State of California
AIR RESOURCES BOARD

STAFF REPORT: INITIAL STATEMENT OF REASONS FOR RULEMAKING

PROPOSED AMENDMENTS TO THE LEV III CRITERIA POLLUTANT REQUIREMENTS FOR LIGHT- AND MEDIUM-DUTY VEHICLES, THE HYBRID ELECTRIC VEHICLE TEST PROCEDURES, AND THE HEAVY-DUTY OTTO-CYCLE AND HEAVY-DUTY DIESEL TEST PROCEDURES

Date of Release: September 2, 2014
Scheduled for Consideration: October 23, 2014

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Staff Report: Initial Statement of Reasons for Proposed Rulemaking

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EXECUTIVE SUMMARY

Background

Although significant strides have been made toward improving California's air quality, health-based state and federal air quality standards continue to be exceeded in regions throughout California. To achieve the 1997 8-hr ozone standard by the attainment date in 2023, oxides of nitrogen (NOx) emissions in the greater Los Angeles region must be reduced by two thirds, even after considering all of the control measures in place today. Furthermore, to achieve the more stringent 2008 8-hr ozone standard by 2032 will require even more dramatic reductions. In the San Joaquin Valley, the 2007 State Implementation Plan identified the need to reduce NOx emissions by 82 tons per day in 2023 through the use of long-term and advanced technology strategies. To put this in context, this is equivalent to eliminating the NOx emissions from all on-road vehicles operating in these regions. Furthermore, California's growing population and increasing use of motor vehicles will continue to exert upward pressure on statewide emissions.

In order to address the need to further reduce vehicle emissions and achieve California's goals of meeting ambient air quality standards and reducing climate changing greenhouse gas emissions (GHG), in January 2012, California developed the Advanced Clean Cars (ACC) program. The ACC program incorporates three elements that combine the control of smog-causing (criteria pollutant) emissions and GHG into a single coordinated package of requirements for model years 2015 through 2025, assuring the development of environmentally superior cars that will continue to deliver the performance**,** utility, and safety vehicle owners have come to expect. These three elements include: the Low-Emission Vehicle III (LEV III) regulations, the Zero-Emission Vehicle (ZEV) regulations, and the Clean Fuels Outlet regulations.[1]

Proposed Program Changes

Subsequent to the adoption of the ACC program, the U.S. Environmental Protection Agency (U.S. EPA) finalized the federal Tier 3 program designed to reduce criteria pollutants from light-duty vehicles from model years 2017 through 2025. (The Tier 3 regulations do not address GHG emissions.) The Tier 3 program essentially mirrors California's LEV III criteria pollutant program in both structure and requirements and was developed in a cooperative effort with the Air Resources Board (ARB). Consistent with ARB's comments on the Tier 3 program as originally proposed by U.S.EPA, staff is proposing to align with a number of features of the Tier 3 program, some of which are more stringent than LEV III. This further alignment with Tier 3 will allow manufacturers to produce vehicles that can meet both California and federal emission requirements.

[1] Although the Clean Fuels Outlet regulation update was adopted by the Board as part of the ACC package, it was not finalized by the California Office of Administrative Law due to the passage of legislation, Assembly Bill 8 (AB 8 - 2013), which included dedicated funding for hydrogen fueling infrastructure to support the market launch of hydrogen fuel cell vehicles.

Other proposed changes include:

- Updates to the references to the Code of Federal Regulations in California's test procedures (including the light- and medium-duty test procedures, the non-methane-organic gas test procedures, the heavy-duty Otto-cycle and heavy-duty diesel test procedures, and the hybrid electric vehicle test procedures).

- Revisions to the manufacturer reporting procedures for their advanced technology vehicles to include Battery Electric Vehicles and Plug-In Electric Vehicles in order to better facilitate California's infrastructure planning for these vehicles.

- Modifications to the California Environmental Performance Label scores to incorporate the LEV III emission categories.

- Modifications to the Hybrid Electric Vehicle Test Procedures to accommodate "real world" plug-in hybrid electric vehicles.

I. INTRODUCTION

Although significant strides have been made toward improving California's air quality, health-based state and federal air quality standards continue to be exceeded in regions throughout California. To achieve the 1997 8-hr ozone standard by the attainment date in 2023, oxides of nitrogen (NOx) emissions in the greater Los Angeles region must be reduced by two thirds, even after considering all of the control measures in place today. Furthermore, to achieve the more stringent 2008 8-hr ozone standard by 2032 will require even more dramatic reductions. In the San Joaquin Valley, the 2007 State Implementation Plan identified the need to reduce NOx emissions by 80 tons per day in 2023 through the use of long-term and advanced technology strategies. To put this in context, this is equivalent to eliminating the NOx emissions from all on-road vehicles operating in these regions. Furthermore, California's growing population and increasing use of motor vehicles will continue to exert upward pressure on statewide emissions.

Emissions from the light- and medium-duty fleet are regulated through California's low-emission vehicle (LEV) program. The Air Resources Board (ARB) adopted the first LEV regulations in 1990, requiring automobile manufacturers to introduce progressively cleaner light- and medium-duty vehicles with more durable emission controls from 1994 through 2003. By adopting these regulations, ARB established the most stringent exhaust regulations ever for light- and medium-duty vehicles. The regulations, now referred to as the "LEV I" regulations included three primary elements — (1) tiers of exhaust emission standards for increasingly more stringent categories of low-emission vehicles, (2) a mechanism requiring each manufacturer to phase-in a progressively cleaner mix of vehicles from year to year with the option of credit banking and trading, and (3) a requirement that a specified percentage of passenger cars and lighter light-duty trucks be zero-emission vehicles (ZEVs), vehicles with no exhaust or evaporative emissions.

As the state's passenger vehicle fleet continued to grow and more sport utility vehicles and pickup trucks were used as passenger cars rather than work vehicles, the new, more stringent LEV II standards were necessary for California to meet federally-mandated clean air goals outlined in the 1994 State Implementation Plan (SIP). One of the major changes made by the LEV II standards was that all light-duty trucks became subject to the same emission standards as passenger cars, and vehicles 6,000 to 8,500 lbs. gross vehicle weight rating (GVWR) (including sport utility vehicles) that had previously been treated as medium-duty vehicles were treated as light-duty trucks. The LEV II rulemaking also included the adoption of Compliance Assurance Program "CAP 2000" amendments that established new, streamlined motor vehicle certification and in-use test requirements – developed jointly with the U.S. Environmental Protection Agency (U.S. EPA) – applicable to 2001 and subsequent model motor vehicles.

Accordingly, following a November 5, 1998 hearing, ARB adopted California's second generation "LEV II" regulations, which generally became applicable with the 2004 model year (although earlier certification to the LEV II standards was permitted). Building on LEV I, the LEV II program included three major interrelated elements designed to reduce exhaust emissions — (1) expanding the light-duty truck category up to 8,500

lbs., GVW so that most sport utility vehicles, mini-vans and pick-up trucks were subject to the same low-emission vehicle standards as passenger cars, (2) strengthening the NOx standard for passenger cars and light-duty trucks, and changing other emission standards, and (3) establishing more stringent 2004 through 2010 model year phase-in requirements for passenger cars, light-duty trucks, and medium-duty vehicles.

Continuing its leadership role in the development of innovative and ground breaking emission control programs and to achieve California's goals of meeting ambient air quality standards and reducing climate changing greenhouse gas (GHG) emissions, California developed the Advanced Clean Cars (ACC) program, which was approved in January 2012. The ACC program incorporates three elements that combine the control of smog-causing pollutants and GHG emissions into a single coordinated package of requirements for model years 2015 through 2025, assuring the development of environmentally superior cars that will continue to deliver the performance, utility, and safety vehicle owners have come to expect. These three elements include: the LEV III regulations, the ZEV regulations, and the Clean Fuels Outlet regulations.[2]

Subsequent to the adoption of the ACC program, U.S. EPA finalized the federal Tier 3 program designed to reduce criteria pollutants from light-duty vehicles from model years 2017 through 2025. (The Tier 3 regulations do not address GHG emissions.) The Tier 3 program essentially mirrors California's LEV III criteria pollutant program in both structure and requirements and was developed in a cooperative effort with ARB. Consistent with ARB's comments on the Tier 3 program as originally proposed by U.S.EPA, staff is proposing to align with a number of features of the Tier 3 program, some of which are more stringent than LEV III. This further alignment with Tier 3 will allow manufacturers to produce vehicles that can meet both California and federal emission requirements.

Tier 3 also restructures and updates the test procedures in the Code of Federal Regulations (CFR) which are extensively referenced by California's test procedures to assure that manufacturers can use the same test procedures to certify both their federal and California vehicles. Accordingly, staff is proposing to update the references to the CFR in California's test procedures (including the light- and medium-duty test procedures, the non-methane-organic gas test procedures, the heavy-duty Otto-cycle and heavy-duty diesel test procedures, and the hybrid electric vehicle test procedures).

Staff is also proposing to revise the manufacturer reporting procedures for their advanced technology vehicles. Currently, manufacturers are required to report their production plans for hydrogen vehicles – including fuel cell electric vehicles – 33 months before they are certified. Staff is proposing that manufacturers also include their production plans for Battery Electric Vehicles (BEVs) and Plug-In Electric Vehicles

[2] Although the Clean Fuels Outlet regulation update was adopted by the Board as part of the ACC package, it was not finalized by the California Office of Administrative Law due to the passage of legislation, Assembly Bill 8 (AB 8 - 2013), which included dedicated funding for hydrogen fueling infrastructure to support the market launch of hydrogen fuel cell vehicles.

(PHEVs) in order to better facilitate California's infrastructure planning for these vehicles.

In addition, staff is proposing to modify the California Environmental Performance Label scores to incorporate the LEV III emission categories.

Since the last update in 2009, manufacturers have developed and marketed a variety of PHEV configurations that have proven difficult to test using the existing test procedures. Accordingly, staff is proposing a number of modifications to the Hybrid Electric Vehicle Test Procedures to accommodate these "real world" vehicles.

II. STATEMENT OF REASONS

A. DESCRIPTION OF PROBLEM PROPOSAL IS INTENDED TO ADDRESS

While developing the LEV III regulations, staff worked with U.S. EPA in an effort to provide as much consistency as possible between LEV III requirements and the federal Tier 3 program, which was under development at that time, while still meeting California criteria emission reduction needs. Now that the Tier 3 program has been finalized, modifications to the LEV III program designed to provide further consistency with the federal program are warranted. Although some elements of the LEV III program remain more stringent than the federal program in order to address California's unique air pollution problems, this will enable vehicle manufacturers to develop vehicles that meet the requirements of both the California and the federal programs.

In addition, California test procedures contain extensive references to sections of the CFR pertaining to test procedures and protocols for demonstration of compliance to the emission standards. Since the Tier 3 program was not finalized and incorporated into the CFR until after the adoption of LEV III, staff was unable to update the test procedure references as part of the original LEV III proposal.

Improvements to the reporting requirements for advanced technology vehicles to facilitate California's infrastructure development are necessary and the California Environmental Performance Label needs updating.

Finally, as mentioned in Chapter IV, changes are also needed to the HEV test procedures to reflect the operational characteristics of today's commercially available PHEVs. Consequently, it is necessary for staff to return to the Board at this time to present updated test procedures for the Board's consideration.

B. SPECIFIC PURPOSE FOR THE ADOPTION, AMENDMENT, OR REPEAL

On April 28, 2014, U.S. EPA adopted new criteria pollutant emission standards for light- and medium-duty passenger cars and trucks (Tier 3 program) that closely mirrors the California LEV III criteria pollutant standards. The Tier 3 program also includes new specifications for certification gasoline and for E85 certification fuel that closely resemble California certification fuel specifications. While LEV III standards are

generally more stringent than the comparable federal requirements, there are some features of the Tier 3 program that are more stringent than those that are required in California. In these instances, ARB is proposing to modify the LEV III regulations to incorporate these more stringent federal requirements. ARB is also proposing to incorporate elements of the Tier 3 program that provide additional compliance flexibility without either reducing or delaying progress towards achieving the benefits of the LEV III program.

In addition, although California has its own regulations to control criteria pollutant emissions from passenger vehicles, vehicle manufacturers demonstrate compliance with both California and Federal regulations using test procedures that are substantially similar. This harmonization of the test procedures helps to streamline the certification procedure for vehicle manufacturer. The California test procedures currently incorporate significant sections of Part 86 of the CFR, which are modified as needed to incorporate California-specific requirements. Under Tier 3, U.S. EPA has adopted modifications to the CFR that migrate the testing requirements in Part 86 to a new Part 1066. The migration of the testing requirements from Part 86 to Part 1066 is scheduled to coincide with the phase-in of Tier 3 exhaust emission requirements beginning in 2017. The proposed amendments to California's test procedures are designed to similarly incorporate Part 1066 into the California test procedures consistent with Tier 3 requirements to enable manufacturers to continue to certify California vehicles using substantially the same test procedures.

C. PROPOSED SOLUTIONS TO THE PROBLEM

A number of modifications are being proposed to the regulations and test procedures in order to ensure that emission reductions from the LEV III program are maintained and to allow vehicle manufacturers to continue to demonstrate compliance with both California regulations and Federal regulations using test procedures that are substantially similar through the incorporation of new 40 CFR Part 1066 sections in the each of the modified test procedures. Finally, staff is proposing to modify the HEV test procedures to facilitate the testing of today's commercially available PHEVs.

