

**State of California
Environmental Protection Agency
AIR RESOURCES BOARD**

**“LEV II” AND “CAP 2000” AMENDMENTS TO THE CALIFORNIA
EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST
PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS
AND MEDIUM-DUTY VEHICLES, AND TO THE EVAPORATIVE EMISSION
REQUIREMENTS FOR HEAVY-DUTY VEHICLES**

FINAL STATEMENT OF REASONS

September 1999

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Attachment A: NONSUBSTANTIAL MODIFICATIONS TO THE REGULATIONS AFTER THE SECOND 15-DAY COMMENT PERIOD

State of California
AIR RESOURCES BOARD

Final Statement of Reasons for Rulemaking
Including Summary of Comments and Agency Responses

PUBLIC HEARING TO CONSIDER THE “LEV II” AND “CAP 2000” AMENDMENTS TO THE CALIFORNIA EXHAUST AND EVAPORATIVE EMISSION STANDARDS AND TEST PROCEDURES FOR PASSENGER CARS, LIGHT-DUTY TRUCKS AND MEDIUM-DUTY VEHICLES, AND TO THE EVAPORATIVE EMISSION REQUIREMENTS FOR HEAVY-DUTY VEHICLES

Public Hearing Date: November 5, 1998
Agenda Item No.: 98-12-1

I. GENERAL

In this rulemaking the Air Resources Board (ARB or Board) is adopting a comprehensive set of “LEV II” amendments to the California Low-Emission Vehicle (LEV) regulations. The amendments include the application of passenger car exhaust emission standards to most sport utility vehicles (SUVs), pick-up trucks and mini-vans, lower tailpipe standards for all vehicles, more stringent requirements for phasing in cleaner vehicles, substantial strengthening of most evaporative emission standards, additional mechanisms for the generation of zero-emission vehicle (ZEV) credits, and numerous technical modifications. The amendments are designed to meet the ARB’s commitment to achieve emission reductions from light-duty vehicles under the State Implementation Plan (SIP) for ozone attainment. The Board is also adopting “CAP 2000” amendments to the certification and in-use compliance requirements for motor vehicles.

The rulemaking was initiated by the September 18, 1998 publication of a notice for a November 5, 1998 public hearing to consider the LEV II amendments. A “Staff Report: Initial Statement of Reasons” (referred to as the Staff Report) was also made available for public review and comment on September 18, 1998. The Staff Report, which is incorporated by reference herein, contains an extensive description of the rationale for the proposal. The text of the proposed amendments to title 13, California Code of Regulations (CCR), and proposed new and amended test procedures and related documents incorporated by reference in the title 13, CCR regulations, were included as appendices to the Staff Report. These documents were also posted on the ARB’s Internet site for the LEV II rulemaking:
<http://www.arb.ca.gov/regact/levii/levii.htm>.

The proposed action consisted of amendments to title 13, CCR, sections 1900, 1960.1 and the incorporated “California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles” and “California Non-Methane Organic Gas Test Procedures,” 1965 and the incorporated “California Motor Vehicle Emission Control and Smog Index Label Specifications,” 1968.1, 1976, the incorporated “California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles,” and the proposed to be incorporated new “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles,” 1978, the incorporated “California Refueling Emission Standards and Test Procedures for 1998 and Subsequent Motor Vehicles” and the proposed to be incorporated new “California Refueling Emission Standards and Test Procedures for 2001 and Subsequent Motor Vehicles,” 2037, 2038, 2062, the incorporated “California Assembly-Line Test Procedures for 1998 and Subsequent Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles” and the proposed to be incorporated new “California Assembly-Line Test Procedures for 2001 and Subsequent Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” 2101 and the incorporated “California New Vehicle Compliance Test Procedures,” 2106, 2107, 2110, 2112, 2114, 2119, 2130, 2137-2140, and 2143-2148. Adoption of title 13, CCR, sections 1961 and the incorporated new “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles,” and 1962 and the incorporated new “California Zero-Emission and Hybrid Electric Vehicle Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles.”

On November 5, 1998, the Board conducted the public hearing, at which it received written and oral comments. At the conclusion of the hearing, the Board adopted Resolution 98-53, in which it approved the originally proposed amendments with several modifications. All but one of the modifications had been suggested by staff in an 18-page document entitled “Staff’s Suggested Changes to the Original Proposal” that was distributed at the hearing and was Attachment N to the Resolution. The remaining modification was to delete the Transitional Low-Emission Vehicle (TLEV) standards starting with model year 2004. In accordance with section 11346.8 of the Government Code, the resolution directed the Executive Officer to incorporate the modifications into the proposed regulatory texts, with such other conforming modifications as may be appropriate, and to make the modified text available for a supplemental comment period of at least 15 days. He was then directed either to adopt the amendments with such additional modifications as may be appropriate in light of the comments received, or to present the regulations to the Board for further consideration if warranted in light of the comments.

Subsequent to the hearing, the staff identified a number of additional technical corrections to the regulatory texts that are needed to reflect the underlying intent of the original proposal. Most of these conforming modifications were nonsubstantive. These modifications were incorporated into the texts of the proposed regulations and incorporated documents, along with the modifications approved by the Board at the hearing.

The texts of the substantive modifications to the originally proposed regulations and incorporated documents were made available for a supplemental 15-day comment period by issuance of a “Notice of Public Availability of Modified Text and Supporting Documents and Information” (the “first 15-day notice”). This Notice and its two attachments were mailed by April 15, 1999 to all parties identified in section 44(a), title 1, CCR, including the over 5000 persons who submitted written comments.¹ Ten comments were received during the first 15-day comment period.

In light of the supplemental comments received, the Executive Officer determined that additional modifications were necessary. A Second Notice of Public Availability of Modified Text (the “second 15-day notice”) and a four-page Attachment I identifying the additional substantive modifications were mailed to all parties identified in section 44(a), title 1, CCR, by June 1, 1999; the second deadline for supplemental comment was June 15, 1999.² Comments from three parties were submitted during the second supplemental comment period.

¹ The complete texts of the regulations and incorporated documents are several hundred pages long, and the ARB was required to mail the modified text to more than 5800 interested parties due to the large number of written comments the ARB received (these included over 4750 individually mailed “Citizen Letters” supporting the proposal to make SUVs and minivans subject to the same exhaust emission standards as passenger cars). The ARB accordingly modified its normal practices of distributing modified regulatory language, in order to maximize wide dissemination in a practical way. Appended to the first 15-day notice as Attachment I was a 31-page document that set forth excerpts of the originally proposed text of the regulations and incorporated documents, showing the proposed substantive modifications along with a commentary on their rationale. Attachment II was a 4-page document identifying additional supporting documents and information being made available for inspection and comment pursuant to section 45, title 1, CCR. The first 15-day notice with the two attachments was mailed to all section 44(a), title 1, CCR parties by April 15, 1999, with an April 30 deadline for public comment.

On March 26, 1999, the first 15-day notice and the two attachments were posted on the ARB’s Internet site for the rulemaking, along with the complete modified texts of the proposed regulations and seven incorporated documents that contained proposed modifications. The first 15-day notice included the address of the LEV II Internet site, so that any party would be able to access and download the complete modified text of the regulations and all incorporated documents.

During the “45-day” comment period for the original proposal, the ARB received 36 comments by e-mail from parties that did not provide any address other than their e-mail address. Prior to April 15, 1999, the ARB sent e-mail messages to all of these parties, advising them of the 15-day comment period and providing links to the LEV II Internet site, containing the 15-day notice, its attachments, and the modified regulations and incorporated documents.

² The Second Notice of Public Availability of Modified Text, its four-page Attachment I identifying the additional substantive modifications, and the complete modified text of the proposed regulations and four incorporated documents were posted on the LEV II Internet site on May 25, 1999. The address of the Internet site was included in the second 15-day notice. Notification of commenters providing only e-mail addresses was provided as had been done for the first 15-day notice.

