues/failures for a test.

* * * *

(3) Verification and Reporting of In-use Monitoring Performance.

* * * *

(3.2) Required Data:

(3.2.1) For each test group or combination of test groups with vehicles using SAE J1979:~~,~~

(A) T~~t~~he data must include all of the in-use performance tracking data reported through SAE J1979 (i.e., all numerators, denominators, and the ignition cycle counter(s)), the model year, the manufacturer, the vehicle model, the test group, the date the data was collected, the odometer reading, the VIN, and the ECM software calibration identification number and be in the standardized format detailed in Attachment D: Rate Based Data of ARB Mail-Out #MSC 06-23, December 21, 2006, incorporated by reference. Additionally, the data shall include the OBD II group (if applicable), whether or not the vehicle is an alternate-fueled vehicle, and powertrain type (i.e., conventional, mild hybrid electric, strong hybrid electric, or plug-in hybrid electric vehicle).

(B) The manufacturer shall ~~also~~ submit a report that includes a summary of any problems identified in the data (e.g., a monitor where the average in-use monitor performance ratio is less than the minimum acceptable ratio under section (d)(3.2.1)).

(3.2.2) For each test group or combination of test groups with vehicles using SAE J1979-2:

~~(A) The data must be collected only from vehicles where the general denominator (as defined in section (d)(5.6)) has a value equal to or greater than 300.~~

(~~B~~A) The data ~~must~~shall include all of the in-use performance tracking data reported through SAE J1979-2 (i.e., all numerators, denominators, and the ignition cycle counter(s)), the model year, the manufacturer, the vehicle model, the test group, the date the data was collected, the odometer reading, the VIN, and the ECM software calibration identification number and be in the standardized format detailed in Attachment D: Rate Based Data of ARB Mail-Out #MSC 06-23, December 21, 2006, incorporated by reference. Additionally, the data ~~must~~shall include the OBD II group (if applicable), whether or not the vehicle is an alternate-fueled vehicle, powertrain type (i.e., conventional mild hybrid electric, strong hybrid electric, or plug-in hybrid electric vehicle), and the data specified in sections (d)(5.7), (g)(4.1) through (g)(4.9), and (g)(6).

(~~C~~B) The manufacturer shall submit a report that includes a summary of any problems identified in the data (e.g., a monitor where the average in-use monitor performance ratio is less than the minimum acceptable ratio defined in section (d)(3.2.1)).

(3.2.3) In lieu of the VIN required under sections (j)(3.2.1)(A) and (j)(3.2.2)(~~B~~A) above, a manufacturer may request Executive Officer approval to include an alternate vehicle identifier. The Executive Officer shall approve the request if the following conditions are met:

(A) The alternate vehicle identifier is unique for each vehicle (i.e., multiple vehicles cannot have the same alternate vehicle identifier),

(B) A specific VIN always has the same alternate vehicle identifier (i.e., a specific VIN cannot have more than one different alternate vehicle identifiers), and

(C) The manufacturer shall provide the VIN for a specific alternate vehicle identifier upon request from the Executive Officer.

* * * *

(3.4) Upon request of the manufacturer, the Executive Officer may reduce the minimum sample size of fifteen vehicles set forth in section (j)(3.3) for test groups with low sales volume. In granting approval of a sampling plan with a reduced minimum sample size, the Executive Officer shall consider, among other things, information submitted by the manufacturer to justify the smaller sample size, sales volume of the test group(s), and the sampling mechanism utilized by the manufacturer to procure vehicles. In lieu of defining a fixed minimum sample size for low sales volume test groups, sampling plans approved for collection of data on higher sales volume test groups under section (j)(3.3) shall also be approved by the Executive Officer for low sales test groups if they use the identical sampling mechanism to procure vehicles from the low sales volume test groups.