D. RATIONALE SUPPORTING THE PROPOSED SOLUTIONS

The need and rationale for the proposed amendments are discussed in Chapter III and Chapter IV.

The amendments identified in these Chapters represent the most significant changes being proposed to the regulations and test procedures. As mentioned in Chapter III, one significant proposed change that applies to the following test procedures is the incorporation of new 40 CFR Part 1066 sections. Modifications to the regulations that are being proposed that are corrections to errors in the text, are editorial in nature, or are updates to the most current versions of incorporated sections of the CFR are not summarized below. A more detailed list and description of all of the proposed changes is found in Appendix K.

III. CALIFORNIA'S LEV III CRITERIA POLLUTANT EMISSION REGULATIONS

The LEV III element of the ACC program incorporates requirements to significantly reduce both criteria pollutant and GHG emissions from model years 2015 through 2025. These requirements, to simultaneously reduce criteria and GHG emissions, present a significant technology challenge to the vehicle manufacturers in that they will need to incorporate advanced drivetrain technology on their vehicles while substantially lowering the criteria emissions of their combustion engines. Recognizing this challenge, the ARB worked with the U.S. EPA in a cooperative effort in the development of the criteria pollutant requirements of LEV III and Tier 3 to achieve the maximum feasible criteria emission reductions while taking into consideration the concomitant requirements to reduce GHG emissions.

A. PROPOSED AMENDMENTS TO CALIFORNIA'S LEV III EXHAUST EMISSION REGULATIONS

1. Background

1.1 Exhaust Emission Regulations

The criteria pollutant element of LEV III calls for further reductions in vehicle emissions by requiring the average emissions of new vehicles to be equivalent to super-ultra-low-emission (SULEV) levels by 2025. To place that in context, SULEV emission levels represent a reduction from uncontrolled vehicle emissions of greater than 99 percent. Phased-in from 2015-2025, the proposed criteria pollutant emissions program provides significant flexibility to manufacturers by providing: 1) an extended phase-in period for manufacturers to incorporate improved emission control systems across their vehicle lines; 2) an array of emission standards to which manufacturers may certify their vehicles, as long as their fleet average emissions meet the declining fleet average requirement; 3) combined non-methane organic gas (NMOG) plus NOx standards, which will enable manufacturers to more cost-effectively tailor their emission control systems and; 4) a requirement that all vehicles emit zero evaporative emissions.

While LEV III requires SULEV fleet average emissions over the Federal Test Procedure (FTP) which represents vehicle operation in an urban environment, emissions from aggressive driving and air conditioner use are not accounted for by this test cycle. Instead, these "off-cycle" emissions are regulated via California's Supplemental Federal Test Procedures (SFTP). As part of the SFTP program, manufacturers are required to control exhaust emissions over the US06 cycle, a high-speed, high-load driving cycle, while emissions resulting from use of the vehicle's air conditioner are accounted for with a climate-controlled, air conditioning test cycle called the SC03 cycle.

1.2 Exhaust Emission Test Procedures

Current California test procedures extensively reference the CFR. This avoids repeating lengthy identical language to the federal test procedures in the California test procedures and enables manufacturers to use the same test procedures to certify both their California and federal vehicles.

2. Summary of Proposed Amendments

2.1 The proposed amendments to the LEV III exhaust emissions program that incorporate features of the Tier 3 program to provide additional flexibility to industry or to align with elements of the Tier 3 program with no adverse air quality impacts are as follows:

2.1.1 *Establishment of a NOx cap for the LEV395, ULEV340, LEV630, and ULEV570 emission categories and sunsetting these categories after the 2021 model year*. The Tier 3 Bin 395, Bin 340, Bin 630, and Bin 570 emission categories correspond to current Tier 2 bins. When U.S. EPA adopted NMOG+NOx standards for these categories, they also adopted separate additional standards for NOx for these categories that are identical to the currently applicable Tier 2 NOx standards. U.S. EPA included the separate NOx standards to ensure that manufacturers do not redesign or recalibrate their vehicles under the combined NMOG+NOx standards such that NOx emissions are increased compared to today's Tier 2 vehicles. U.S. EPA also eliminated these transitional bins after model year 2021 to correspond with the complete phase-in of the Tier 3 program.

Staff is proposing to align with Tier 3 and likewise adopt similar separate NOx standards for the least stringent LEV395 and LEV340 emission categories for medium-duty vehicles between 8,501-10,000 lbs. GVWR and the LEV630 and LEV570 emission categories for medium-duty vehicles between 10,001-14,000 lbs. GVWR and to eliminate these emission categories after model year 2021.

2.1.2 *Establishment of LEV III NMOG+NOx 150,000-mile exhaust mass emission standards that apply at high-altitude conditions for the LEV160, ULEV125, ULEV70, ULEV50, SULEV30, and SULEV20 emission categories*. The Tier 3 regulations provide limited relief for certification testing at high-altitude conditions for the cleanest emission bins. This was done to avoid requiring manufacturers to equip vehicles with special high-altitude emission control technologies. Since California's high-altitude requirements are currently aligned with the federal requirements, staff is proposing to similarly provide relief at high-altitude conditions for the cleanest LEV III emission categories. This will continue to align the stringency of the LEV III program with the federal program.

2.1.3 *Establishment of an NMOG+NOx fleet average phase-in for medium-duty LEV III vehicles as an alternative to the current phase-in requirement that is based on percentage of medium-duty vehicles being sold each year*. The Tier 3

regulations include a fleet average NMOG+NOx phase-in for medium-duty vehicles that provides equivalent emission benefits to the current phase-in requirements for LEV III medium-duty vehicles. LEV III medium-duty vehicles are phased into the California fleet based on sales percentage for the different LEV III emission categories. Staff is proposing to include a fleet average NMOG+NOx phase-in for medium-duty vehicles as an alternative to the current requirement to provide manufacturers more flexibility in meeting the requirement.

2.1.4 *Establishment of more stringent fleet average NMOG+NOx requirements for small volume manufacturers*. Under LEV III, manufacturers are required to meet increasingly stringent NMOG+NOx fleet average requirements in the 2015 through 2025 model years, at which time the fleet average plateaus. The LEV III fleet average requirements for small volume manufacturers are directionally similar to those required from larger manufacturers, however they decline at a slower rate to reflect the limited number of test groups that are produced by these manufacturers. Tier 3 also reduces vehicle emissions using this approach.

The adopted Tier 3 fleet average NMOG+NOx requirements for small volume manufacturers are more stringent than the current LEV III requirements, as shown in the following table. Staff is proposing to align the LEV III requirements for these manufacturers through the 2025 model year, at which time the fleet average will plateau, consistent with the LEV III fleet average NMOG+NOx requirements for larger manufacturers, which similarly plateau at 2025 model year levels. This proposal does not completely align LEV III requirements with those in Tier 3, which further reduces the fleet average requirement for small volume manufacturers beginning in the 2028 model year. This is because staff is concerned that there is too much uncertainty to establish fleet average requirements for small volume manufacturers for the 2028 and subsequent model years. Tier 3 addresses this uncertainty by including a provision to allow an individual manufacturer to request a delay in complying with the fleet average if it can demonstrate that compliance would cause "severe economic hardship."[3] However, California's regulations do not include a similar provision. Hence, the proposed LEV III amendments for small volume manufacturers will plateau after the 2025 model year and staff will re-evaluate the appropriateness of more stringent standards beyond 2025 at a future time.

Table III.A.2.1.4.1. Small Volume Manufacturer Fleet Average Requirements

	NMOG+NOx Fleet Average Requirement for Small Volume Manufacturers (grams per mile)					
Model Years	2015-2021		2022-2024		2025+	
		2017-2021		2022-2027		2028+
LEV III	0.160 g/mi		0.125 g/mi		0.070 g/mi	
Tier 3		0.125 g/mi		0.051 g/mi		0.030 g/mi

[3] See CFR §86.1811-17(h)(3) (April 28, 2014).

2.1.5 *Eliminate interim in-use SFTP NMOG+NOx standards for light-duty vehicles*: Under LEV III, vehicles certifying to light-duty SFTP NMOG+NOx standards are provided less stringent in-use standards for the first two model years of the test group through model year (MY) 2019. ARB has traditionally provided less stringent in-use standards to account for the uncertainty associated with potential new technologies and strategies that may be used to comply with new emission requirements. While the stringency of the Tier 3 SFTP NMOG+NOx standards are equivalent to those set forth in LEV III, U.S. EPA did not provide relaxed in-use standards and instead, requires vehicles to comply with the same standards in-use that they comply with at certification. U.S. EPA has indicated this is because it does not expect new technology to be needed to comply with Tier 3 standards. After reconsideration, staff agrees and proposes to align LEV III with Tier 3 and eliminate the relaxed interim in-use standards.

2.1.6 *Require LEV II vehicles included in the LEV III SFTP NMOG+NOx fleet average to certify to bins and be subject to their bin value at full-useful life*: U.S. EPA requires Tier 2 vehicles that are included in the Tier 3 SFTP NMOG+NOx fleet average to derive full-useful life emission values and certify to bins, thus requiring them to comply with their Tier 3 bin value through full useful life. Under LEV III, for the purpose of the fleet average, manufacturers similarly derive LEV III emission values for their LEV II vehicles; however, such vehicles are otherwise treated as LEV II vehicles, which do not have an in-use SFTP requirement. Staff proposes to amend LEV III so that the treatment of LEV II vehicles in the LEV III SFTP fleet-average is aligned with the treatment of Tier 2 vehicles in the Tier 3 SFTP fleet average.

2.1.7 *For fuel-flexible vehicles, require SFTP testing on all fuels they are designed to use*: U.S. EPA requires fuel-flexible vehicles to certify to their applicable emission standards, including SFTP standards, on all fuels they are designed to use. This ensures that emission controls remain effective regardless of fuel type. Currently, LEV III only requires fuel-flexible vehicles to test on E10 certification fuel. Staff proposes to align the LEV III requirements with the Tier 3 requirements by amending this provision to require testing on all applicable fuels as required under Tier 3.

2.1.8 *Require the same medium-duty vehicle test groups that certify to a LEV III NMOG+NOx emission category for FTP compliance to also certify to the equivalent LEV III emission category for SFTP compliance*: Under LEV III, manufacturers are only required to certify the same volume of medium-duty vehicles to LEV III NMOG+NOx emission categories on SFTP as they certify to LEV III NMOG+NOx emission categories on FTP. However, the actual test groups certifying to LEV III SFTP standards do not have to be the same as those certifying to LEV III FTP standards. Under Tier 3, U.S. EPA requires the test groups to be the same. Staff proposes to align with Tier 3 because it streamlines the requirements of the program without affecting stringency.

2.1.9 *Align with federal SFTP enrichment limitations*: U.S. EPA modified enrichment limitations for SFTP testing in Tier 3. Specifically, for vehicles being tested on SFTP test cycles, their engines may only enrich up to lean best torque with a tolerance of four percent. Prior to Tier 3, the limitation was set at six percent. U.S. EPA reduced the tolerance in order to reflect advancements in fuel control, which more precisely control enrichment events during driving. Staff proposes to align on this item.

2.2 The proposed amendments to the LEV III exhaust emissions program that clarify existing requirements are:

2.2.1 *Clarification that 50 degree Fahrenheit (^{o}F) standards only apply at 4,000 miles*.

2.2.2 *Clarification that Direct Ozone Reduction Technology Credits can only be used to demonstrate compliance with FTP standards and temperatures*.

2.2.3 *Clarification of how the NMOG+NOx Contribution Factor for Off-vehicle Charge Capable HEVs should be calculated for LEV II vehicles and for 2018 and subsequent model year vehicles*. The current formulas for calculating the NMOG+NOx Contribution Factor for PHEVs use LEV III nomenclature. Proposed changes will clarify that the formula for LEV160 also applies to LEV II LEV, the formula for ULEV125 also applies to LEV II ultra-low-emission vehicle (ULEV), and the formula for SULEV30 also applies to LEV II SULEV. In addition, current test procedure requirements state that, for 2018 and subsequent model years, the "Zero-emission Vehicle Miles Travelled (or "VMT") Allowance" that is included in these formulas is determined in accordance with the "California Exhaust Emission Standards and Test Procedures for 2018 and Subsequent Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes." However, it is not clear that the Zero-emission VMT Allowance is equal to the sum of the "Zero-Emission Vehicles Miles Traveled TZEV Allowance" and the "Allowance for US06 Capability" in this test procedure. Staff is proposing to add language to clarify this.

2.2.4 *Incorporation of a methodology for calculating fleet average credits and debits for medium-duty vehicles including conversion of credits and debits from the current Vehicle Equivalent Credits (VECs) to fleet average credits*. Under the LEV II program, medium-duty NMOG VECs were earned based on the percentages of vehicles certified to each LEV II emission category. Staff is proposing to add a factor to convert these credits to NMOG+NOx fleet average credits for those manufacturers that elect to phase-in LEV III medium-duty vehicles using the optional fleet average.