Following the close of the second supplemental 15-day comment period, the Executive Officer issued Executive Order G-99-059, adopting the amendments to title 13, CCR, and to the various incorporated documents.³

This Final Statement of Reasons (FSOR) updates the Staff Report by identifying and providing the rationale for the modifications made to the originally proposed regulatory texts. The Final Statement of Reasons also contains a summary of the comments the Board received on the proposed regulatory amendments during the formal rulemaking process and the ARB's responses to those comments.

Incorporation of Test Procedures and Federal Regulations. The 12 amended and new test procedures and other documents are incorporated by reference in CCR, title 13, sections 1960.1, 1961, 1962, 1965, 1976, 1978, 2062, and 2101. Some of the test procedure documents in turn incorporate certification test procedures adopted by the U.S. Environmental Protection Agency (U.S. EPA) and contained in 40 Code of Federal Regulations (CFR) Part 86.

California Code of Regulations, title 13, sections 1960.1, 1961, 1962, 1965, 1976, 1978, 2062, and 2101 identify the incorporated ARB documents by title and date. The ARB documents are readily available from the ARB upon request and were made available in the context of this rulemaking in the manner specified in Government Code section 11346.5(b). The CFR is published by the Office of the Federal Register, National Archives and Records Administration, and is therefore reasonably available to the affected public from a commonly known source.

The test procedures are incorporated by reference because it would be impractical to print them in the CCR. Existing ARB administrative practice has been to have the test procedures incorporated by reference rather than printed in the CCR because these procedures are highly technical and complex. They include the "nuts and bolts" engineering protocols required for certification of motor vehicles and have a very limited audience. Because the ARB has never printed complete test procedures in the CCR, the affected public is accustomed to the incorporation format utilized therein. The ARB's test procedures as a whole are extensive and it would be both cumbersome and expensive to print these lengthy, technically complex procedures with a limited audience in the CCR. Printing portions of the ARB's test procedures that are incorporated by reference would be unnecessarily confusing to the affected public.

The test procedures incorporate portions of the CFR because the ARB requirements are substantially based on the federal regulations. Manufacturers typically certify vehicles and engines to a version of the federal emission standards and test procedures which has been modified by state requirements. Incorporation of the federal regulations by reference makes it easier for manufacturers to know when the two sets of requirements are identical and when they differ.

³ The adopted regulatory documents contained a few nonsubstantial modifications made after the second 15-day comment period. These are listed in Attachment 1 hereto.

Fiscal Impacts. The Board has determined that this regulatory action will not result in a mandate to any local agency or school district, the costs of which are reimbursable by the state pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code.

Consideration of Alternatives. The amendments proposed in this rulemaking were the result of extensive discussions and meetings involving staff and the affected motor vehicle manufacturers and others. Staff seriously considered all of the alternatives proposed by industry. As described in Comments 10 and 85, the American Automobile Manufacturer's Association (AAMA) presented an alternative proposal which the manufacturers believed was more technologically feasible, less costly, and more cost-effective than staff's LEV II proposal. The alternative proposal was supported by several business and agricultural groups, although some such groups supported the staff proposal.

As discussed in this FSOR, the primary objective of the rulemaking is to implement Measure M2 of the 1994 California State Implementation Plan (SIP) for ozone, and to achieve as much additional ROG plus NOx emissions reductions as are technologically feasible and cost-effective, to be counted against the SIP's additional 75 tpd ROG plus NOx emission reduction target — the so-called "Black Box." The amendments are also designed to achieve maximum feasible and cost-effective emissions reductions of NOx as part of the ARB's efforts to attain the state ambient air quality ozone standard as early as practicable, as well as to reduce emissions of particulate matter. The adopted LEV II amendments are expected to achieve emissions reductions of reactive organic gases (ROG) plus oxides of nitrogen (NOx) in 2010 in the South Coast Air Basin (SCAB) that are significantly greater than what would be achieved by the industry alternative. Accordingly, the Board has determined that neither the AAMA's alternative proposal, nor any other alternative considered by the ARB, would be more effective in carrying out the purpose for which the regulatory action was proposed or would be as effective and less burdensome to affected private persons than the action taken by the Board.

II. MODIFICATIONS TO THE ORIGINAL PROPOSAL

A. AN OVERVIEW OF THE ORIGINAL PROPOSAL

1. The Existing California Motor Vehicle Emission Regulations

(a) The LEV Regulations

In adopting the LEV regulations in 1990-91, the ARB established the most stringent exhaust regulations ever for light- and medium-duty vehicles. The regulations include 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 trading, and (3) a

requirement that a specified percentage of passenger cars and lighter light-duty trucks be ZEVs, vehicles with zero emissions of any criteria pollutant or precursor.

(i) *LEV Standards*

There are four low-emission vehicle categories to which a passenger car or lighter light-duty truck may be certified: Transitional Low-Emission Vehicle (TLEV), Low-Emission Vehicle (LEV), Ultra Low-Emission Vehicle (ULEV) and ZEV. For medium-duty vehicles, there are four categories: LEV, ULEV, Super Ultra Low-Emission Vehicle (SULEV) and ZEV. Each low-emission vehicle category has a progressively more stringent standard for exhaust emissions of nonmethane organic gas (NMOG), a precursor of ozone pollution in the lower atmosphere. For example, a passenger car TLEV must meet an NMOG emission standard that is about one-half of the corresponding basic standard for 1994 model vehicles. Passenger car LEVs and ULEVs must meet standards for NMOG that are respectively about one-third and one-sixth of the corresponding 1994 standard. The identical LEV and ULEV standard for oxides of nitrogen (NO_x) represents a 50% reduction from the basic NO_x standard for 1994 passenger cars, and the ULEV standard for carbon monoxide (CO) also represents a reduction of about 50% from the basic 1994 CO standard.

All passenger cars are subject to the same low-emission vehicle standards, regardless of weight. However, for light-duty trucks and medium-duty vehicles, the numerical standards for each low-emission vehicle category depend on the weight classification of the vehicle. The lightest light-duty trucks, such as the Toyota RAV4 and Ford Ranger, must meet the same standards as passenger cars (this vehicle category is often called “LDT1”). Medium-light trucks, such as the Jeep Grand Cherokee and all mini-vans, are allowed to emit about 25-33% more NMOG and CO, and 75-100% more NO_x, than passenger cars in the same low-emission vehicle category. For most of the remaining heavier pick-up trucks and SUVs such as the Dodge Ram 1500 truck and Ford Expedition, the permitted LEV emission levels are from 50 to 160% higher than the passenger car levels, and the permitted ULEV emission levels are about 200% higher than those for passenger car ULEVs. For many full size vans and the very heaviest pickups and SUVs, the permitted emission levels for LEVs and ULEVs are generally more than 200% higher than the corresponding passenger car levels.

(ii) *Requirements for phasing-in a cleaner vehicle fleet*

For each model year, a manufacturer may choose the standards to which each passenger car and light-duty truck is certified, provided that the manufacturer’s entire fleet of these vehicles meets a specified fleet average NMOG emissions level. The permitted fleet average NMOG emission level for passenger cars and the lightest light-duty trucks gradually falls every year from 0.250 gram per mile (g/mi) in 1994 to 0.062 g/mi in the 2003 and subsequent model years. The 2003 model-year level is derived from a potential vehicle mix of 75% LEVs, 15% ULEVs and 10% ZEVs. The heavier light-duty trucks are subject to numerically higher fleet average NMOG emissions requirements reflecting the numerically higher TLEV, LEV and ULEV standards and

the absence of the ZEV requirements described below. Medium-duty vehicles have separate requirements based on a percent phase-in schedule, because the numerous vehicle weight classifications make a fleet average requirement difficult to implement. The low-emission vehicle standards for chassis-certified medium-duty vehicles are phased in between the 1998 and the 2004 model years, at which time a manufacturer must certify at least 60% LEVs and 40% ULEVs. The regulations also establish a system for earning marketable credits for use in complying with the phase-in requirements.