* * * *

(k) *Deficiencies.*

* * * *

(3) The fines are in the amount of $50 per deficiency per vehicle for non-compliance with any of the monitoring requirements specified in sections (e)(1) through (e)(8), (e)(11), (e)(13), (e)(14), (e)(16), (f)(1) through (f)(9), (f)(12), (f)(13), and (f)(16) and $25 per deficiency per vehicle for non-compliance with any other requirement of section 1968.2. The fines are applied to vehicles produced for sale in California. In determining the identified order of deficiencies, deficiencies subject to a $50 fine are identified first. Total fines per vehicle under section (k) may not exceed $500 per vehicle and are payable to the State Treasurer for deposit in the Air Pollution Control Fund. Except as provided below, a manufacturer shall submit the fines payment not more than 30 calendar days after the close of a calendar quarter. Within 30 days from the end of the calendar quarter, a manufacturer shall report the number of affected vehicles produced for sale in California during the quarter and submit the total payment for the vehicles produced for sale during that quarter. A manufacturer may request Executive Officer approval for an alternate payment schedule in lieu of the schedule described above. Executive Officer approval shall be based on the projected sales volume of the entire manufacturer product line, and the appropriateness and effectiveness of the schedule in paying the total fines in a timely manner.

* * * *

(6) Request for retroactive deficiencies

(6.1) Manufacturers may request that the Executive Officer grant a deficiency and amend a vehicle's certification to conform to the granting of the deficiencies ~~during the first 6 months after commencement of normal production~~ for each aspect of the monitoring system: (a) identified by the manufacturer (during testing required by section (j)(2) or any other testing) to be functioning different than the certified system or otherwise not meeting the requirements of any aspect of section 1968.2; 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 include all affected vehicles within the model year. The manufacturer may request a retroactive deficiency until either of the following dates, whichever is later:

(6.1.1) When the last affected vehicle is produced (no later than December 31 of the calendar year for which the model year is named); or

(6.1.2) 6 months after commencement of normal production.

~~(6.1.1) For issues found during testing required by section (j)(2), if the manufacturer requests that the Executive Officer grant a deficiency for the issue, the manufacturer must make the request during the first 9 months after commencement of normal production.~~

~~(6.1.2) For issues other than those found during testing required by section (j)(2), if the manufacturer requests that the Executive Officer grant a deficiency for the issue, the manufacturer must make the request during the first 6 months after commencement of normal production.~~

* * * *

(l) *How to Submit Required Information.*

(1) Wherever section 1968.2 requires manufacturers to submit information to the Executive Officer, the manufacturer may send the information through the electronic documentation system at this website: https://ww2.arb.ca.gov/certification-document-management-system.

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

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

* * * *

(b) *Testing Procedures*

* * * *

(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:

* * * *

(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 2027 model year vehicles certified to a ratio of 0.100 in accordance with title 13, CCR section 1968.2(d)(3.2.1)(~~D~~E~~F~~G),

b. monitors specified in title 13, CCR section 1968.2(e) on 2007 through 2012 model year vehicles for the first three model years the monitor is certified to the in-use performance ratio monitoring requirements of title 13, CCR sections 1968.2(d)(3.2.1)(A)~~ through (C)~~, (B), and ~~(E)~~(F)

* * * *

(ii) For monitors that are certified to the ratios in title 13, CCR sections 1968.2(d)(3.2.1)~~(A) through (C~~E~~)~~ and are not described in sections (b)(6)(B)(i)~~b.~~a. through e. above, the data collected from the vehicles in the test sample indicate either that (1) 66.0 percent or more of the vehicles in the test sample group have an in-use monitor performance ratio less than the required minimum ratio defined in title 13, CCR section 1968.2(d)(3.2.1) for the same monitor, or (2) the average in-use monitor performance ratio for one or more of the monitors in the test sample group is less than:

* * * *

d. 0.088 for the diesel catalyst warm-up system monitor identified in title 13, CCR section 1968.2(f)(12.2.2);

e. 0.441 for the gasoline cold start emission reduction strategy cold start catalyst heating monitor in title 13, CCR section 1968.2(e)(11.2.3)

~~c.~~~~e.~~f. 0.297 for catalyst, oxygen sensor, EGR, VVT system, and all other monitors specifically required in section title 13, CCR sections 1968.2(e) and (f) to meet the monitoring condition requirements of title 13, CCR section 1968.2(d)(3.2).