Most medium-duty manufacturers are expected to have NMOG VECs banked (either credits or debits) when LEV III requirements for MDVs begin phasing in for model year 2016. VECs can be either positive (a VEC credit) or negative (a VEC debit)

depending on whether a manufacturer exceeds the required phase-in percentages or fails to meet the required phase-in percentages. In the LEV II program, VEC credits earned prior to 2016 are discounted in subsequent model years and then expire four years after they are accrued. VEC debits must be made up the model year after they are accrued. Further, under LEV II, MDV emission standards (and VEC credits or debits) are in units of NMOG while under LEV III, the standards (and VECs) are in units of NMOG+NOx. However, since VECs are calculated based on the percentage of a manufacturer's vehicles meeting the applicable emission standards, the value of VECs calculated using either the NMOG value of the applicable LEV II standard or the NMOG+NOx value of the applicable LEV III standard is the same. Therefore, no conversion factor is needed for converting LEV II NMOG VECs to equivalent LEV III NMOG+NOx VECs. The value of any LEV II VECs converted to LEV III VECs will, however, continue to be treated as LEV II VECs. That is, they will be discounted and then expire four years after they were originally accrued. LEV III VECs accrued beginning in 2016 will retain full value for five years and can be carried back three years.

Staff is also proposing an option whereby manufacturers can comply with LEV III MDV emission requirements by meeting a fleet average emission requirement rather than certifying a specified percentage of their MDVs to the applicable emission standards. In this case, a manufacturer's LEV III credits or debits would be expressed in g/mi instead of VECs. In order to convert any LEV II NMOG VEC credits or debits carried forward to 2016 LEV III NMOG+NOx g/mi credits or debits, staff is proposing that manufacturers calculate equivalent NMOG+NOx g/mi credits or debits for their LEV II MDVs based on the implied LEV II fleet average requirements of 0.364 g/mi for MDVs between 8,501-10,000 lbs. GVWR and 0.592 g/mi for MDVs between 10,001-14,000 lbs. GVWR. These MDV g/mi fleet average credits or debits would be calculated in the same manner as g/mi NMOG+NOx credits or debits are calculated for LEV II vehicles less than 8,500 GVWR. The value of any LEV II NMOG+NOx credits will continue to be treated as credits earned in LEV II and, therefore, they will be discounted in subsequent model years and then expire four years after they were originally accrued.

2.2.5 *Clarification on in-use SFTP particulate matter (PM) testing:* Staff proposes to clarify that for in-use verification testing, any vehicle tested to demonstrate compliance with FTP PM standards must also be tested to demonstrate compliance with SFTP PM standards.

2.2.6 *Clarification on using FTP test values in place of SC03 test values in SFTP PM composite value calculations*: Staff proposes to clarify that for medium-duty vehicles, FTP emission values can be used for SC03 values when calculating SFTP PM composite values. The SC03 test procedure is designed to determine emissions associated with the use of an air conditioner. Because medium-duty vehicles have larger displacement engines than light-duty vehicles, the effect of using the air conditioner on this vehicle class is typically negligible.

2.2.7 *Clarification on SFTP NMHC to NMOG conversion factor applicability*: U.S. EPA and ARB jointly derived the NMHC to NMOG conversion factor for hot start tests based on testing with E10 and E15 fuels and intended for it to apply only to low level ethanol fuel blends. The regulations currently require this conversion factor for all fuels and staff proposes to clarify that it applies to gasoline-fueled vehicles only.

2.2.8 *Clarification on SFTP CO standard applicability*: Under LEV III, the SFTP NMOG+NOx fleet average includes LEV II, LEV III, and cleaner federal vehicles in the calculation. Staff proposes to clarify that the LEV III SFTP CO standard does not apply to LEV II vehicles or cleaner federal vehicles included in a manufacturer's SFTP NMOG+NOx fleet average.

2.3 The proposed amendments to the LEV III program that establish new requirements are:

2.3.1 *More stringent SFTP PM standards, which reflect more aggressive real world driving – change to FTP PM alternative phase-in*.

As part of the original LEV III rulemaking, ARB adopted US06 PM emission standards of 10 mg/mi for light-duty vehicles with a GVWR at or below 6,000 pounds and 20 mg/mi for light-duty vehicles between 6,001 and 8,500 pounds GVWR based on data from U.S. EPA and ARB test programs. Following the adoption of LEV III, it was discovered that flexible transfer tubing used in U.S. EPA's emissions measurement equipment degraded from extreme heat exposure during testing and created artificially high PM emission values in their US06 test results.[4] This discovery invalidated a significant portion of the data used to develop these standards, which prompted ARB to initiate a new US06 PM test program (and for U.S. EPA to repeat their testing). Data from the new testing shows that a reduction from the originally adopted US06 PM emission standards is warranted. In light of the new test data, U.S. EPA adopted a more stringent US06 PM standard in Tier 3 of 6 mg/mi, phasing in from 2017 through 2021 model years for all vehicles through 8,500 lbs. GVWR. U.S. EPA's standards also included interim relief in the form of both a higher certification standard of 10 mg/mi for the first two model years of the phase-in (2017 and 2018) and a higher in-use standard of 10 mg/mi through the 2023 model year. As discussed below, staff is proposing to align with Tier 3 on both the 6 mg/mi certification standard as well as the interim relief. However, because manufacturers are allowed to use an alternative phase-in, the higher 10 mg/mi certification standard for the first two years could be exploited to avoid certification to the 6 mg/mi standard until the end of the phase-in. Accordingly, staff is also proposing an anti-backsliding provision that would apply if a manufacturer elects to use an alternative phase-in to ensure that consistent progress is made towards the 6 mg/mi standard.

[4] U.S. EPA. March 1, 2013. Memorandum to Tier 3 Docket: Test Program to establish LDV Full Useful Life PM Performance. http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2011-0135-0428

Manufacturers are expected to utilize GHG-reducing technologies, such as turbocharging and gasoline direct injection (GDI), in a wider range of their vehicles in coming years to comply with increasingly stringent GHG and fuel economy standards. Turbocharging is a strategy for forcing excess air into the engine to improve combustion efficiency, and GDI allows for better fuel control. One contention from the auto industry is that these technologies present new challenges for controlling PM emissions. Specifically, they have indicated that turbocharging could lead to additional need for enrichment, the process of injecting excess fuel in order to lower combustion and exhaust temperatures and correspondingly counter the higher heat load resulting from turbocharging and protect the turbocharger itself from excessively high temperature exhaust gases, especially under the high-speed and load driving modes of the US06. Additionally, manufacturers have argued that fuel-air mixing is not as effective in GDI engines as it is in port fuel injection engines which can lead to fuel condensing on the walls of the engine cylinders. Both conditions can potentially result in higher PM emissions due to incomplete combustion. To evaluate this, ARB conducted a test program that focused on vehicles equipped with turbocharging and GDI technologies and compared them with vehicles equipped with port fuel injection (PFI) technologies. All vehicles were tested using LEV III E10 certification gasoline.

The following table describes the vehicles tested as part of this test program:

Table III.A.2.3.1.1. Vehicles from ARB's US06 PM Test Program

Vehicle	LEV II Emission Category	Odometer (miles)	PFI	GDI	Turbo	Engine Size (liters)
2012 Nissan Maxima	ULEV	19k	x			3.5
2012 Toyota Corolla	ULEV	23k	x			1.8
2007 Chevy Silverado	ULEV	128k	x			5.3
2011 Nissan Altima	SULEV	31k	x			2.5
2006 Hyundai Sonata	ULEV	105k	x			3.3
2013 Chevy Spark	ULEV	24k	x			1.2
2009 Toyota Camry	SULEV	64k	x			2.4
2009 Ford Explorer	ULEV	53k	x			4.0
2013 Dodge Dart	LEV	13k	x		x	1.4
2013 Ford Fusion	SULEV	9k		x	x	1.6
2011 Nissan Juke	ULEV	51k		x	x	1.6
2013 Kia Optima	SULEV	1k		x	x	2.4
2013 Hyundai Veloster	ULEV	11k		x	x	1.6

The results of ARB's recent US06 PM test program are summarized in the figures below. It is important to note that none of the test vehicles were designed to comply with the future 3 mg/mi PM standard on the FTP (which phases-in concurrently with the requirement to meet this new US06 PM standard) or to control PM emissions at all over the US06 test (as this proposed standard will be the first time vehicles are subjected to a PM standard on the US06 test). Furthermore, when assessing the

appropriateness of the proposed US06 PM standards, staff based the analysis on the expected performance of vehicles that will already have the hardware and calibration necessary to comply with the 3 mg/mi FTP PM standard. Accordingly, test vehicles that currently emit at levels above the future 3 mg/mi FTP standard are not compared directly to a future 6 mg/mi US06 PM standard as they would be expected to take further actions necessary to reduce PM levels on the FTP and such actions would also likely reduce US06 levels to a more appropriate level.

As can be seen in Figure III.A.2.3.1.1, all PFI vehicles, including a turbocharged Dodge Dart, had average US06 PM emissions lower than 6 mg/mi. The turbocharged Dodge Dart had one out of four tests (at least three US06 tests were run for each vehicle) that exceeded 6 mg/mi, but staff believes a modification to the engine's calibration would resolve this.

Generally, the GDI vehicles tested (Figure III.A.2.3.1.2) had higher emissions over the US06 cycle compared to the PFI vehicles and showed greater variability. However, one of these vehicles, the Ford Fusion, performed well and had PM emissions well below 6 mg/mi. Another vehicle, the Nissan Juke, performed poorly and significantly exceeded 6 mg/mi, but data from this vehicle is not being considered because it failed to comply with even its current LEV II FTP PM certification standard of 10 mg/mi. The remaining three GDI vehicles each had one test point that exceeded 6 mg/mi, but two of these vehicles had an average emission value that was lower than 6 mg/mi. Because FTP PM emission values of all three of these vehicles were close to, or in excess of, 3 mg/mi, further improvements would likely occur before being certified to the LEV III FTP PM standard. Staff believes that after such improvements, those vehicles would also likely comply with a 6 mg/mi US06 PM standard. Testing of the GDI vehicles did show more test to test variability than PFI vehicles, but staff believes that calibration modifications would likely resolve much of the variability. Additionally, most GDI vehicles today, including these test vehicles, have newly switched from PFI to GDI systems and the systems are expected to undergo significant refinement as second generation systems are implemented in upcoming years and manufacturers pay further attention to detail during PM calibration on both the FTP and the US06 cycles.

Figure III.A.2.3.1.1. US06 PM Emissions from PFI Vehicles in US06 PM Test Program

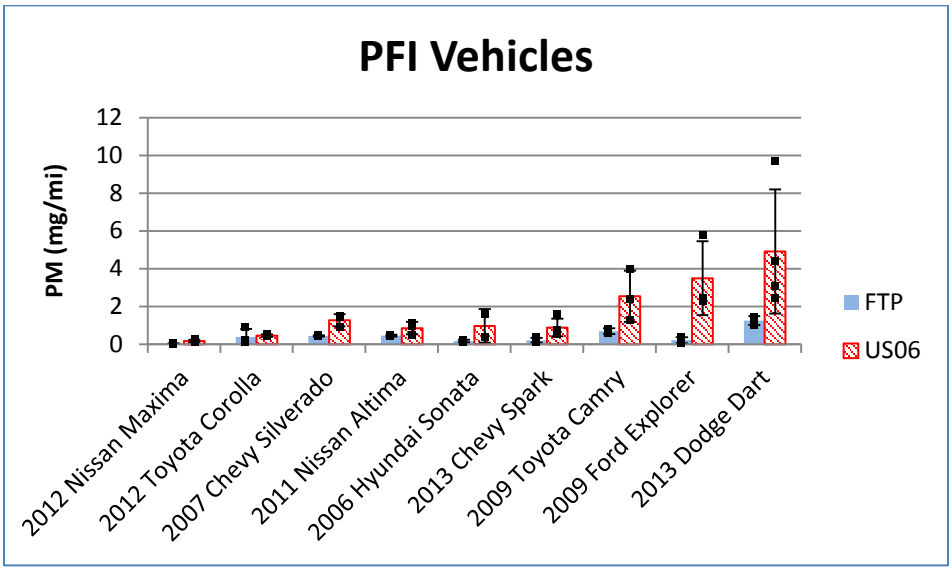
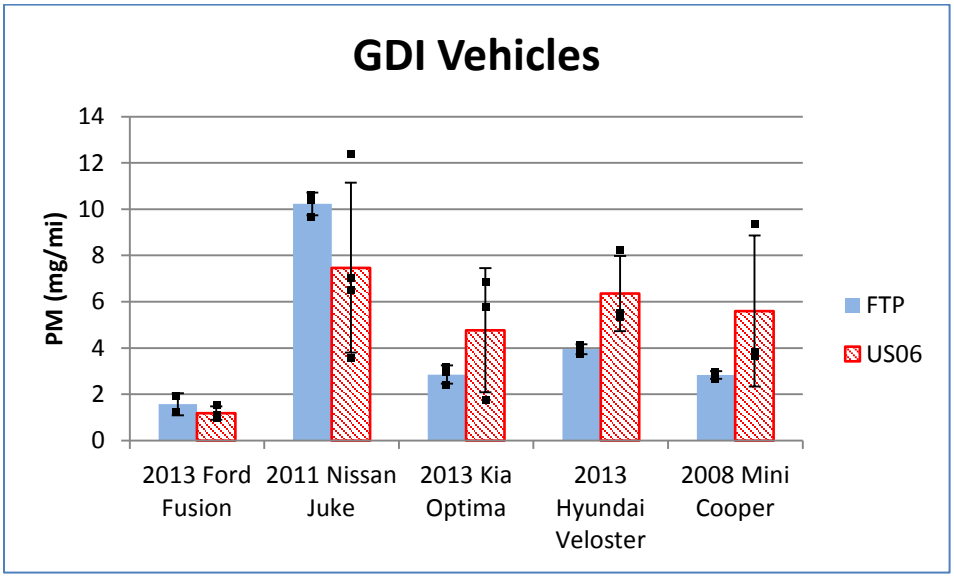