(iii) *ZEV requirements*

As originally adopted, the regulations required that specified percentages of the passenger cars and lightest light-duty trucks produced by each of the seven largest manufacturers be ZEVs, starting in 1998. The percentages were 2% for the 1998-2000 model years and 5% for the 2001-2002 model years. A requirement of 10% ZEVs applied to all but small-volume manufacturers starting in model-year 2003. In 1996 the Board eliminated the regulatory ZEV requirements applicable prior to the 2003 model year. The ZEV element also includes a marketable credits system.

(b) Evaporative emissions standards

Evaporative emissions from motor vehicles account for approximately half of the reactive organic gas (ROG) motor vehicle emission inventory in the state, and are classified into three types — running loss, hot soak, and diurnal emissions. Running loss emissions occur when the vehicle is driven. Hot soak emissions occur immediately after a fully-warmed up vehicle becomes stationary with the engine turned off. Diurnal emissions occur when a vehicle is parked and are caused by daily ambient temperature changes. Most of these emissions result during increasing ambient temperatures which cause an expansion of the vapor in the fuel tank.

Just a month before its September 1990 approval of the LEV regulations, the Board approved significant new enhanced evaporative emission requirements that were phased in over the 1995-1997 model years. As subsequently modified, the enhanced requirements mandated effective control of the three types of evaporative emissions. Two test sequences are applicable for certification: (1) a 3-day diurnal-plus-hot-soak sequence ensures that running loss emissions, high-temperature hot soak emissions, and three days worth of diurnal emissions are controlled, and (2) a 2-day diurnal-plus-hot-soak sequence verifies that the canister is well purged during vehicle operation. Compliance with three separate emission standards is required for the vehicle's useful life: a stand-alone running loss standard, a combined highest 3-day diurnal plus high-temperature hot soak standard, and a combined highest 2-day diurnal plus moderate-temperature hot soak standard. The evaporative emission standards for passenger cars and light-duty trucks are 2.0 grams of hydrocarbon for the 3-day diurnal-plus-hot-soak test, 2.5 grams of hydrocarbon for the 2-day diurnal-plus-hot-soak test, and 0.05 g/mi for running losses.

(c) Certification, assembly-line, and in-use test requirements

The ARB has for many years administered programs requiring a vehicle manufacturer to demonstrate that its vehicles meet the applicable emission standards in three ways — at the time of certification, as the vehicles are produced on the assembly-line, and in actual customer use.

Prior to vehicle production, a manufacturer must submit test data to the ARB demonstrating that the vehicle meets the applicable standards. The manufacturer must predict the anticipated emissions deterioration (called the “deterioration factor” or DF) of the vehicle in-use using pre-production, developmental vehicles. Once the deterioration factor is established, low mileage “emission-data” vehicles are tested and the emission results are adjusted using the deterioration factor to determine whether the vehicle meets the emission standards throughout its useful life. A manufacturer must provide this information for each “engine family,” which is a group of vehicles having engines and emission control systems with similar operational and emission characteristics, in order for the vehicles to be California-certified.

Once an engine family has been certified, the manufacturer must conduct “quality audit” emission tests on a small portion of the actual production vehicles in each engine family as they leave the assembly-line.

The ARB administers its in-use compliance program by procuring late-model vehicles from their owners for emission testing to determine whether vehicles that have been properly maintained and used comply with the standards in actual use. If the ARB test data demonstrate that an engine family does not comply, the manufacturer must either submit a plan to remedy the nonconformity at its expense or be required to recall the vehicles. In either case, penalties may be assessed.

2. The Proposed Amendments

The primary impetus for the proposed amendments came from the ARB’s obligations under the State Implementation Plan (SIP) for ozone adopted by the Board in 1994. The SIP, which represents California’s commitment to attain and maintain the federal ambient air quality standard for ozone in greater Los Angeles and the rest of the state, was approved by U.S. EPA in 1995. The SIP contains Mobile Source Measure M2, which calls for the adoption of technology-based emission control strategies for light-duty vehicles to be implemented beginning with the 2004 model year and identifies a reduction of 25 tons per day (tpd) ROG plus NOx. In addition to Measure M2, the SIP recognizes that the greater Los Angeles area designated as extreme ozone nonattainment may need to rely on the development of additional technology measures to meet an additional 75 tpd ROG plus NOx emission reduction target — a target often referred to as the “Black Box.” The proposed amendments are intended to achieve the emission reduction targets of M2 and over two-fifths of the emission reductions in the Black Box.

(a) LEV II Portion of the Proposal

(i) *Exhaust Emission Reductions*

The LEV II proposal included three major interrelated elements designed to reduce to exhaust emissions — (1) restructuring the light-duty truck category so that most SUVs, mini-vans and pick-up trucks are subject to the same low-emission vehicle standards as passenger cars, (2) strengthening the NO_x standard for passenger car and light-duty truck LEVs and ULEVs, and changing other emission standards, and (3) establishing more stringent 2004 and subsequent model year phase-in requirements for passenger cars, light-duty trucks and medium-duty vehicles.

(A) Passenger car standards for light and medium trucks

Under the restructuring of vehicle weight classifications, all current light-duty trucks, and all current medium-duty vehicles having a gross vehicle weight (GVW) of less than 8,500 lbs. would generally be subject to the same TLEV, LEV and ULEV standards as passenger cars. Only the very heaviest SUVs and pick-up trucks would remain subject to separate medium-duty vehicle standards — vehicles such as the yet to be introduced Ford Excursion, Dodge Ram 2500 and 3500 trucks, and the largest Chevrolet Suburban model. When the vehicle categories were first established, the majority of vehicles in the medium-duty category were primarily used for work purposes. More lenient gram per mile emission standards were developed that account for heavier loads and a potentially more rigorous duty cycle of work trucks. However, it is now very common for trucks and SUVs to be used primarily for personal transportation (i.e., as passenger cars), and light trucks (including SUVs) have increased from 20% of the vehicle market in 1980 to almost 46% in 1997. This trend has a substantial impact on California's air quality because, although these vehicles are used as passenger cars, they are certified to the more lenient gram per mile emission standards designed for work trucks.

Since most pick-up trucks and SUVs have a curb weight less than 5,500 lbs. and a payload of approximately 1,000-2,000 lbs., it is anticipated that the majority of the heavier trucks will fall in the new LDT2 category below 8,500 lbs. GVW. (Although the same low-emission vehicle standards will apply, the current LDT1 category would be retained because of the different fleet average NMOG requirements described below and because only LDT1s are subject to the ZEV requirements.) It appears unlikely that manufacturers would unnecessarily add payload to trigger a numerically higher standard because of the negative impact on fuel economy, performance and cost. In recognition of the fact that some of the heavier trucks in the new truck category will be engineered for more rigorous duty, staff proposed that a small percentage (up to 4%) of a manufacturer's truck sales in the LDT2 category be allowed to certify to a marginally higher NO_x emission standard.

(B) New LEV II standards

The staff proposed new “LEV II” standards for the current TLEV, LEV, ULEV and SULEV categories; the preexisting standards would be referred to as the “LEV I” standards. The new LEV II standards would be phased in from the 2004 to 2007 model years; during these four years a manufacturer must certify its vehicles to the LEV II standards at a rate of at least 25/50/75/100%. Thus 2006 would be the last model year in which a vehicle could be certified to the LEV I standards.