* * * *

(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 any of the following:

(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 ~~(CE)~~(F) (except monitors specified in sections (b)(6)(B)(i)b. through e.), 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 specified in sections (b)(6)(B)(i)a. through e., the Executive Officer shall determine the remedial action for nonconformances regarding the in-use monitor performance ratio in accordance with section (c)(4) below.

* * * *

(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:

* * * *

(iv) designate a date at least 45 days from the date of receipt of such notice by which the manufacturer shall submit a plan, pursuant to section (d)(1) below, outlining the remedial action to be undertaken consistent with the Executive Officer's order. Except as provided in section (c)(7)(C) below, all plans shall be submitted to the Chief, ~~Mobile Source Operations~~

~~Division~~Emissions Certification and Compliance Division, ~~9528 Telstar Avenue, El Monte, California 91731~~CA Air Resources Board, 4001 Iowa Avenue~~P.O. Box 55009~~, Riverside, California 9250792517~~, within the time limit specified in the notice. The Executive Officer may grant the manufacturer an extension of time for good cause.

* * * *

(d) *Requirements for Implementing Remedial Actions*

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(4) *Label Indicating that Recall Repairs Have Been Performed.*

(A) If the required remedial action involves recall of a test group(s), OBD II group(s), or subgroup(s) thereof, the manufacturer shall require those who perform inspections and/or recall repairs to affix a label to each vehicle that has been inspected and/or repaired.

(B) The label must be placed in a location approved by the Executive Officer and must be fabricated of a material suitable for such location in which it is installed and which is not readily removable.

(C) The label must contain the remedial action campaign number and a code designating the facility at which the remedial action or inspection to determine the need for remedial action was performed.

(D) Manufacturers are exempt from the label requirements of sections (d)(4)(A) through (C) if the following conditions are met:

(i) The recall involves only software and/or software calibration repairs or changes and does not involve hardware repairs or changes,

(ii) The manufacturer keeps a record of the VINs of all vehicles that were inspected and/or repaired, and

(iii) Upon request from the Executive Officer, the manufacturer provides information about running changes, field fixes, service campaigns, and recalls for any given VIN from all vehicles affected by the nonconformity.

* * * *

(6) *Record Keeping and Reporting Requirements.*

* * * *

(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~~Emissions Certification and Compliance Division, ~~9528 Telstar Avenue, El Monte, California 91731~~CA Air Resources

Board, 4001 Iowa Avenue~~P.O. Box 55009~~, Riverside, California 9250792517~~2517~~.
For each recall campaign, the quarterly report must contain the following:

* * * *

(x) An initial list, using the following data elements and designated positions, indicating all vehicles subject to recall that the manufacturer has not been invoiced for, or a subsequent list indicating all vehicles subject to the recall that the manufacturer has been invoiced for since the previous report. The list must be supplied in a standardized computer format to be specified by the Executive Officer. The data elements must be written in "ASCII" code without a comma separating each element. For example: XTY32A71234E-9456123408-25-91A. The add flag (see below) should reflect the vehicles for which the manufacturer has not been invoiced and the delete flag should reflect changes since the previous report. The Executive Officer may change the frequency of this submittal depending on the needs of enforcement. The Executive Officer may not, however, require a frequency or format for this submittal that is different in any way from the frequency or format determined by the Executive Officer as required for reporting of data in title 13, CCR sections 2119(a)(10) and 2133(a)(10).

Data Elements	*Positions*
• File Code (designated by DMV)	1
• License Plate Number	2-8
• Last three VIN positions	9-11
• Recall ID Number	12-17
• Mfg. ID Number (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

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