Figure III.A.2.3.1.2. US06 PM Emissions from GDI Vehicles in US06 PM Test Program



Based on the above, staff is proposing to adopt an approach similar to that set forth in U.S. EPA's Tier 3 program. The current requirement that any light-duty vehicle certifying to the 3 mg/mi LEV III FTP PM standard must also meet the US06 PM standard would be retained. However, the proposal would change the US06 PM standard. For the first two years of the phase-in (2017 and 2018), the US06 PM standard would be 10 mg/mi and then the standard would drop to the final value of 6 mg/mi for 2019 and subsequent model years. The proposal would also require that, for any manufacturer using an alternative phase-in, the percentage of its fleet

certifying to LEV III PM standards in the 2019 and 2020 model years must be equal to or greater than the highest percentage certified in any model year prior to 2019. This anti-backsliding provision would ensure manufacturers begin to certify vehicles to the 6 mg/mi PM standard in 2019 rather than delay such work until 2021 by amassing excess credits with vehicles certified to the interim 10 mg/mi PM standard allowed before 2019 model year. Identical to Tier 3, the proposal would also provide additional interim relief in the form of a relaxed in-use standard of 10 mg/mi that would apply through model year 2023. The proposed approach would address manufacturer concerns about uncertainty with the new standard and the higher variability of PM emissions over the US06 cycle while still ensuring timely progress on PM control over high acceleration, high load operation.

2.3.2 *Allowing ARB to participate in the selection process of the emission data vehicles chosen for LEV III PM testing by a manufacturer*. A manufacturer must select emission data and/or engineering development vehicles each year from passenger car or light-duty truck test groups and engineering development vehicles from medium-duty vehicle test groups to demonstrate compliance with emission standards. Staff is proposing to add language that allows ARB to request LEV III PM testing of specific test groups when it appears that compliance with emission standards might be problematic.

2.3.3 *Exempting a federal Bin 8, Bin 85, or Bin 110 vehicle that is sold in California as an alternative to a LEV II vehicle under the Cleaner Federal Vehicle provisions from 50^{o}F testing requirements*. California's Cleaner Federal Vehicle provisions state that when a vehicle model is certified to a federal standard that is more stringent than the applicable California standard (based on the FTP NMOG+NOx exhaust emission standards to which it certifies), that "cleaner federal vehicle" must be sold in California. This ensures that the vehicle models sold in California cannot be dirtier than those sold federally. In those instances when a "cleaner federal vehicle" is sold in California, that vehicle continues to be subject to all other California requirements including evaporative emissions, OBD II, SFTP emissions, 50^{o}F exhaust emissions, highway NMOG+NOx emissions, GHG emissions, and emission warranty. Currently, vehicles that certified to federal Tier 2 emission Bins 3 and 4 qualify as "cleaner federal vehicles" compared to the LEV II LEV and ULEV emission categories. For these two bins, however, the California test procedures exempt these vehicles from meeting 50^{o}F testing requirements since there are no 50^{o}F standards that correspond to the Bin 3 and Bin 4 standards. A comparable situation exists for federal Bin 8, Bin 85, and Bin 110 vehicles that may also qualify as "cleaner federal vehicles" compared to LEV II vehicles. Staff is, therefore, proposing to similarly exempt Bin 8, Bin 85, and Bin 110 vehicles that are sold in California under the "Cleaner Federal Vehicle" provisions from meeting 50^{o}F testing requirements.

B. PROPOSED AMENDMENTS TO CALIFORNIA'S LEV III EVAPORATIVE EMISSION REGULATIONS

1. Background

1.1 Evaporative Emission Regulations

The LEV III evaporative emissions program will result in the deployment of zero-evaporative emission technology across the entire fleet. The zero-evaporative emission standards were first introduced in LEV II as optional standards that allowed vehicle manufacturers to generate credits under California's ZEV program. Under LEV III, these standards are no longer optional, and the program requires new vehicles to reduce fuel evaporative emissions to essentially zero. To ease the transition into these standards, LEV III provides flexibility to vehicle manufacturers by providing: 1) the option to use a less burdensome emission test; 2) the ability to comply with the standards as a fleet average; and 3) the ability to customize their phase-in so long as cumulative emissions are not impacted.

1.2 Refueling Emission Regulations

Emissions resulting from refueling are regulated with the LEV III refueling emission standard and test procedure. The LEV III refueling emission standard applies to complete vehicles up to 14,000 lbs. GVWR.

2. Summary of Proposed Amendments to Evaporative Emission Regulations

2.1 The proposed amendments to the LEV III evaporative emissions program that incorporate features of the Tier 3 program or provide additional flexibility to industry with no adverse air quality impacts are as follows:

2.1.1 *Adoption of effective leak diameter standard and procedure:* U.S. EPA introduced a leak test and standard in Tier 3 in order to facilitate verification that in-use evaporative emissions are being adequately controlled. This standard is set at the current On-Board Diagnostics II (OBD II) evaporative leak check threshold (equivalent to a 0.020 inch diameter hole), and the test procedure is a relatively quick method for detecting gross emitters. Staff is proposing to adopt this same standard and procedure and expects the measure to provide further assurance that evaporative emission benefits expected from the standards and from OBD II are being realized in-use. Compliance with the leak standard would be determined either by using OBD II's leak check function or by using a commercially available flow-measurement type leak tester. This proposal also includes an in-use provision, which would require manufacturers to perform in-use leak testing on all vehicles brought in for exhaust emission testing under the in-use verification program (IUVP). The leak test requirements would be phased in for California on the same schedule set forth in Tier 3, with compliance required starting in the 2018 model year.

2.1.2 *Adoption of evaporative canister bleed test in-use requirements:* As part of the LEV III evaporative emissions program, California adopted a canister bleed emission test procedure and standard, which applied solely to initial (4,000 mile) vehicle certification. U.S. EPA adopted this same standard in Tier 3, but as a full-useful life requirement instead. Clearly, a full-useful life standard helps to better ensure in-use canister durability. Therefore, staff proposes to apply the full-useful life requirement to LEV III's canister bleed test provisions as well.

2.1.3 *Extension of the carry-over period for LEV II zero-evaporative certified vehicles*: Under the current LEV III regulation, manufacturers can carry-over vehicles certified to LEV II's optional zero-fuel evaporative standards to meet LEV III evaporative emission requirements through the 2018 model year. Staff proposes to extend this carry-over allowance to the 2019 model year to align with how these vehicles are treated in Tier 3 and under ARB's LEV III exhaust emission carry-over provisions. Staff does not believe this change will affect emissions.

2.1.4 *Adoption of evaporative emission testing provisions for vehicles equipped with an auxiliary (non-road) engine*: Tier 3 requires complete vehicles equipped with an auxiliary engine to meet evaporative emission standards with the auxiliary engine installed, the auxiliary engine's fuel tank filled to 40 percent capacity, and its components permeation stabilized. This ensures that evaporative emissions from the entire vehicle, including its auxiliary engine, are effectively controlled. Staff proposes to adopt equivalent provisions in LEV III.

2.1.5 *Amending the alternate phase-in compliance basis*: Both Tier 3 and LEV III provide flexibility by allowing manufacturers to use an alternative phase-in schedule in lieu of the prescribed phase-in of the new evaporative emission standards. However, Tier 3's alternative phase-in is based on actual production volumes, whereas LEV III's is based on projected sales volumes. While the two approaches are generally equivalent, the use of actual production volumes provides a higher level of assurance. Therefore, staff proposes to align LEV III with Tier 3 on the alternative phase-in compliance basis, which would require manufacturers to report the number of vehicles produced and delivered for sale in California (actual volumes) that meet LEV III's evaporative emission standards.

2.1.6 *Option to comply with an attestation of compliance for liquefied petroleum gas (LPG) vehicles*: In Tier 3, U.S. EPA clarified a provision that gives manufacturers the option to certify LPG-fueled vehicles that do not allow venting during refueling with the evaporative and refueling emission standards through an attestation of compliance only. This option, which existed prior to the adoption of Tier 3, is currently incorporated by reference in California's regulation as well. Staff proposes to align with Tier 3 on this change as it adds clarity without altering existing requirements.

2.2 The proposed amendments to the LEV III evaporative emissions program that clarify existing requirements are:

2.2.1 *Clarification of fuel requirement for evaporative emission durability mileage accumulation*: Currently, California's evaporative emission regulations do include a requirement regarding the type of fuel used during mileage accumulation for durability demonstration. Manufacturers have traditionally followed the federal requirement set forth for 50-state vehicle certifications, which requires the use of the fuel with the highest ethanol content commercially available in the United States. For clarity, staff proposes to incorporate that same requirement into California's test procedures.

3. Summary of Proposed Amendments to Refueling Emission Regulations

3.1 The proposed amendments to the LEV III refueling emissions program that incorporate features of the Tier 3 program or provide additional flexibility to industry with no adverse air quality impacts are as follows:

3.1.1 *Expand applicability to include complete vehicles over 14,000 lbs. GVWR:* California's refueling emission standards currently apply to vehicles with a GVWR less than 8,501 lbs. Starting with model year 2015, LEV III refueling emission standards will apply to all complete vehicles up to 14,000 lbs. GVWR. In the Tier 3 rulemaking, U.S. EPA further expanded the applicability of the refueling standards to include all complete vehicles, including those over 14,000 lbs. GVWR, starting with model year 2022. Staff proposes to align the LEV III refueling requirements with Tier 3 by expanding the applicability of LEV III's refueling standards in the same manner.

3.1.2 *Allow federal test fuel for fuel-flexible vehicles:* Under California's LEV III regulation, refueling testing on fuel-flexible vehicles is performed using LEV III E10 certification gasoline, which has a Reid Vapor Pressure (RVP) of 7 pounds per square inch (psi). For Tier 3, the prescribed test fuel for flex-fueled vehicles is a worst-case (in terms of vapor generation) E10 fuel blend of indolene (E0) fuel mixed with a high-level ethanol-gasoline blend (about 80-83 percent ethanol by volume) and has an RVP of 10 psi. This is representative of a worst case blend of market fuels that a fuel-flexible vehicle may encounter outside California. While such fuel is not representative of in-use fuel in California, staff proposes to allow the use of the RVP 10 fuel blend, along with the corresponding federal dispensing temperatures, for performing refueling tests on fuel-flexible vehicles because it would reduce testing burden and not compromise stringency.

3.1.3 *Modifications to the exemption criteria for diesel refueling emission testing:* In the Tier 3 rulemaking, U.S. EPA modified a provision exempting all diesel-fueled vehicles from refueling emission testing, so long as the manufacturer provides a statement of attestation that the vehicles comply with the refueling standard. Specifically, U.S. EPA eliminated the two criteria that were required to qualify for this exemption: 1) the fuel tank temperature does not exceed 130 degrees Fahrenheit

and 2) the RVP of in-use diesel fuel is no greater than 1 psi. U.S. EPA made this change because they believe diesel-fueled vehicles will easily comply with the refueling standard due to diesel fuel's inherent low volatility and "vapor shrinkage," a phenomenon that occurs during diesel refueling where headspace vapors are condensed by the fuel being discharged into the tank. Staff agrees and proposes to eliminate the fuel temperature and RVP exemption criteria and only require an attestation of compliance with the refueling standard for diesel-fueled vehicles.

C. REPORTING REQUIREMENTS

1. Background

Under Assembly Bill 8 (AB 8) (Perea 2013), ARB is directed to work with the California Energy Commission on the planning and funding of hydrogen infrastructure. In order to facilitate these legislatively-required planning efforts, data related to the production and placement of hydrogen vehicles is essential.

Current test procedures allow ARB to solicit vehicle manufacturers for their hydrogen vehicle production plans. For the past several years, ARB has been surveying vehicle manufacturers on their production plans for the next one to three model years and using this information for the planning of hydrogen infrastructure.

Previous versions of the LEV III test procedures allowed ARB to survey vehicle manufacturers for their production plans of all vehicles not certified exclusively on gasoline or diesel; this included BEVs and PHEVs. However, in December 2012, the test procedures were changed and only hydrogen vehicle production plans remained subject to survey. This was done at the request of industry. Since manufacturers already report their alternative fuel vehicle production plans to ARB during the certification process, the "double reporting" was believed to be redundant and unnecessary. However, it has since been realized that the lead time provided by the certification process is not sufficient for BEV and PHEV infrastructure planning and for financial planning of consumer incentives.