The LEV II standards reflected the following changes from LEV I. First, staff proposed that the LEV II NO_x standard for passenger cars and light-duty trucks certified to the LEV and ULEV standards be reduced to 0.05 g/mi from the current 0.2 g/mi level. The particulate emission standard would be 0.01 g/mi for diesel LEVs, ULEVs and SULEVs, and 0.04 g/mi for diesel TLEVs. Second, the overall emission standards for medium-duty vehicles would be reduced to be substantially equivalent in stringency to the light-truck standards (although numerically higher). Third, the useful life for passenger cars and light-duty trucks would be increased from the current 100,000 miles to 120,000 miles. Manufacturers must show compliance with the full useful life standards over this mileage. Fourth, a new light-duty SULEV category would be created with an NMOG standard less than one-fourth of the level for ULEVs; recent technology developments indicate that gasoline, alternative fuel and hybrid electric vehicles could potentially reach these emission levels. Fifth, manufacturers would have the option of certifying any TLEV, LEV, ULEV or SULEV to a 150,000 mile certification standard, in which case the vehicle would generate greater NMOG credits for the fleet average NMOG determination. A manufacturer electing this option would have to provide an 8-year/100,000-mile warranty for high cost parts rather than for the normal 7 years/70,000 miles. There would also be various other technical amendments.

(C) Requirements for phasing-in a cleaner vehicle fleet

The proposal retained the current fleet average NMOG requirements running through the 2003 model year. The proposed amendments provided for continuing yearly reductions through 2010, when the fleet average NMOG requirement for passenger cars would be 0.035 g/mi. Although each manufacturer can select its own vehicle mix, one approach in meeting the 2010 requirement would be a fleet made up of 1% TLEVs, 15% LEVs, 49% ULEVs, 25% SULEVs and 10% ZEVs. There would be a separate phase-in schedule for the heavier light-duty trucks in the new LDT2 class. The fleet average for these vehicles would start at 0.085 g/mi in 2004 and decline to 0.043 g/mi in 2010 — the levels are somewhat higher because no ZEVs in this class are projected and a longer phase-in period for ULEVs and SULEVs is provided. For MDVs, the requirement of a 60/40 mix of LEVs and ULEVs in 2004 and subsequent model years would be changed to 40/60.

(ii) *Partial ZEV Allowances*

In the eight years since the ZEV requirements were originally adopted, a variety of new, advanced technologies have been developed. Many of these technologies are capable of achieving

extremely low levels of emissions on the order of the power plant emissions that occur from charging battery-powered electric vehicles, and some demonstrate other ZEV-like characteristics such as inherent durability and partial zero-emission range. As a result, staff proposed additional flexibility in the ZEV program from broadening the scope of vehicles that could qualify for meeting some portion of the ZEV requirement. Manufacturers would decide which mix of vehicles to use to meet the 10% ZEV requirement for the 2003 and subsequent model years, with the exception that large-volume manufacturers would have to meet at least 40% of the requirement using true ZEVs or vehicles receiving a full ZEV allowance. The process of calculating ZEV allowances for candidate vehicles would consist of assigning basic “allowances” consisting of a baseline allowance, a zero-emission vehicle miles traveled (VMT) allowance, and a low fuel-cycle emissions allowance.

In order to receive any ZEV allowance, a vehicle would have to qualify for the “baseline ZEV allowance” of 0.2. To receive this allowance, the vehicle would have to meet the SULEV standard at 150,000 miles, satisfy applicable second generation on-board diagnostics requirements (OBD II), and have “zero” evaporative emissions — evaporative emissions below the background level established for non-fuel evaporative emissions resulting from off-gassing of paint, upholstery, tires and other vehicle sources. The manufacturer would also need to provide an emission warranty under which all malfunctions identified by the OBD II system would be repaired under warranty for a period of 15 years or 150,000 miles, whichever occurs first.

An additional allowance would be provided based on the potential for realizing zero-emission VMT (e.g. capable of some all-electric operation traceable to energy from off-vehicle charging), up to a maximum of 0.6. If a vehicle does not have any zero-emission VMT potential but is equipped with advanced ZEV componentry, it could qualify to earn an additional 0.1 ZEV allowance. Under the final allowance, a vehicle that uses fuels(s) with very low fuel-cycle emissions can receive a ZEV allowance of up to 0.2. In order to qualify for a full ZEV allowance of 1.0, a car would have to qualify for the maximum amount under each allowance.

Staff also proposed that, where a ZEV (or full ZEV allowance vehicle) has a long all-electric range, it will qualify for declining numbers of multiple ZEV credits in the 1999-2007 model years.

(iii) *Evaporative emissions requirements*

The staff proposed new more stringent evaporative emission standards for the 3-day diurnal-plus-hot-soak test and the 2-day diurnal-plus-hot-soak test. The proposed standards would apply to both fuel and non-fuel vehicle emissions. The standards for passenger cars would represent up to an 80% reduction from the current evaporative emission standards. The proposed standards for the other vehicle categories were based on the passenger car standards and are incrementally increased to account for higher non-fuel emissions of the larger vehicles. The staff also proposed that the useful-life requirements of each of the evaporative emission standards be extended to 15 years or 150,000 miles, whichever first occurs, for all vehicles.

Certification to the new evaporative emission standards would be required for 40% of a manufacturer's vehicles in the 2004 model year, 80% in the 2005 model year, and 100% in the 2006 model year. Manufacturers would have the option of developing an alternative phase-in schedule similar to the option allowed for OBD II compliance. The proposal also included various improvements to the evaporative emissions test procedures designed to assure accuracy at low measurement levels.

(iv) *Other Amendments*

The proposal included a number of other elements, including amendments to the test procedures for hybrid electric vehicles (HEVs) and for ZEVs, changes to the requirements for the California smog index label, NMOG credits for vehicles using an ozone-reducing catalyst on the radiator or other supporting substrates, and an extension in the phase-in period for 0.020 inch evaporative leak detection for OBD II systems.

(b) CAP 2000 Portion of the Proposal

The U.S. EPA administers certification and in-use test requirements that are similar to the ARB requirements. In 1995, the U.S. EPA, ARB and automobile manufacturers signed a Statement of Principles committing themselves to working together to achieve regulatory streamlining of light-duty vehicle compliance programs with a greater focus on in-use compliance with emission standards. Since then the U.S. EPA and ARB have worked with manufacturers to implement these principles in what has become known as the "Compliance Assurance Program," or "CAP 2000". On July 23, 1998 (63 FR 39654), U.S. EPA issued a notice of proposed rulemaking for the program to become effective with the 2001 model year, although manufacturers would have the option to certify 2000 model-year vehicles using CAP 2000. The ARB staff's proposal in this rulemaking incorporated by reference much of the federal program, and had the same implementation dates. U.S. EPA's final adoption of the federal CAP 2000 regulations was published in the May 4, 1999 Federal Register (64 F.R. 23906.)

The proposed CAP 2000 program significantly reduced the emission testing and reporting requirements for certification and provides manufacturers with more control over roll out of their product lines. A manufacturer would be able to develop its own durability demonstration (with pre-approval by the Executive Officer) and apply it to several engine families that have been grouped into broad "durability groups" of vehicles with similar deterioration characteristics. Each durability group would consist of several "test groups" based on the emission standards to which a vehicle is certified. Manufacturers would then select one "worst case" vehicle from each test group to emission test rather than the two required under the current program. This reduction in testing would result in 75% fewer durability demonstrations than now required and a 50% reduction in the number of emission data vehicles tested. CAP 2000 would also provide more flexibility regarding the information required for certification.

The amendments would eliminate the 2% assembly-line quality audit emission tests because the new in-use testing requirements described below are more likely to ensure that manufacturers have durable emission control systems that prevent potential recalls. The 100% assembly-line functional test would be retained.

The proposed CAP 2000 amendments established a significant new in-use compliance program under which manufacturers would be required to procure and test customer vehicles on an “as received” basis at 10,000 miles, at 50,000 miles and one vehicle from every test group at a minimum of 75,000, 90,000 or 105,000 miles depending on the useful life of the vehicle. If the vehicles tested do not meet the applicable emission requirements, the manufacturer would have to conduct a subsequent test program on properly maintained and used vehicles to determine whether remedial action is required. ARB staff plans to continue its own in-use testing program of engine families identified as having a greater chance of failing the standards. The tested engine families have comprised about 15% of the total annual vehicle production for California.