2. Summary of Proposed Amendments

2.1 *Hydrogen Vehicles*: For hydrogen vehicles, the current LEV III test procedure requires vehicle manufacturers to submit projected California sales and lease data, fuel economy data, vehicle fuel pressure ratings, and the name of the air-basin where the vehicle is projected to be delivered, 33 months prior to January 1st of the model year for which the vehicles are certified. The changes proposed in this amendment would change the geographic reporting requirement from air-basin to county, add vehicle type (i.e. compact, sport utility vehicle, etc.), and add hydrogen tank capacity to further facilitate hydrogen infrastructure planning and development.

2.2 *Battery Electric Vehicles (BEVs) and Plug-In Hybrid Vehicles (PHEVs)*: For BEVs and PHEVs, the changes being proposed under this amendment would require

vehicle manufacturers to submit projected California sales and lease data, fuel economy data, battery energy capacity, on-board charger rating, and presence of a direct current fast charge port, 33 months prior to January 1 of the model year for which the vehicles are certified. These proposed changes will align the reporting periods for hydrogen vehicles, BEVs, and PHEVs, provide key details necessary to refine electric infrastructure planning and development, and better project upcoming financial demands for ZEV incentive programs.

As noted above, these requirements are very similar to what was required of vehicle manufacturers prior to 2012. Additionally, for the last two years, ARB has asked vehicle manufacturers to voluntary supply data on their proposed BEV and PHEV production plans and most vehicle manufacturers have complied with this request. However, in order to fully capture the scope and breadth of the planned ZEVs and to plan accordingly, ARB needs all vehicle manufacturers to submit this data.

D. CERTIFICATION FUEL

1. Background

1.1 E10 Certification Gasoline Specifications

The current specifications for California E10 certification gasoline used for testing exhaust and evaporative emissions for LEV III passenger cars, light-duty trucks, medium-duty vehicles, and 2020 and subsequent model heavy-duty gasoline engines and vehicles include a range for the allowable total oxygen content and the ethanol content of 3.3-3.7 weight percent and 9.8-10.2 volume percent, respectively. Given typical values for gasoline density, industry has indicated that meeting the current specifications for oxygen and ethanol content simultaneously is difficult. Specifically, refiners can readily blend ethanol with base gasoline to meet the nominal 10 percent ethanol volume requirement but simultaneously achieving a total oxygen content in the allowable range is extremely sensitive to the formulation of the base gasoline that is used in the blending. As a result, the only compliant blends would likely need to have ethanol levels to be at the very lower end of the ethanol volume percent specification and total oxygen content to be at the very upper end of its specification.

1.2 Certification Fuel Reciprocity

LEV III gasoline vehicles and 2020 and subsequent model heavy-duty gasoline engines and vehicles may only demonstrate compliance with emission standards using California E10 certification gasoline. While, historically, manufacturers were allowed to certify vehicles using federal certification gasoline as an alternative to California certification gasoline, at the time LEV III was adopted, no reasonably equivalent federal certification gasoline existed. Similarly, ethanol-capable vehicles that are sold in California must demonstrate compliance with emission standards using California E85 certification fuel. Until recently, there were no federal certification fuel specifications for E85.

2. Summary of Proposed Amendments

The following modifications are being proposed to California's certification fuel requirements. These changes will also apply to heavy-duty engines and vehicles.

2.1 Ethanol Specification in Certification Gasoline

A change is being proposed to the ethanol limit for LEV III certification gasoline to expand the overlap between that and the allowable total oxygen content. This change will give refineries enough flexibility to meet both specifications and avoid potential conflicts between them in LEV III. This change will also apply to the certification gasoline specifications for heavy-duty Otto-cycle engines and vehicles, as applicable.

2.2 Certification Fuel Reciprocity

2.2.1 *Reciprocity with Tier 3 Certification Gasoline*: Use of Tier 3 certification gasoline will be allowed as an alternative to California certification gasoline for both LEV II and LEV III passenger cars, light-duty trucks, and medium-duty vehicles.

2.2.2 *Reciprocity for Heavy-Duty Certification Gasoline*: Use of Tier 3 certification gasoline will be allowed as an alternative to California certification gasoline for heavy-duty Otto-cycle engines and vehicles.

2.2.3 *Reciprocity for LEV II, LEV III, and heavy-duty Certification E85*: Use of federal E85 certification fuel will be allowed as an alternative to California E85 certification fuel for LEV II and LEV III passenger cars, light-duty trucks, and medium-duty vehicles, and for heavy-duty engines and vehicles.

E. ENVIRONMENTAL PERFORMANCE LABEL

1. Background

Currently, all new vehicles sold in California must include a California Environmental Performance Label, which provides consumers with a user-friendly scoring system for comparing the relative smog emissions (Smog Score) and global warming emissions (Global Warming Score) from comparable vehicles. Both scores are based on a scale of 1-10, with 10 being the cleanest and 5 representing an average new car. The Smog Score is based on the emission category to which a vehicle certifies, while the Global Warming Score is based on the relative grams per mile CO_2-equivalent emissions from the vehicle.

In 2012, ARB adopted the LEV III program, which establishes emission categories that are unique to this program. The California Environmental Performance Label scores were not, however, modified at that time to incorporate the LEV III vehicle emission

categories into the scoring system. As a result, the California Environmental Performance Label cannot be used on LEV III vehicles at this time.

2. Summary of Proposed Amendments

With this rulemaking, the smog scores in the Environmental Performance Label will be updated to include the LEV III vehicle emission categories and the global warming scores will be updated to reflect the range of GHG emissions from the current fleet. These scores will be updated annually with a Manufacturers Advisory Correspondence (MAC) per the rating methodologies established in 40 CFR Parts 85, 86, and 600. This MAC will be released the first quarter of each year for the following model year vehicles.

IV. CALIFORNIA'S HYBRID ELECTRIC VEHICLE TEST PROCEDURES

A. PROPOSED AMENDMENTS TO CALIFORNIA'S HYBRID ELECTRIC VEHICLE TEST PROCEDURES

1. Background

In 1990, ARB adopted an ambitious regulation to significantly reduce the environmental impact of light-duty vehicles through the commercial introduction of ZEVs into the California fleet. Over the years, the ZEV program has evolved to include hybrid electric vehicle (HEV) technologies among compliance options. The regulation includes certification standards and test procedures for HEV and ZEV technologies.

In 2009, the HEV test procedures[5] were modified to address Off-vehicle Charge Capable HEVs (also called "plug-in hybrids" or "PHEVs") before any of these types of vehicles actually existed. Since 2009, manufacturers have introduced new configurations of PHEVs that are difficult to test using the existing test procedures. Consequently, modifications to these test procedures are needed.

2. Summary of Proposed Amendments

Modifications that are being proposed to the Hybrid Electric Vehicle Test Procedures are:

2.1 Test Burden Reduction

The current PHEV urban test procedures require significant time to determine exhaust emissions. To ensure robust emission performance in-use, exhaust emission testing includes measuring electric range, measuring emissions during "charge-depleting" operation (i.e., while the vehicle is using stored electric energy from off-board charging), and measuring emissions during "charge-sustaining" operation (i.e., after the vehicle has used up any stored energy from off-board charging and is operating as a conventional hybrid vehicle). Measuring emissions during charge-depleting operation is

[5] Appendix I

especially time and resource consuming for PHEVs with significant electric operating range such as 30 miles or more. As an example, a conventional vehicle requires approximately 11 miles of driving to conduct an exhaust emission test that simulates urban driving. For comparison, a PHEV with a 30 mile electric range requires at least 45 miles of driving to conduct the same urban exhaust emission test just for the charge-depleting operation mode. The proposed amendments reduce test burden by establishing more efficient procedures for qualifying PHEVs.

Specifically, the proposed alternative test procedure would allow qualifying PHEVs to forego repeating the complete electric range test each time charge-depleting emissions need to be measured. This would allow the 45 miles or more of driving that is currently required for the high electric range PHEV to be reduced to levels similar to conventional vehicles. As noted, however, this alternative would only be available to qualifying PHEVs. As proposed, the qualification requirements involve a comparison of all-electric range (AER) to equivalent all-electric range (EAER). In simple terms, AER measures the range up to the point the engine first turns on while EAER continues to measure the range up to the point the vehicle transitions to charge-sustaining operation. For some hybrid designs, there can be significant amounts of periodic engine operation during charge-depleting operation leading to a significantly longer EAER relative to AER. These two ranges are measured during electric range testing to determine applicable credits for the ZEV regulation. The ratio of these two ranges is an indicator of the amount of internal combustion engine assist that the electric powertrain needs to meet driver demand under urban charge-depleting operation. PHEVs with a minimal difference between AER and EAER, by definition, have no engine operation in urban charge-depleting operation until virtually all of the off-board charge energy has been depleted. Consequently, there is no need to measure emissions during the entire portion of charge-depleting operation and focusing the testing to capture emissions during the end of the charge-depleting operation is appropriate. Several PHEVs were tested at ARB's Haagen-Smit Laboratory and data generated indicated that a ratio of 0.98 AER to EAER would robustly ensure that any engine operation during charge-depleting would be limited to the very end of charge-depleting operation. Table IV.A.2.1.1 and Table IV.A.2.1.2 below list AER and EAER for five current PHEV models and the emission data as tested by ARB for these vehicles. Vehicles B, C and E were tested using the proposed alternative test procedure.

Table IV.A.2.1.1 – AER/EAER Ratio

Vehicle	AER (miles)	EAER (miles)	AER/EAER ratio
A	8.29	13.93	0.60
B	30.90	31.16	0.99
C	30.90	31.16	0.99
D	18.80	20.05	0.94
E	54.16	54.17	1.00

Table IV.A.2.1.2 – Urban Cycle Emission Test Data

Vehicle	NMOG (mg/mi)	NOx (mg/mi)	NMOG Standard (mg/mi)	NOx Standard (mg/mi)	Time 1st Engine Start (sec)*
A**	4.8	2.6	10	20	196
B**	7.6	6.4			25
C	7.1	5.6			0
E**	5.5	5.0			24

*Time of UDDS engine first started

**Average of two tests

In addition to the AER to EAER ratio, a minimum urban all-electric range (i.e., AER) of 30 miles would be required to qualify for the proposed alternative test procedure. For vehicles with shorter AER than this, the original test procedure is still appropriate and does not require an unreasonable amount of test time or resources. Further, the shorter the AER, the more frequently during in-use driving that the vehicle would be expected to routinely operate past the end of its AER and into operation with the engine running and the original testing procedure will appropriately capture that type of operation. In contrast, for vehicles with AER of 30 miles or more, the original test procedure required significant test time and resources that was not needed to accurately quantify emissions. Test data showed that the 30 mile AER threshold, along with the AER to EAER ratio of 0.98 or higher, identified PHEVs that merited a reduction in test burden with minimal risk of overlooking vehicle operation with significant emission impacts.

2.2 Worst Case Testing

The HEV test procedures have required 'worst case' testing of PHEVs since 2008. For vehicles that have more than one operating mode (e.g., a driver selectable switch for 'economy' mode or 'sport/performance' mode), worst case refers to finding the operating mode that results in the highest emissions during the exhaust emission test. For PHEVs, worst case also includes charge-depleting versus charge-sustaining operation as modes that must be considered. The worst case requirement is intended to focus certification emission testing on a single mode rather than requiring manufacturers to test and submit data from every operational mode. If emissions are below the standards under worst case operation, then any other mode of operation would be expected to remain under emission standards as well.

However, the current language is not clear as to which pollutant (e.g., NMOG, NOx, etc.) should be used to determine worst case emissions and the language does not clearly identify if the worst case determination is based on each required emission test cycle, a composite of all of them, or a single test cycle. The proposed language clarifies that NMOG+NOx emissions is the appropriate parameter for determining worst case emissions and that the determination is based on each test cycle as required with the existing test procedures.

2.3 New Proposed End-of-Test Criteria for PHEVs

Under current procedures, meeting the criteria necessary for a valid emission test for PHEVs has been dependent upon satisfying a State-of-Charge (SOC) Criterion and this has proven difficult for some PHEVs. In simple terms, battery energy level is defined in terms of SOC from 0 to 100%. Exhaust emission testing for charge-sustaining operation requires that the PHEV operate over the test cycle without a net battery energy increase or decrease. This can be described as battery energy neutrality where the PHEV drives through the test cycle solely on the energy provided by the onboard consumable fuel (e.g., gasoline). To ensure this, the net SOC change must remain within a ±1% range when comparing the SOC at the start of the test cycle to the SOC at the end of the cycle.

The SOC Criterion is purposely set at a narrow ±1% range in an attempt to ensure battery energy neutrality. However, manufacturers sometimes find it necessary to perform several repeat emission tests to satisfy the SOC Criterion, and some vehicle designs are not ever able to meet this criterion. To avoid unnecessary extra repeat testing, two alternatives to this criterion are being proposed. The first alternative allows a manufacturer to set the magnitude of the SOC Criterion relative to the total amount of battery energy depleted during an Urban charge-depleting exhaust test. A second proposed alternative would allow manufacturers to continue testing for a few more cycles in order improve the chances of meeting the SOC Criterion. This would minimize repeating the entire test cycle (and all the pre-test vehicle preparations).

V. OTHER TEST PROCEDURE MODIFICATIONSS

A. PROPOSED AMENDMENTS TO CALIFORNIA'S NON-METHANE ORGANIC GAS TEST PROCEDURE

California's "Non-Methane Organic Gas Test Procedures" is being split into two separate test procedures to correspond with the incorporation of 40 CFR Part 1066 beginning with the 2017 model year. 40 CFR Part 1066 also contains many of the requirements that currently reside in the "Non-Methane Organic Gas Test Procedures," so separate but identical requirements are not needed for California. Therefore, the portions of the "Non-Methane Organic Gas Test Procedures" that are duplicated in 40 CFR Part 1066 have been removed from the procedures applicable to model year 2017 and newer.

B. PROPOSED AMENDMENTS TO CALIFORNIA'S HEAVY-DUTY OTTO-CYCLE AND HEAVY-DUTY DIESEL TEST PROCEDURE

In addition to the certification fuel modifications discussed in Chapter III section D, both the Heavy-Duty Otto-Cycle Test Procedures and the Heavy-Duty Diesel Test Procedures are being updated to incorporate revisions to the CFR on April 28, 2014.

VI. DIFFERENCES BETWEEN CALIFORNIA'S LIGHT- AND MEDIUM-DUTY VEHICLE PROGRAM AND THE FEDERAL PROGRAM

1. *Initial year of programs*: The LEV III program begins with the 2015 model year. The Tier 3 program begins with the 2017 model year.

2. *Full useful life standards*: While the numerical values of the emission categories within the LEV III standards and the bins within the Tier 3 standards are the same, the LEV III standards apply at a 150,000 mile full useful life, while the Tier 3 standards apply at a 120,000 mile full useful life with an option to comply at a 150,000 mile full useful life. The numerical values of the NMOG+NOx fleet average are also the same in LEV III as Tier 3, however, Tier 3 includes a correction factor to the fleet average for manufacturers certifying vehicles to a 120,000 mile full useful life.

3. *PM Standards*:

   3.1 *Phase-in of 3 mg/mi PM FTP standards*: While the Tier 3 program has aligned with the LEV III 3 mg/mi PM FTP standard for light-duty vehicles and medium-duty passenger vehicles, under the federal program, 100% phase-in of the standard does not occur until the 2022 model year, which is one year longer than the LEV III program. Staff's assessment is that this additional lead time is not needed and, therefore, is not proposing amendments to align with this Tier 3 provision.

   3.2 *1 mg/mi PM FTP standard*: In addition to the 3 mg/mi PM FTP standard, the LEV III program also includes a 1 mg/mi PM FTP standard for light-duty vehicles and medium-duty passenger vehicles, which phases-in to the California fleet beginning with the 2025 model year. Staff will be assessing laboratory measurement capability for sub-1 mg/mi PM levels and evaluating the timing of the 1 mg/mi PM tailpipe standard, including whether the standard should be applied prior to the 2025 model year, as part of a mid-term review in 2017. The Tier 3 program does not include a 1 mg/mi PM standard.

4. *50^{o}F standards*: The LEV III program includes NMOG+NOx standards that apply at 50^{o}F. These were adopted to ensure adequate control of vehicle emissions during California summer mornings on high ozone days. There are no 50^{o}F emission standards in the Tier 3 program.

5. *5-year credit life*: LEV III fleet average NMOG+NOx credits retain full value for five years after they are earned throughout the 2017 to 2025 model years. The full value five year credit life was a significant change made during the development of LEV III as it was both longer than previous programs (like the three year credit life in LEV II) and no longer discounted the credits over time (e.g., LEV II credits are discounted by 50% and 75%, respectively, in the second and third years after they are earned). The change was made after much discussion with manufacturers in recognition of the challenges they face in complying with both new criteria pollutant standards and new GHG standards within the same time frame under the LEV III

program. (ARB adopted LEV III criteria pollutant and GHG standards for tailpipe emissions, evaporative emissions, certification fuel, etc., (effective 2015-2025) as part of the ACC program in 2012.)

Under Tier 3, the life of fleet average NMOG+NOx credits is based on the year in which they are earned. Credits that are earned in the 2017 through 2022 model years retain full value for eight years after they are earned. Credits that are earned in model years 2023 and 2024 retain full value for seven years and six years, respectively, after they are earned. Credits that are earned in the 2025 and subsequent model years retain full value for five years after they are earned.

Staff's assessment is that this additional credit life is not needed for the following reasons and, therefore, is not proposing amendments to align with this Tier 3 provision.

Two arguments have been made in favor of extending the credit life from five years to eight years. First, it has been argued that the air quality benefits that are achieved in the early years as manufacturers earn credits (by over-complying with the fleet average) will balance the loss in air quality benefits that will occur in the later years when those credits are used. This same logic applies whether the credit life is five or eight years because, by definition, the credit/debit process has to balance out in the end. However, there can be an impact on air quality related to the model years when cars are made that are cleaner or dirtier than required. Specifically, California has key ozone ambient air quality compliance dates in 2023 and 2032 calendar years and shifts in vehicle emissions earlier versus later will likely help for 2023 compliance but hurt for 2032 compliance. The impact would be dependent on how many manufacturers fully utilized the longer credit life and by the magnitude of credits used in the later years and as such, is difficult to quantify.

The second argument that has been made is that some of the technologies that could be introduced to meet GHG requirements in 2022 and later model years are less developed and may be harder to simultaneously meet the most stringent criteria pollutant requirements. The uncertainty related to what it will take to make some of these newer technologies comply with SULEV emission standards is the primary reason industry has requested the extension of credit life. However, staff believes it is premature at this time to extend the credit life because of uncertainties related to possible technologies for 2022 and later model years. As noted above, the credit structure was already extended to five years and modified to maintain full value of those credits when LEV III was adopted to specifically address uncertainties and difficulties related to simultaneously meeting increasingly stringent GHG and criteria pollutant reductions, and staff has not seen any developments in the last two years that would already warrant a revision. Additionally, the LEV III fleet average phase-in schedule was extended when LEV III was adopted from an end date of 2023 to 2025 to reach the final fleet average of 30 mg/mi NMOG+NOx in response to requests from industry to account for some of the risks in working towards both GHG and criteria pollutant reductions. Further, staff will be participating in a mid-term review of the 2022 through 2025 model year GHG regulations with U.S. EPA and NHTSA in the 2017 timeframe.

One of the issues that vehicle manufacturers have already asked us to re-assess at that time is the interaction of the GHG requirements with the criteria pollutant requirements. If it is determined that adjustments to either program (including changes to the LEV III criteria pollutant 5-year credit life) are needed, they can be done at that time.

In conclusion, staff believes that it is premature to make a determination at this time that the NMOG+NOx fleet average for model years 2023 and later cannot be met without relying primarily on credits earned more than 5 years in advance. Staff will continue to monitor manufacturers' progress in meeting the LEV III requirements. If it turns out that manufacturers are struggling to meet these requirements despite their best efforts to comply, staff can return to the Board as part of the mid-term review and modify the LEV III credit life accordingly.

6. *Interim in-use compliance standards*: Historically, when ARB adopts more stringent emissions standards, interim in-use compliance standards are provided during the phase-in period of these standards. This means that manufacturers are subject to less stringent in-use compliance standards (for the purpose of determining if a test group is in non-compliance and a possible recall is warranted) for the first two years after a test group is certified to a new, more stringent emission standard. These interim in-use compliance standards typically apply only to the most stringent emission categories. This provision reduces a manufacturer's risk of recall should emissions in-use turn out to be somewhat higher for a new technology than suggested by development and pre-sale certification testing. Accordingly, the LEV III interim in-use standards are applicable to those vehicles certifying to LEV III requirements prior to model year 2020. Under Tier 3, interim in-use standards are not limited to two years and apply all the way through the 2021 model year. Consistent with staff's assessment at the time of LEV III adoption, staff does not believe manufacturers need more than two years to address any problems they may have when meeting a new, more stringent emission standard in-use. (Although the LEV III program does not officially begin until the 2015 model year, the first LEV III vehicle was certified to LEV III SULEV20 standards in December, 2012. Currently, five manufacturers have certified 2014 model year vehicles to LEV III standards that are more stringent than applicable LEV II standards.) Extending the interim in-use standard beyond two years could result in increased in-use emissions. Therefore, staff is not proposing amendments to align with this Tier 3 provision.

7. *50-State Fleet Average Compliance*: Compliance with the Tier 3 requirements is based on vehicle sales in all 50-states. Compliance with LEV III is based on cumulative vehicle sales in California and the other states that have adopted California's LEV III program.

Industry has requested that ARB also allow compliance with the LEV III regulations based on vehicle sales in all 50 states. Specifically, manufacturers want to demonstrate compliance with items like the LEV III NMOG+NOx fleet average based on 50-state sales numbers and vehicle mix. Staff does not believe that allowing 50-state compliance is in California's best interest as it may create difficulties in implementing

and enforcing the LEV III program and ensuring that the full air quality benefits of this program are achieved in California.

Supporters of a 50-state compliance approach argue that the fleet average emissions from the national fleet will be so close to California's fleet average emissions that the air quality impacts from the two approaches will be virtually identical. However, the fleet mix (types and proportions of which kinds of vehicles and trucks) in California is different at this time than the 50-state mix and future projections suggest there will be an even bigger difference in the future. Accordingly, there is less certainty with such an approach that the full benefits of the program will be realized in California and the benefits are critical to meeting ambient air quality standards in California.

Certification and compliance based on 50-state sales would also be harder for ARB to verify as staff does not readily have access to the necessary information to confirm a manufacturer's reported sales numbers in other states. Additionally, California's enforcement efforts may be complicated by the inclusion of vehicle variants that are used to comply with the fleet average but which are not offered for sale in California. Furthermore, California enforcement will be harder to separate from Federal enforcement since they both would be based on 50-state sales and the same numeric standards. This lack of separation could be problematic to establishing appropriate penalties or remedies for non-compliance because a given violation is likely to have a more severe impact in California as compared to other states due to California's air quality situation. Accordingly, non-compliance in California may merit a higher penalty or different remedy than Tier 3 provides for when considering the impact in other states.

Lastly, ARB has, and will continue to maintain, separate authority to regulate vehicle emissions to protect the air quality benefits in California. This includes maintaining strong certification, in-use compliance, and enforcement programs specific to California for the LEV III program to ensure critical emission reductions are achieved. Given the additional uncertainty and other complications noted above, staff is not proposing a change to allow compliance based on 50-state sales.

8. *Alternate phase-in for evaporative emission requirements starting in MY 2017*: Under Tier 3, the phase-in to the Tier 3 evaporative emission standards starts at 40 percent of the fleet in MY 2017. Included in this is an ability to earn significant phase-in credit for additional vehicles that comply with Tier 3 evaporative emission requirements in MY 2017 which in turn, reduces phase-in volumes in the later years of the phase-in period. Federally, very few vehicles exist today that already meet equivalent zero evaporative emission standards like Tier 3 is phasing-in because Tier 2 did not have such a standard. California, however, already has a sizeable portion of vehicles that meet equivalent zero-evaporative emission standards in LEV II. Accordingly, the LEV III requirements only contain an anti-backsliding provision for MY 2017 that ensures manufacturers do not decrease the proportion of such vehicles in California prior to the phase in of LEV III evaporative standards starting in MY 2018. Given the lack of such vehicles federally, Tier 3 was structured to encourage rapid introduction in the early years of the phase-in to try and catch up with the California fleet. If California were to

now align with Tier 3, staff believes manufacturers would be able to accrue significant credits in California with only their existing zero evaporative vehicles, which would allow them to delay the deployment of similar evaporative emission technologies on the rest of their vehicles. Therefore, staff proposes not to align with Tier 3 on the evaporative emission phase-in.

9. *Extension of LEV II certification fuel backstop*: U.S. EPA allows manufacturers to certify vehicles to the Tier 2 evaporative emission standards through the 2021 model year. These vehicles may be certified with either indolene (federal Tier 2 certification fuel without ethanol) or with Tier 3 E10 certification fuel. This was done to ensure adequate lead time for the phase in of the new Tier 3 E10 certification fuel. Currently, LEV III requires the use of California's new E10 certification fuel for all evaporative emission certifications starting in model year 2020. This two-year discrepancy is the result of LEV III being adopted approximately two years ahead of Tier 3 and both programs being structured to provide five years lead time for the phase in of the new ethanol-containing certification fuels. Given adequate lead time has been provided for in LEV III, staff is not proposing amendments to extend the LEV III fuel phase-in to align with Tier 3.

10. *Ethanol retention checks for Sealed Housings for Evaporative Determination (SHEDs)*: Both California and federal evaporative emission test procedures contain requirements for checking a SHED's ability to retain propane or ethanol over a period of 24 hours after injecting a known amount. Under California's current LEV III regulations, both propane and ethanol retention checks are required following initial installation, after any major maintenance or modification, and at monthly intervals after that. After six months of passing results, retention check frequency can be reduced from monthly to quarterly intervals.

In the Tier 3 rulemaking, U.S. EPA reduced ethanol retention check requirements with two modifications. First, ethanol retention checks are no longer required at all if a manufacturer opts to use the 1.08 ethanol adjustment factor (a multiplier), rather than direct ethanol measurement, to account for ethanol content in emissions. Second, if a manufacturer chooses to measure ethanol directly, ethanol retention checks are now only required at initial installation and after any major maintenance or modification; after that, only propane retention checks are required.