B. MODIFICATIONS TO THE ORIGINAL PROPOSAL

The adopted amendments contain a substantial number of modifications to the originally proposed regulatory texts. Some of the modifications had significant substantive implications. Most of the modifications, however, either were nonsubstantive or simply made corrections to effectuate the underlying intent of the original, necessarily complex proposed text. Attachments I to the first and second 15-day notices included not only the text of the substantive regulatory modifications, but also explanations of the rationale for the modifications. Those two documents are incorporated by reference in this Final Statement of Reasons. As noted in footnotes 1 and 2, the complete modified texts of the Proposed Regulation Order and all modified incorporated documents, showing both substantive and nonsubstantive modifications, were posted on the ARB’s Internet site for the rulemaking prior to the beginning of the first and second 15-day comment periods. The posted complete modified text of the Proposed Regulation Order included explanations of nonsubstantive modifications as well as the substantive modifications shown on the attachments to the first and second 15-day notices. The versions of the Proposed Regulation Order made available with the first and second 15-day notices are also incorporated herein by reference. Set forth below are descriptions of the substantive modifications and the rationale for the changes.

1. Elimination of the TLEV Standards After the 2003 Model Year

The most significant modification made by the Board pertained to the TLEV standards. The current 50,000 mile LEV I TLEV standard for passenger cars allows two-thirds more NMOG emissions (0.125 vs. 0.075 g/mi) and twice as much NOx emissions (0.4 vs. 0.2 g/mi) compared to the next more stringent LEV standard. Under the original LEV II proposal, the LEV II NMOG standard for TLEVs and LEVs would remain at LEV I levels. However, while the LEV II NOx standard for passenger car TLEVs would remain at 0.4 g/mi, the LEV II NOx standard for LEVs would decline to 0.05 g/mi. Thus TLEVs would be allowed to emit four times

as much NO_x as LEVs. Diesel TLEVs would also be subject to a 120,000 mile diesel particulate standard that was four times higher than the corresponding LEV standard (0.04 vs. 0.01 g/mi). The original proposal also included optional 150,000 mile TLEV standards with a NO_x standard of 0.6 g/mi — nine times as high as the 0.07 g/mi 150,000 mile NO_x standard for LEVs. Another “Option 1” 150,000 mile TLEV standard included a 0.5 g/mi NO_x standard coupled with a 0.125 NMOG standard not adjusted to reflect the longer mileage. The proposed TLEV standards were designed to provide for the sale of limited numbers of high fuel economy engines that currently exhibit higher NO_x emissions, but also show promise of lower NO_x emissions with additional development; direct injection gasoline and diesel engines would most likely utilize this option. (Staff Report, p. II-8.) The declining fleet average requirement would generally allow fewer TLEVs in successive years; the potential implementation schedule for passenger cars and LDT1s developed by staff specified only 1% TLEVs in the 2007 and successive model years. For LDT2s, it was 2% TLEVs in 2007 and 1% in the 2008 and subsequent model years. (Staff Report p. II-14.)

As a result of comment after issuance of the notice, at the hearing staff suggested modifications to the 150,000 Option 1 TLEV standard that would reduce the 0.5 g/mi NO_x standard to 0.3 g/mi starting in model-year 2007. This compared to the 150,000 mile 0.07 g/mi NO_x standard for LEVs. The Option 1 150,000 mile diesel particulate standard for 2004-2006 model TLEVs would be 0.04 g/mi (and 0.03 g/mi for 2007 and subsequent models) compared to the corresponding 0.01 g/mi standard for LEVs. The two-step 150,000 mile NO_x standards for TLEVs were intended to stimulate the development of aftertreatment technologies for diesel vehicles, including the heavy-duty diesel sector that is a major contributor to mobile source NO_x and particulate emissions.

In a joint October 30, 1998 letter and testimony at the hearing, six environmental organizations — Union of Concerned Scientists, Sierra Club of California, Natural Resources Defense Council (NRDC), Coalition for Clean Air, California Public Interest Research Group (CAL-PIRG) and Environmental Health Coalition — testified against retaining the TLEV category beyond 2003. They argued that the primary and optional TLEV standards were designed mainly to encourage the introduction of diesel vehicles into the U.S. and California light-duty market. Allowing a significant number of diesel TLEVs to penetrate the light-duty vehicle market would result in increased emissions of NO_x and toxic particulate matter. They asserted that all fuels and technologies should be held to the same pollution standards and that differential TLEV standards would give special status to diesels. The environmental groups found it particularly inappropriate to facilitate the introduction of light-duty diesel vehicles when ARB had recently listed particulates from diesel-fueled engines as a Toxic Air Contaminant because exposure to diesel exhaust has been demonstrated to increase rates of lung cancer. The TLEV standards were also opposed by the South Coast Air Quality Management District.

After considering the testimony at the hearing, the Board voted to eliminate the LEV II TLEV standards entirely, and to eliminate the LEV I TLEV standard after the 2003 model year. This change was effected by modifying the introduction to the LEV I standards table in

section 1960.1(g)(1), title 13, CCR and Part I, Section E.1.1.1 of the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles” (hereafter the 2001+ LDV/MDV Exhaust TPs), and modifying the LEV II standards table and introduction in section 1961(a)(1) and Part I, Section E.1.1.2 of the 2001+ LDV/MDV Exhaust TPs. The elimination of the TLEV standards after the 2004 model year also necessitated a number of additional conforming modifications to various provisions in the proposed regulation text and the incorporated documents.⁴

The Board’s action on TLEVs reflected several considerations. First is the interest in avoiding the establishment of relaxed standards designed for one particular vehicle technology — diesels — when the gasoline vehicles that make up almost the entire current passenger car and light-duty fleet can meet a much more stringent NOx standard. The TLEV standards involved more than just “tweaking” some numbers. Notwithstanding the fact that the LEV II rulemaking primarily targets NOx emissions, the 50,000 mile TLEV standard for NOx was *eight* times higher than the corresponding NOx standard for LEVs (and four times the spread that exists for the LEV I NOx standards for TLEVs and LEVs). The proposed 150,000 mile TLEV standard for NOx was *nine* times the corresponding standard for LEVs. The PM standards for TLEVs were also four times less stringent than those for LEVs. Historically, the ARB’s motor vehicle emission standards have not allowed such substantial disparities.

Second, maintaining the TLEV standards in the middle of the next decade could have significant adverse emission impacts. The schedules for the fleet average NMOG requirements are such that during the 2004 through 2006 model years manufacturers could make substantial numbers of TLEVs while complying with the specified fleet average NMOG levels. For instance, the hypothetical phase-in schedule for LDT2s on page II-14 of the Staff Report called for 19%, 16% and 8% TLEVs respectively in the 2004, 2005 and 2006 model years. Even with an identical fleet average NMOG level, a fleet with a significant number of TLEVs would emit significantly more NOx and PM than a fleet without TLEVs. Based on the 50,000 mile standards, six TLEVs could emit the same amount of total NMOG as ten LEVs — 0.75 g/mi. But those six TLEVs could emit almost *five times as much* total NOx as the ten LEVs — 2.4 g/m NOx for the TLEVs vs. 0.5 g/mi for the LEVs.

Third, the action on TLEVs does not adversely affect technologies that are now in general use for passenger cars and light-duty trucks. The manufacturers have not identified current diesel models that would be adversely impacted. Indeed, only a small number of new passenger cars are currently sold as diesels (models from VW and Mercedes which are certified to the Tier 1 standard to be sunsetted after model-year 2003), and no new diesel light-duty trucks are currently being sold in California. There are also no current California diesel models in the lighter medium-duty vehicle categories that will ultimately be treated as light-duty trucks under LEV II; the diesel

⁴ These modifications are identified in the Attachments I to the first and second 15-day notices, incorporated by reference in Final Statement of Reasons.

pickup trucks now being sold are in the MDV4 and MDV5 weight categories that will not become subject to the passenger car standards (and for which there are no TLEV standards).

Fourth, the LEV II amendments remain technologically feasible and cost-effective without the need for a TLEV category after the 2003 model year. Since diesel vehicles make up a negligible portion of the current passenger car and light-duty truck fleet, the staff's technical feasibility demonstration focused on gasoline powered vehicles because they are expected to be continue to dominate the affected weight classes for the foreseeable future. In fact, the technological feasibility demonstration was premised on the assumption that all affected vehicles would be certified to the LEV, ULEV, or SULEV standards.⁵ The staff demonstrated the feasibility of the LEV II ULEV standards for gasoline passenger cars and the LEV II LEV standard for the gasoline-powered heavier trucks that would certify to the LEV II LDT2 category. Accordingly, eliminating the TLEV standard would not result in a significant loss of choice of the types and models of vehicles available to consumers in California. Just as the current California emission standards are technologically feasible despite the fact that manufacturers may be unable to certify diesel-powered passenger cars to the TLEV, LEV or ULEV standards, elimination of the TLEV standard after the 2003 model year does not render the LEV II program technologically infeasible.

Similarly, the staff's cost-effectiveness analysis demonstrated that each element of the LEV II program compared to the equivalent LEV I element (i.e. ULEV II compared to ULEV I or SULEV compared to ULEV I) was cost-effective and that the LEV II program is therefore cost-effective. Removing an element such as the TLEV category does not affect the overall cost-effectiveness of the LEV II program since all other elements remaining in the program are individually cost-effective. To calculate the cost-effectiveness of each LEV II emission category staff calculated, the incremental cost per vehicle of achieving the LEV II standard and divided it by the lifetime emission benefits of a LEV II vehicle compared to LEV I vehicle. The cost-effectiveness of the TLEV standard was previously demonstrated under the LEV I program and since the TLEV standard did not change between the LEV I and LEV II programs, staff used the same cost-effectiveness ratio for the LEV II program as well. Virtually all major elements of the LEV II program had a cost-effectiveness of approximately \$1 per pound of emissions reduced, which compares well with other mobile source emission control programs adopted by the Board.

Fifth, the current heavy-duty diesel engine market is sizeable and important enough to justify the development of advanced technologies for those engines without first testing the technologies on passenger cars and light-duty trucks now being sold only in gasoline configurations.

⁵ Note that under the staff's original proposal, the LEV I TLEV standard would have sunsetted after the 2006 model year with the rest of the LEV I standards, and, as noted above, the staff's hypothetical phase-in schedule projected only 1% TLEVs for all PCs and LDTs by the 2008 model year.

Finally, the fact that particulates from diesel engines have been listed as a Toxic Air Contaminant is of concern, particularly where a potential standard has been designed to accommodate the introduction of diesel engines into a market segment they are not currently penetrating.

2. 50°F Formaldehyde Standard for LEV II Medium-Duty Vehicles

The 50°F formaldehyde exhaust emission standards for LEV II MDVs were revised upwards to conform them with the protocol for setting the 50°F standard for formaldehyde at two times the formaldehyde standard at ambient temperatures. This adjustment was inadvertently omitted in the originally proposed text. (Title 13, CCR, §1961(a)(4) text and table, and the Part I, Section E.1.4.2 table in the 2001+ LDV/MDV Exhaust TPs.)

3. Intermediate In-Use Compliance Standards for SULEVs

The original proposal established less stringent intermediate in-use compliance standards for the first two years of a pre-2006 model-year LEV II vehicle, to provide manufacturers for a temporary compliance margin when they first introduce vehicles certified to a new standard. This is discussed on pages II-8 - II-9 of the Staff Report. Three substantive modifications were made to these provisions. First, vehicles first certified to the LEV II standards in the 2006 model year were made subject to this provision, since the phase-in schedule in section 1961(b)(2) allows the last vehicles to be transitioned to the LEV II standards in the 2006 model year. Second, where a vehicle model is initially certified to the SULEV standards prior to the 2004 model year, the model is allowed to be subject to the intermediate in-use compliance standards through the 2006 model year, rather than just for the first two years. This was done because the increased stringency of the SULEV standards and the greater challenge presented for earlier model-year vehicles. Third, language was revised to make clear that the provisions applied on a vehicle test group basis. (Title 13, CCR, §1961(a)(10), and Part I, Section E.4.3 of the 2001+ LDV/MDV Exhaust TPs.)

4. NMOG Credit for Vehicles with Zero Evaporative Emissions

The original proposal provided that a vehicle certified to the “zero” evaporative emission standard in title 13, CCR, section 1976(b)(1)(E) would receive an 0.006 g/mi NMOG credit to be subtracted from the reactivity-adjusted NMOG exhaust mass emission certification level to demonstrate compliance with the standard. Subsequent analysis revealed the proposed 0.006 g/mi credit value overestimated the g/mi NMOG from evaporative emissions. The identification of the credit was accordingly modified to eliminate the 0.006 g/mi NMOG value and provide instead that the Executive Officer will identify the appropriate gram per mile NMOG factor based on available data. (Title 13, CCR, §1961(a)(11) and Part I, Section E.1.9 of the 2001+ LDV/MDV Exhaust TPs.)

5. Credits for the Early Introduction of Larger Trucks and SUVs Meeting an 0.2 g/mi NO_x Emission Level

Various modifications were incorporated to provide manufacturers with credit for the early introduction of larger trucks and sport utility vehicles meeting a 0.2 g/mi NO_x emission level and certified to the LEV I LEV and ULEV standards. This credit can be used in the 2004-2008 model years on like vehicles certifying to the LEV and ULEV 0.05 g/mi NO_x standards. MDVs certifying to the LEV I LEV and ULEV standards for PCs and LDT1s prior to model year 2004 would similarly earn the appropriate VECs. These modifications provide manufacturers with more flexibility during the initial implementation period. (Title 13, CCR, §1961(a)(13), (c)(2)(A) and (c)(2)(B); and Part I, Section E.1.11, E.3.2 and E.3.2.1 of the 2001+ LDV/MDV Exhaust TPs.)

6. LEV II Phase-In Requirement for Passenger Cars and Light-Duty Trucks

Language was added to clarify applicability of the phase-in schedule to vehicles that are medium-duty vehicles under LEV I but are treated as light-duty vehicles under LEV II. The modified language provides that:

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

Another modification allows a manufacturer to gain extra alternative phase-in credit for introducing LEV II vehicles prior to the 2004 model year, providing additional compliance flexibility. (Title 13, CCR, §1961(b)(1)(B)1. and Part I, Section E.2.1.1. [renumbered] of the 2001+ LDV/MDV Exhaust TPs.)

7. Equalizing Emission Debits for Medium-Duty Vehicles

A modification allows LEV II medium-duty vehicles three model years to equalize vehicle emission debits (VEDs) while still allowing LEV I medium-duty vehicles only one model year to equalize VEDs. This makes the medium-duty vehicle provisions consistent with the approach for LEV II passenger cars and light-duty trucks, and also with the approach in the original LEV I program. (Title 13, CCR, §1961(c)(3)(A) and Part I, Section E3.3.1 of the 2001+ LDV/MDV Exhaust TPs.)

8. Phase-In Schedule for On-Board Refueling Vapor Recovery

The phase-in schedule for on-board refueling vapor recovery (ORVR) has been modified to make clear that the phase-in requirements for medium-duty vehicles will not change as a result of the new LEV II changes in vehicle weight classifications. (Title 13, CCR, §1978(a)(3).)

9. **Emission Control and Smog Index Label Specifications**

(a) The heading for the required label for light-duty trucks and medium-duty vehicles was modified so that it would be the same as the labels for vehicles certified to the federal emission standards. (Section 3.(a) I. of the “Emission Control and Smog Index Label Specifications” incorporated by reference in title 13, CCR, §1965.)