In regards to the first change, the purpose of the 1.08 ethanol adjustment factor is to account for a flame ionization detector's (FID's) reduced response to ethanol in an emission sample. It does not account for SHED retention problems that could lead to sample loss. Therefore, even if the adjustment factor is used, the SHED must still retain the full emission sample (including the ethanol component) in order to obtain accurate emission data. As such, staff believes it is still necessary to require SHED retention checks with ethanol regardless of how the ethanol component of the sample is accounted for (adjustment factor or direct measurement).

Regarding the second change, manufacturers support it and contend that ethanol retention can be adequately evaluated using propane retention checks alone if a SHED does not undergo any major maintenance or modification. However, staff is not convinced and has requested data from manufacturers supporting their contention. As of the writing of this Initial Statement of Reasons, no data has been provided. If it cannot be verified that a SHED is adequately retaining ethanol, the accuracy of any emission data obtained from that SHED is uncertain and emissions may be unaccounted for. As such, staff opposes aligning on these changes.

11. *Refueling emissions correction for Flame Ionization Detectors (FIDs):* As described in the current LEV III regulation, ethanol needs to be accounted for during refueling emission testing. Since FIDs have reduced sensitivity to ethanol, it is necessary to correct FID measurements by either measuring ethanol in the emissions separately, or applying a correction factor to the FID value. As part of Tier 3, U.S. EPA set forth that such a correction is not necessary for refueling testing conducted with E10 test fuel primarily because they assumed that concentrations of ethanol in refueling emissions are small. However, staff proposes to retain the correction requirement because refueling emissions are known to contain some degree of ethanol, the extent of which varies depending on the design of the fuel system.

VII. ENVIRONMENTAL ANALYSIS

A. INTRODUCTION

ARB's regulatory program that involves the adoption, approval, amendment, or repeal of standards, rules, regulations, or plans for the protection and enhancement of the State's ambient air quality has been certified by the California Secretary for Natural Resources under Public Resources Code section 21080.5 of the California Environmental Quality Act (CEQA) (14 CCR 15251(d)). Public agencies with certified regulatory programs are exempt from certain CEQA requirements, including but not limited to, preparing environmental impact reports, negative declarations, and initial studies. ARB as a lead agency, prepares a substitute environmental document (referred to as an Environmental Analysis or EA) as part of the Staff Report to comply with CEQA. (17 CCR 60000-60008). This section serves as a substitute document equivalent to an addendum to the 2012 Advanced Clean Cars (ACC) Program Environmental Analysis (ACC EA) prepared under ARB's certified regulatory program to document ARB's determination that no subsequent or supplemental environmental analysis is required for the proposed amendments to the LEV III Regulation.

ARB staff has determined that the proposed amendments do not involve any changes that result in any new significant adverse environmental impacts or a substantial increase in the severity of the significant adverse impacts previously disclosed in the EA prepared for the LEV III Regulation when it was approved as part of the ACC Program in 2012. Further, there are no changes in circumstances or new information that would otherwise warrant any subsequent environmental review. The ACC EA adequately addresses the implementation of the LEV III Regulation as modified by the proposed amendments and no additional environmental analysis is required.

B. PRIOR ENVIRONMENTAL ANALYSIS

When LEV III was proposed as part of the package of regulations referred to as the ACC Program in December 2011, the Staff Reports: Initial Statement of Reasons (ISORs) prepared for each of those regulations included as an appendix, an environmental analysis prepared under ARB's certified regulatory program (ACC EA). The ACC EA provided a programmatic level analysis of the potential environmental impacts associated with the ACC Program, including LEV III. Comments received on the ACC EA were responded to in writing in a document entitled *Response to Comments on the ACC EA* released on March 12, 2012. At its hearing on March 22, 2012, the Board adopted Resolution 12-21 certifying the ACC EA, approving the written responses to comments on the ACC EA, and adopting the findings and statement of overriding considerations. A Notice of Decision was filed with the Secretary of the Natural Resources Agency for public inspection and on ARB's website on March 27, 2012. These documents are available at http://www.arb.ca.gov/regact/2012/leviiighg2012/leviiighg2012.htm.

The ACC EA was based on the reasonably foreseeable compliance responses of the regulated entities covered by the ACC Program. The ACC EA concluded that the compliance responses to the proposed ACC Program would result in beneficial impacts to air quality through reductions in emissions, including GHGs, criteria air pollutants and precursors, and toxic air contaminants. It further concluded that the proposed ACC Program would result in less-than-significant impacts to agricultural and forest resources, GHGs, land use, minerals, population and housing, public services, and recreation.

No adverse environmental impacts were identified for the LEV III regulations. The ACC EA concluded there could be potentially significant adverse impacts to aesthetics, air quality, and noise (both related to construction), biological resources, cultural resources, geology/soils, hazards/hazardous materials (related to accidental releases), hydrology/water quality, traffic and utilities due to construction activities related to the Clean Fuels Outlet Regulation (which was part of the originally proposed package of regulations in 2011) and due to construction and operation of new battery manufacturing facilities, as needed, to achieve compliance with the ZEV Regulation. The ACC EA identified mitigation measures to reduce these potentially significant impacts to a less-than-significant level; however, it was determined that the authority to determine project-level impacts and require project-level mitigation lies with the local lead agency for individual projects, which is beyond ARB's authority. Since the ACC EA programmatic analysis could not determine project-specific details of mitigation, there is an inherent uncertainty in the degree of mitigation ultimately implemented to reduce the potentially significant impacts. Therefore, the ACC EA took a conservative approach in its post-mitigation significance conclusion and disclosed, for CEQA compliance purposes, that the potentially significant impacts to these resource areas resulting from the construction and operation of new manufacturing plants may be significant and unavoidable.

C. PROPOSED MODIFICATIONS

As previously described in Chapter III of this Staff Report, the proposed amendments to the LEV III regulation include changes in the following areas:

- Alignment of certain LEV III provisions with the federal Tier 3 program in order to provide additional flexibility to industry and incorporation of some requirements of the Tier 3 program that are more stringent;

- Clarification of existing requirements;

- Establishment of new requirements to prevent an increase in emissions from the vehicle fleet; and

- Regulatory changes that are administrative in nature.

D. ANALYSIS

1. Legal Standards

   Under its certified regulatory program, ARB prepares the required CEQA documentation as part of the Staff Report for the proposed action (17 CCR 60000-60008). When the equivalent of an EIR or negative declaration has been prepared for a rule, regulation, order, standard or plan, ARB looks to Public Resources Code section 21166 and CEQA Guidelines section 15162 for guidance on the triggers for further environmental review when considering changes to that project. When an EIR for a project has been certified, that EIR is conclusively presumed valid unless a lawsuit challenging the EIR is timely filed (PRC 21167.2). This presumption precludes reopening the prior CEQA process unless one of the events triggering additional review as specified in Public Resources Code section 21166 and CEQA Guidelines section 15162 has occurred.

   CEQA Guidelines section 15162 states:

   (a) When an EIR has been certified or a negative declaration adopted for a project, no subsequent EIR shall be prepared for that project unless the lead agency determines, on the basis of substantial evidence in the light of the whole record, one or more of the following:

      (1) Substantial changes are proposed in the project which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects;

(2) Substantial changes occur with respect to the circumstances under which the project is undertaken which will require major revisions of the previous EIR or negative declaration due to the involvement of new significant environmental effects or a substantial increase in the severity of previously identified significant effects; or

(3) New information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous EIR was certified as complete or the negative declaration was adopted, shows any of the following:

(A) The project will have one or more significant effects not discussed in the previous EIR or negative declaration;

(B) Significant effects previously examined will be substantially more severe than shown in the previous EIR;

(C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effects of the project, but the project proponents decline to adopt the mitigation measure or alternative; or

(D) Mitigation measures or alternatives which are considerably different from those analyzed in the previous EIR would substantially reduce one or more significant effects on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

If a subsequent or supplemental EIR or negative declaration is not required, the lead agency may document its decision and supporting evidence in an addendum (14 CCR 15164 (e)). The addendum and lead agency's findings should include a brief explanation of the decision not to prepare a subsequent or supplemental EIR or negative declaration (14 CCR 15164(e)). An addendum need not be circulated for public review, but must be considered by the lead agency prior to making a decision on the project (14 CCR 15164(c), (d)).

2. Basis for Determination

A brief explanation is provided below of staffs' determination that none of the conditions requiring further environmental review are triggered by the proposed modifications.

a) There are no substantial changes to the regulation previously analyzed in the Environmental Analysis which require major revisions to the Environmental Analysis involving new significant environmental effects or a substantial increase in the severity of previously identified effects.

The proposed amendments do not substantially change LEV III as analyzed in the ACC EA. The amendments make administrative and procedural changes to the way the regulation is implemented that do not alter the emission standards or fleet average mix. These changes do not alter the compliance responses of the regulated entities identified in the ACC EA, which included technology improvements to engines, emission control systems, transmissions, air conditioning systems, materials, and tires. Therefore, the proposed amendments do not alter the analysis of air quality emissions or impacts to any other resource area covered in the ACC EA.

b) There are no substantial changes with respect to the circumstances under which the regulation is being undertaken which require major revisions to the previous Environmental Analysis involving new significant environmental effects or a substantial increase in the severity of previously identified effects.

The proposed amendments do not include any changes to the setting in which the regulation will be implemented. Therefore there are no substantial changes in the environmental circumstances under which LEV III is being implemented that require major revisions to the ACC EA. As explained above, the amendments are largely administrative and procedural in nature and would not alter the compliance responses of the regulated entities or result in any changes that affect the physical environment.

c) There is no new information of substantial importance, which was not known and could not have been known with the exercise of reasonable diligence at the time the previous Environmental Analysis was certified as complete, that changes the conclusions of the Environmental Analysis with regard to impacts, mitigation measures, or alternatives;

No new information of substantial importance has become available to ARB staff since the ACC EA was certified. Therefore, the conclusions found in the ACC EA about the compliance responses for LEV III or potential environmental impacts to any resource areas have not changed.

E. CONCLUSION

The ACC EA certified in 2012 covered the LEV III Regulation. It concluded there were no adverse environmental impacts associated with implementation of the LEV III regulation. ARB staff has determined that an EA equivalent to an addendum is appropriate for the Board's approval of the current proposed amendments to the LEV III Regulation because, as described above, the changes do not result in any new significant environmental impacts or in a substantial increase in the severity of the prior impacts disclosed for the LEV III Regulation in the ACC EA. Further, there are no changes in circumstances or new information that would otherwise warrant any subsequent environmental review, and therefore, the ACC EA adequately address the potential environmental impacts of implementation of the LEV III Regulation as modified by the proposed amendments and no additional environmental analysis is required to comply with CEQA.

VIII. ENVIRONMENTAL JUSTICE

State law defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies. ARB is committed to making environmental justice an integral part of its activities. The Board approved its Environmental Justice Policies and Actions (Policies) on December 13, 2001, to establish a framework for incorporating environmental justice into ARB's programs consistent with the directives of State law (CARB 2001). These policies apply to all communities in California, but recognize that environmental justice issues have been raised more in the context of low-income and minority communities

IX. ECONOMIC IMPACTS ANALYSIS/ASSESSMENT

A. COSTS AND SAVINGS FROM PROPOSAL

There are minimal costs and savings associated with the proposed regulatory amendments. The estimated costs and savings are summarized below.

1. Medium-Duty Vehicle Fleet Average

Staff is proposing an optional emission compliance mechanism for manufacturers of medium-duty vehicles (MDVs) whereby they can meet a fleet average emission requirement rather than certifying a specified percentage of their MDVs to the applicable LEV III emission standards. This optional compliance mechanism aligns with the federal Tier 3 program compliance mechanism for MDVs. Manufacturers choosing this compliance option may incur some administrative or other cost savings in that they may be able to more precisely target their MDVs to meet the applicable emission standards. It is possible that those manufacturers with the larger number of MDV test groups will may choose this compliance option. Because auto manufacturers do not disclose their detailed business practices, the extant of the cost savings cannot be estimated.

2. SFTP Changes

Most of the proposed SFTP changes are either clarifications or procedural in nature and thus would not result in a change in cost or benefit. However, staff is proposing one significant SFTP change, to adopt a more stringent US06 PM standard similar to what U.S. EPA has adopted in their Tier 3 program. As discussed in Attachment O to the ISOR released as part of the ACC program in December 2011, the LEV III US06 PM standards are intended to be capping standards that are set such that vehicles do not require additional hardware or catalyst loading beyond what is needed to comply with the LEV III FTP requirements and thus, should incur no additional cost. However, as discussed in Chapter III section A.2.3.1, the original US06 PM standards were based on faulty data, and staff is proposing to simply adjust the cap based on new data generated through more recent testing. That is, the proposed US06 PM standards of 10 mg/mi in 2017 and 2018 model years and 6 mg/mi in 2019 and subsequent model years are still

capping standards, and the FTP standard would continue to dictate the hardware that a vehicle will need, while the US06 PM standards would ensure proper calibration of the vehicle over high acceleration, high load driving. U.S. EPA concluded in its Tier 3 rule and ARB staff agree that any additional PM control required would be through calibration and that there is minimal cost associated with this change.