(b) A number of changes were made to the smog indices as a result of the elimination of the LEV II TLEV standard, and the LEV I TLEV standard after the 2003 model year. The originally proposed smog indices for 2004 and subsequent model-years assigned the 1.00 baseline value to TLEVs meeting the enhanced evaporative emissions requirements. With elimination of the TLEV standard, the 1.00 baseline value for these model-years was assigned to LEV I LEVs and the indices for the remaining emission categories were adjusted accordingly. The modifications in baseline values also resulted in changes to the fleet average smog indices. (Sections 3.5(b), (c) and (d) of the “Emission Control and Smog Index Label Specifications,” incorporated by reference in title 13, CCR, §1965.)

(c) The smog index table for the 2000 through 2003 model years was limited to the 2001 through 2003 model years since the amendments will become too late for the 2000 model year; the table for the 1998 and 1999 model years was extended to include 2000. In addition, the table for the 2001 through 2003 model years was modified to accommodate early-introduction LEV II vehicles, in order to allow an accurate comparison with LEV I vehicles in those model-years. For 2001 and subsequent model-years, two new smog indices were added to the LEV II LEV light-duty truck categories to cover the 4% of a manufacturer's LDT2 fleet with a maximum base payload rating of 2,500 lbs. or higher that may be certified to the 0.07 NO_x standard. Finally, very minor modifications were made to the smog indices for vehicles certified to the new evaporative standards to correct for a miscalculation of the evaporative g/mi HC estimates. The correction reduces only the diurnal + hot soak portion (approximately 50%) of the HC estimate by the percentage of increased stringency of the new diurnal + hot soak evaporative emission standards. (Sections 3.5(a), (b), (c) and (d) of the “Emission Control and Smog Index Label Specifications,” incorporated by reference in title 13, CCR, §1965.)

10. **The Optional Zero-Fuel Evaporative Emissions Standard**

A provision was added allowing the manufacturer, prior to certification of a SULEV vehicle intended to generate a partial ZEV credit, to elect to have measured fuel evaporative emissions reduced by a specified value in all certification and in-use testing of the vehicle as long as measured mass exhaust emissions of NMOG for the vehicle are increased in all certification and in-use testing. A mechanism for the trading of the exhaust hydrocarbon emissions compliance margin to cover shortfalls in evaporative emissions control will provide additional flexibility in the certification of SULEV vehicles for which partial ZEVs credits are desired. In addition, a useful life definition was added to the optional zero-evaporative emission standard requirements for

clarification. Since these vehicles will necessarily be SULEVs with a 15 year/ 150,000 useful life, the same useful life should apply for the zero-fuel evaporative emission standards.

The modifications made available with the second 15-day notice in response to manufacturer comments during the first 15-day comment period specifically referenced the three-day and two-day diurnal-plus-hot-soak tests and provided that the test plan for useful-life zero fuel demonstration is an option to demonstration of compliance using the three-day and two-day diurnal-plus-hot-soak tests. (Title 13, CCR, section 1976(b)(1)(E), and Section I.E.1.(c) of the proposed new “California Evaporative Emissions Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles” (hereafter the 2001+ Evap TPs).)

11. Phase-in Requirements for the LEV II Evaporative Emission Standards

The phase-in requirements for the LEV II evaporative emission standards were clarified by expressly allowing vehicles that are certified to the optional zero-evaporative standards to be included towards compliance with the required phase-in percentage, and by defining the vehicle fleet to which these standards are applicable. (Title 13, CCR, §1976(b)(1)(F) note (3)(a), and Section I.E.1.(d) note (1)(a) of the 2001+ Evap TPs.)

12. Intermediate In-Use Compliance Standards for the LEV II Evaporative Emission Standards

Language was added providing that, for vehicles subject to the LEV II evaporative emission standards and introduced prior to the 2007 model year, in-use compliance standards of 1.75 times the LEV II evaporative emission standards will apply for the first three model years of an evaporative family certified to a new standard. This modification is designed to reduce a manufacturer's in-use compliance risk when first meeting the more stringent evaporative emission controls. It will provide manufacturers the ability to make small vehicle adjustments for unanticipated problems encountered in the field during the first three years of the new evaporative family introduction. (Title 13, CCR, section 1976(b)(1)(F) note (4), and Section I.E.1.(d) note (2) of the 2001+ Evap TPs.)

13. Dynamometer Requirements in the Running Loss Enclosure Used in Evaporative Emission Testing

The dynamometer requirements in the running loss enclosure were aligned with the federal requirements, with the result that for vehicles subject to the Supplemental Federal Test Procedure, a single-roll electric dynamometer will be required for running loss emission testing. The modification also provides added flexibility not in the current federal requirements to permit the use of other qualified dynamometer configurations for running loss testing. (Section III.A.2.1.1. of the 2001+ Evap TPs.)

14. Standards and Test Procedures for ZEVs and HEVs

The title of the originally-named “California Zero-Emission and Hybrid Electric Vehicle Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles” was changed to “California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Emission Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles in the Passenger Car, Light-Duty Truck and Medium-Duty Vehicle Classes” (hereafter the ZEV/HEV TPs), and similar changes were made to the Applicability portion of the document. These modifications reflect the staff’s original intent that the new HEV test procedures be applicable to all 2001 and subsequent model-year hybrid electric vehicles, and be optionally available along with the CAP 2000 procedures in the 2000 model year.

15. Application of the ZEV Requirements to Small Volume Manufacturers

A set of modifications addresses an ambiguity in the treatment of small volume manufacturers (SVMs) under the ZEV requirements. SVMs, who are exempt from the ZEV requirements, are defined as manufacturers with “California sales” below specified levels (proposed §1900(a)(17), title 13, CCR; see current §1960.1(g)(2) note (6)). In a “multi-manufacturer” arrangement where a potential SVM produces vehicles that are marketed in California by another manufacturer under the marketing manufacturer’s nameplate, it is unclear whether those vehicles are to be counted as part of the producing manufacturer’s “California sales.” However, the current regulations (§1960.1(g)(2) note (9)) and LEV II amendments (§1962(b)), clearly provide that the 2003 model-year 10% ZEV requirements for a given manufacturer are calculated on the basis of the number of passenger cars and LDT1s produced by that manufacturer and then delivered for sale in California. Thus the ZEV responsibilities are assigned to the producing manufacturer and not the marketing manufacturer in a multi-manufacturer situation.

The ARB concluded that a manufacturer’s marketing presence in California would have a significant impact on its ability to sell California ZEVs. The small volume manufacturer definition was accordingly modified to exclude from a producing manufacturer’s vehicle count those vehicles that are marketed in California by another manufacturer under the marketing manufacturer’s nameplate. An initial shortcoming of this approach is that even though an SVM in a multi-manufacturer agreement may produce more than 5000 vehicles destined for California, none of the vehicles would trigger a ZEV responsibility. Because of this, an additional modification provides that where a manufacturer is marketing vehicles produced by a SVM, the marketing manufacturer incurs a ZEV responsibility for the vehicles it is marketing. As is the case with most other responsibilities, manufacturers in a multi-manufacturer arrangement may agree to assign the ZEV responsibility to the producing manufacturer.

Heavy-duty vehicles and engines would not be counted in California sales for ZEV purposes, as is the case in the current regulations; they *will* be counted for SVM certification purposes to be consistent with U.S. EPA’s CAP 2000 regulations.

(Title 13, CCR, §1900(a)(17); title 13, CCR, §1962(b), and of Section C.2. of the ZEV/HEV TPs; and title 13, CCR, §1962(b)(4), and Section C.2.4 of the ZEV/HEV TPs.)

16. Test Procedures for Hybrid Electric Vehicles

A provision was added to retain evaporative emission testing stringency by separating the four phase hybrid electric vehicle exhaust emission test from the evaporative emission test that requires a three phase test. (Part III, Section D.1.7.1 to the 2001+ Evap TPs.)

17. Partial ZEV Allowance for Fuel-Cycle Emissions

The formula for the partial ZEV allowance for fuel-cycle emissions was modified to correct a drafting error; the result in the formula needed to be divided by 100, since the percent of VMT will be expressed as a number between 1 and 100. (section 1962(c)(5), title 13, CCR, and section C.3.4 of the ZEV/HEV TPs.)