3. Reporting Requirements

It is estimated that the annual cost to a manufacturer for reporting BEV and PHEV projections three years in advance is $1,000 to $2,000. This cost is based on the assumption that it will take a person from each car company about 10 to 20 hours at $100 per hour (loaded cost to company) to complete the required reporting each year. (The loaded cost to a company includes salary, benefits, portion of office space and equipment, training, etc.) The total reporting cost over the life of the regulation (5 year regulatory life) is $5,000 - $10,000 per company. So, the total for all auto companies is $150,000 - $300,000 dollars over the life of the regulation. The total annual reporting cost for a typical business (i.e., almost all businesses) is $1,500 (mid-point of the $1,000 - $2,000 range).

4. Environmental Performance Label

The requirement to have an environmental performance label was part of the original LEV III rulemaking. The option to use the Federal label in lieu of the California label also already exists. The proposed changes just specify the values that must be put on this label for LEV III vehicles. Since there are no changes to the label requirements other than the value put on the label, there are no costs associated with the proposal.

5. Hybrid Electric Vehicle Test Procedures Changes

A reduction in vehicle testing costs would be realized by two of the thirty auto manufacturers affected by the proposed test procedure amendments. If a vehicle model qualifies for the new streamlined test method proposed under this rulemaking, staff estimates that the number of urban driving tests that must be performed by a manufacturer during the development and certification of that vehicle model will be reduced by fifty percent. The number of certification and development tests performed per vehicle model is estimated at 18 to 30 tests. So, using the new streamlined test method, the number of certification and development tests performed per vehicle would be reduced by 9 to 15 tests.

At this time, a total of three vehicle models from the two companies would qualify for the new streamlined test method. A cost savings range of $1500 to $2500 per test is estimated. Based on this cost range for urban-type testing, and assuming that the number of certification and development tests performed per qualifying vehicle model would be reduced by 9 to 15 tests, the cost savings of for this proposal would range from $40,500 to $112,500 when both companies and the three qualifying vehicle models are considered. These cost savings are calculated as follows:

Low estimate: (3 vehicles) * (9 tests) * ($1,500 per test) = $40,500
High estimate: (3 vehicles) * (15 tests) * ($2,500 per test) = $112,500

The test procedure cost savings of $76,500 is calculated as the mid-point of $40,500 - $112,500.

Since manufacturers typically carry over certification data until a new vehicle model is introduced and vehicle models typically last for more than five years, these are the total cost savings over the life of the regulation (5 year regulatory life).

B. MAJOR REGULATIONS

For a major regulation proposed on or after January 1, 2014, a standardized regulatory impact analysis is required. (A major regulation is one "that will have an economic impact on California business enterprises and individuals in an amount exceeding fifty million dollars ($50,000,000), as estimated by the agency." (Govt. Code Section 11342.548) – Note: Health and Safety Code Section 57005(b) For purposes of this section, "major regulation" means any regulation that will have an economic impact on the state's business enterprises in an amount exceeding ten million dollars ($10,000,000), as estimated by the board, department, or office within the agency proposing to adopt the regulation in the assessment required by subdivision (a) of Section 11346.3 of the Govt. Code. These amendments do not meet the requirements for a major regulation.

C. REASONABLE ALERNATIVES TO THE REGULATION AND THE AGENCY'S REASON FOR REJECTING THOSE ALTERNATIVES

1. No other alternatives were presented to or considered by the Board.

2. IMPACT ON SMALL BUSINESS - The Board has not identified any alternatives that would lessen any adverse impact on small business, because the proposed LEV III regulations do not apply to small businesses.

3. Evaluation of Alternatives Considered and Reasons for Rejecting Them

No alternative considered by the agency would be more effective in carrying out the purpose for which the regulation is proposed or would be as effective or less burdensome to affected private persons than the proposed regulation.

Staff considered the following regulatory alternatives to the proposed amendments:

3.1 *Do not amend current test procedures*. This alternative would require vehicle manufacturers to continue to certify their vehicles using current test procedures. This alternative was rejected because it would create an unnecessary test burden for vehicle manufacturers without an associated air quality benefit for California.

3.2 *Do Not Amend US06 PM Standards*. Based on ARB's test program, many vehicles today already comply with the proposed US06 PM standard. However, manufacturers are implementing new GHG-reducing technologies which could potentially result in higher US06 PM emissions if calibration adjustments are not made to optimize PM control during high-acceleration, high-load operation. The proposed US06 PM standards will ensure that manufacturers do not redesign or recalibrate their vehicles to reduce GHG emissions in a way that increases PM emissions compared to today's vehicles. Staff believes that without amending the standards, there is a risk that PM emissions could increase above current levels under high-speed/high-load driving conditions represented by the US06 test cycle. This could compromise the ability of the state to come into compliance with PM ambient air quality standards. Consequently, the alternative to not amend the US06 PM standards was rejected.

D. SIGNIFICANT ADVERSE ECONOMIC IMPACTS DIRECTLY AFFECTING BUSINESSES

There are no significant adverse economic impacts directly affecting businesses, because the costs of the proposed amendments are minimal.

E. JUSTIFICATION FOR ADOPTION OF REGULATIONS DIFFERENT FROM FEDERAL REGULATIONS CONTAINED IN THE CFR

See Chapter III section A.2.3.1 for discussion of US06 PM standards.

The hybrid electric vehicle test procedures in the CFR are not specific enough to address the needs of California. Specifically, detailed test procedures that adequately address the test burden issue for a PHEV are not contained in the CFR. The proposed language includes a streamlining approach that will reduce the time and effort to perform emission tests on these types of vehicles, which will result in cost reductions for testing certain types of PHEVs with significant all-electric range.

F. ECONOMIC IMPACT ASSESSMENT

The proposed rule will increase annual reporting cost for auto manufacturers $1,500. And two manufacturers' testing costs will be reduced on average $76,500. As such, the overall economic impact of these proposed regulatory changes on automotive manufactures is minimal. And as more businesses begin to manufacture qualifying vehicles, the savings from testing cost reductions will increase.

X. PUBLIC PROCESS FOR DEVELOPMENT OF PROPOSED ACTION

To support development of this proposal, ARB staff held a number of meetings with representatives from the automotive industry, as well as one public workshop to engage stakeholders and obtain input on the proposed changes to the regulation and test procedures. These meetings are listed in the following table. In addition, ARB staff also

participated in dozens of individual meetings with vehicle manufacturers to discuss the proposed changes.

Regulatory Development Timeline

Date	Meeting
January 9-10, 2013	§1066 Development Meeting with Industry
January 24, 2013	LEV III Meeting with Industry
February 12, 2013	§1066 Development Meeting with Industry
April 11, 2013	PHEV TP Meeting with Industry
April 24, 2013	PHEV TP Meeting with Industry
May 9, 2013	PHEV TP Meeting with Industry
August 28, 2013	LEV III Meeting with Industry
October 30, 2013	PHEV TP Meeting with Industry
November 6, 2013	PHEV TP Meeting with Industry and EPA
November 18, 2013	PHEV TP Meeting with Industry and EPA
February 27, 2014	LEV III Meeting with Industry
April 3, 2014	PHEV TP Meeting with Industry
April 10, 2014	PHEV TP Meeting with Industry
April 22, 2014	LEV III Meeting with Industry
May 30, 2014	Public Workshop on Rulemaking
June 26, 2014	PHEV TP Meeting with Industry

XII. LIST OF ACRONYMS AND ABBREVIATIONS

AB:	Assembly Bill
ACC:	Advanced Clean Cars
AER:	All-electric range
ARB:	California Air Resources Board
BEV:	Battery electric vehicle
CARB:	California Air Resources Board
CCR:	California Code of Regulations
CEQA:	California Environmental Quality Act
CFR:	Code of Federal Regulations
E10:	Fuel that contains a mix of 10% ethanol and 90% gasoline
EA:	Environmental analysis
EAER:	Equivalent all-electric range
EIR:	Environmental impact report
FID:	Flame Ionization Detectors
FTP:	Federal Test Procedure
GDI:	Gasoline direct injection
GHG:	Greenhouse gas
g/mi:	Grams per mile
GVWR:	Gross vehicle weight rating
HEV:	Hybrid electric vehicle
lbs.:	Pounds
LEV:	Low-emission vehicle
LPG:	Liquefied petroleum gas
ISOR:	Staff Reports: Initial Statement of Reasons
IUVP:	In-use verification program
MAC:	Manufacturers Advisory Correspondence
MDV:	Medium-duty vehicle
mg/mi:	Milligrams per mile
MY:	Model year
NHTSA:	National Highway Traffic Safety Administration
NMOG:	Non-methane organic gas
NOx:	Oxides of nitrogen
OBD:	On-board diagnostic
PFI:	Port fuel injection
PHEV:	Plug-in hybrid electric vehicle; or Off-vehicle Charge Capable HEV
PM:	Particulate matter
PRC:	Public Resources Code
psi:	Pounds per square inch
RVP:	Reid Vapor Pressure
SC03:	A test procedure designed to determine emissions associated with the use of an air conditioner; A/C test procedure
SFTP:	Supplemental Federal Test Procedure
SHED:	Sealed Housings for Evaporative Determination
SIP:	State Implementation Plan

SOC:	State-of charge
SULEV:	Super-ultra-low-emission vehicle
TP:	Test procedures
TZEV:	Transitional Zero-Emission Vehicle
ULEV:	Ultra-low-emission vehicle
U.S. EPA:	United States Environmental Protection Agency
US06:	A high-speed, high-acceleration, test procedure designed to measure off-cycle emissions
VEC:	Vehicle emission credit
VMT:	Vehicle miles travelled
ZEV:	Zero-emission vehicle

XIV. REFERENCES

1. California Air Resources Board, *Appendix O: Technical Support Document for Proposed Amendments to the California Supplemental Federal Test Procedure Exhaust Emissions Standards and Test Procedures for 2015 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles Under 14,001 Pounds Gross Vehicle Weight Rating*. December 7, 2011. http://www.arb.ca.gov/regact/2012/leviiighg2012/levappo.pdf

2. California Air Resources Board, Letter from Mary D. Nichols, Chairman, to The Honorable Robert Perciasepe, Acting Administrator, United States Environmental Protection Agency, June 26, 2013. http://www.regulations.gov/#!documentDetail;D=EPA-HQ-OAR-2011-0135-4261

3. California Air Resources Board, *Policies and Actions for Environmental Justice*, December 13, 2001. http://www.arb.ca.gov/ch/programs/ej/ejpolicies.pdf

4. Code of Federal Regulations, Title 40, Part 86, §86.1811-17(h)(3) (April 28, 2014)

5. Federal Register, Volume 76, No. 129 / Wednesday, July 6, 2011 / Final Rule, Environmental Protection Agency and National Highway Traffic Safety Administration, "Revisions and Additions to Motor Vehicle Fuel Economy Label." http://www.gpo.gov/fdsys/pkg/FR-2011-07-06/pdf/2011-14291.pdf

6. Federal Register, Volume 79, No. 81 / Monday, April 28, 2014 / Final Rule, Environmental Protection Agency, "Control of Air Pollution From Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards." http://www.gpo.gov/fdsys/pkg/FR-2014-04-28/pdf/2014-06954.pdf

7. Perea, 2013. Assembly Bill No. 8. Chapter 401. Alternative fuel and vehicle technologies: funding programs. An act to amend Sections 41081, 44060.5, 44125, 44225, 44229, 44270.3, 44271, 44272, 44273, 44274, 44275, 44280, 44281, 44282, 44283, 44287, 44299.1, and 44299.2 of, to add and repeal Section 43018.9 of, and to repeal Section 44299 of, the Health and Safety Code, to amend Sections 42885 and 42889 of the Public Resources Code, and to amend Sections 9250.1, 9250.2, 9261.1, and 9853.6 of the Vehicle Code, relating to vehicular air pollution, and declaring the urgency thereof, to take effect immediately. http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201320140AB8&search_keywords

8. United States Environmental Protection Agency, "Control of Air Pollution from Motor Vehicles: Tier 3 Motor Vehicle Emission and Fuel Standards Final Rule Regulatory Impact Analysis," EPA-420-R-14-005, March 2014. http://www.epa.gov/otaq/documents/tier3/420r14005.pdf

APPENDICES

Appendix A: Proposed Regulation Order

Appendix B: Proposed Amendments to the "California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles"

Appendix C: Proposed Amendments to the "California Non-Methane Organic Gas Test Procedures"

Appendix D: Proposed New "California Non-Methane Organic Gas Test Procedures for 2017 and Subsequent Model Year Vehicles"

Appendix E: Proposed Amendments to the "California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles"

Appendix F: Proposed Amendments to the "California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles"

Appendix G: Proposed Amendments to the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Otto-Cycle Engines"

Appendix H: Proposed Amendments to the "California Exhaust Emission Standards and Test Procedures for 2004 and Subsequent Model Heavy-Duty Diesel Engines and Vehicles"

Appendix I: Proposed Amendments to the "California Exhaust Emission Standards and Test Procedures for 2018 and Subsequent Model Zero-Emission Vehicles and Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes"

Appendix J: Proposed Amendments to the "California Environmental Performance Label Specifications for 2009 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles"

Appendix K: List of Proposed Changes to Title 13, CCR and Incorporated Test Procedures