18. ZEV Multiplier for Extended Electric Range ZEVs

The provisions on ZEV multipliers for 1999 to 2007 model-year ZEVs having extended electric ranges were modified to provide limited multiple ZEV credits to fast charge ZEVs with an all-electric range from 80 to 99 miles. This modification was included because fast-charge capability can extend the meaningful range of ZEVs with an initial all-electric range of somewhat less than 100 miles. (Title 13, CCR, §1962(d)(1)(B)1., and Section C.4.1(a) of the ZEV/HEV TPs.)

III. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

The Board received numerous written and oral comments, in connection with the November 5, 1998 hearing and during the two subsequent 15-day comment periods. Set forth below is a summary of each objection or recommendation specifically directed at the proposed amendments or to the procedures followed by the ARB in proposing or adopting the amendments, together with the agency response. The comments have been grouped by topic whenever possible. Comments not involving objections or recommendations specifically directed towards the rulemaking are not summarized below.

A number of commenters generally supported adoption of the proposed amendments. Several environmental groups — American Lung Association of California, Sierra Club of California, Union of Concerned Scientists, NRDC, Planning and Conservation League, Cal-PIRG, Coalition for Clean Air and Friends of the Earth — supported most elements of the proposal, particularly making SUVs and minivans subject to the passenger car standards; as noted below, some of these groups opposed the proposed provisions on partial ZEV credits and urged that some facets of the proposal be made more stringent. The South Coast Air Quality

Management District, the Bay Area and Ventura County AQMDs, and the California Air Pollution Control Officers Association also supported the LEV II proposal. In addition, 4766 individually mailed “Citizen Letters,” and over 250 other letters and e-mails from other individuals, supported the proposal to make SUVs and minivans subject to the same exhaust emission standards as passenger cars.

The California Council for Environmental and Economic Balance (CCEEB) and the California Environmental Dialogue expressed support for several of the principles reflected in the LEV II proposal, including the need for the magnitude of emissions reductions proposed in the rulemaking, reducing emissions from future light-duty trucks and SUVs, applying the same emissions standards to all vehicles designed for personal transportation, improving the durability of vehicle emission systems by extending the “useful life” definition for cars and trucks, and assuring that there is no net increase in particle emissions from light-duty trucks. The LEV II proposal was also supported by the California Grape and Tree Fruit League, the Fresno County Farm Bureau, the Merced County Farm Bureau, the Nisei farmers League, the Raisin Bargaining Association, and Western United Dairymen.

The Manufacturers of Emission Controls Association (MECA) also supported the proposed LEV II program. Recognizing that the LEV II program poses engineering challenges, MECA testified that the challenges can and will be met, just as they have been for the original LEV program. MECA also described a recently completed demonstration program in which three vehicles certified to meet the federal Tier 1 standards were equipped with advanced catalyst technology. After aging of the catalysts and control system optimization, the two six- and eight-cylinder passenger cars and the six-cylinder pick-up truck had emissions below the LEV II 120,000 mile ULEV standards.

A. COMMENTS PRESENTED PRIOR TO OR AT THE HEARING

1. **Exhaust Emission Requirements**

(a) General Comments on Technical Feasibility

1. **Comment:** The Staff Report does not demonstrate technical feasibility of the proposed exhaust emission standards. (AAMA)

Agency Response: Although the exhaust emissions portion of the LEV II proposal contains many elements, the two key elements are: (1) making most SUVs, pickup trucks and minivans subject to the same exhaust emission standards that apply as passenger cars, and (2) imposing more stringent exhaust emission standards and durability requirements for the expanded category of passenger cars and light trucks. The technological feasibility demonstration for the new exhaust requirements is set forth on pages II-32 - II-53. It reflects a two-step process — identifying current and projected technologies that can improve exhaust emission performance,

and then conducting actual emission tests on already well-controlled vehicles that the staff equipped with advanced emission technologies.

The emission control technologies that can be used to meet the LEV II ULEV standards consist of both technologies that have already been developed for use in complying with the LEV I standards, and expected improvements to mature LEV I technologies that will help assure compliance with the LEV II standards. Staff identified and discussed 22 different low-emission technologies that are currently available to reduce exhaust emissions. The currently-available LEV I technologies fall into four basic categories — improvements to the fuel control system, improvements in fuel atomization and delivery, improvements in catalyst performance, and methods to reduce engine-out emission levels. The Staff Report presented a range of technologies from which manufacturers will choose; it is unlikely any single vehicle will feature all of these improvements. Many of the technologies discussed are already in use on selected vehicle models. The expected additional improvements that are expected to be developed for LEV II compliance include increased catalyst volume and substrate cell density, increased catalyst loading and improved washcoats, and improved catalyst light-off with secondary air injection and retarded spark timing.

The staff conducted two exhaust emissions test programs, involving over 4000 hours of testing time. The first, described on pages II-45 - II-46 of the Staff Report, was designed to evaluate the feasibility of passenger cars meeting the LEV II ULEV 50,000 mile NO_x standard of 0.05 g/mi, which is four times as stringent as the current ULEV NO_x standard. Five 1997 and 1998 passenger cars in a range of weights up to a Mercury Grand Marquis with a V8 engine. After baseline testing, new advanced catalysts were installed on all of the vehicles; if additional NO_x reductions were needed the staff made additional modifications for air injection timing, fuel biasing, or ignition retard at engine start. All of the cars on which tests were completed met the 50,000 mile LEV II ULEV standards. The Mercury Grand Marquis was the best performer despite its greater size and weight. The automakers have generally acknowledged that passenger cars and vehicles currently classified as light-duty trucks will be able to meet the LEV II standards. In fact, the industry's alternative proposal ULEV standards for these vehicles that are slightly more stringent than those proposed by staff.

The staff's second exhaust emissions test program addressed the feasibility of the LEV II standards for the heavier 6,000 - 8,500 lbs. GVW pickup trucks and SUVs that are now treated as medium-duty vehicles but will be subject under LEV II to the same standards as passenger cars. This is the element of LEV II exhaust proposal towards which most of the industry and business opposition has been directed, and accordingly the ARB's testing efforts focussed on this category of vehicles. This test program is described on pages II-44 - II-51 of the Staff Report. The tests were conducted on 1998 Ford Expeditions, which were chosen because the Expedition is among the heaviest vehicles in the classification but already exhibits very capable emissions performance. Other manufacturers for their catalyst systems. As discussed in the responses to Comments 3-7, modifications of the Expeditions involved adding advanced catalysts, electric air injection, and

efforts to mimic the fuel tailoring manufacturers will be able to achieve by fine-tuning the onboard computer software.

The effort expended on these test programs far exceeded similar feasibility demonstrations conducted by ARB for previous vehicle emission regulations, including the original LEV program. Traditionally, ARB has demonstrated the technical feasibility of new standards using prototype components on low-mileage vehicles. However, for this proposal, ARB not only demonstrated that the standards are achievable on low-mileage vehicles but on vehicles equipped with fully aged emission control components. This is unprecedented in an ARB rulemaking. For each test vehicle, staff requested the vehicle manufacturer to provide the appropriate catalyst aging procedure. When provided, staff used the vehicle manufacturer's aging procedure. For the test vehicles where the manufacturer declined to provide an aging procedure, staff used a generic catalyst aging procedure used by other manufacturers for their catalyst systems.

Furthermore, ARB tested the heavier vehicles under the most rigorous conditions (e.g., at the fully loaded test weight) rather than at the lighter test weights that manufacturers will use when certifying these vehicles. Adding test weight can significantly increase the difficulty of achieving low emissions.

In the considerable leadtime provided by the LEV II regulations, manufacturers will be able not only to employ the advanced catalysts and technologies used in the test programs, but also choose among the numerous other emissions control technologies described in the Staff Report.

2. **Comment:** ARB did not demonstrate the technical feasibility of the proposed SULEV standards despite the fact that ARB assumes at least 75,000 SULEVs in 2004 accumulating to over 1.5 million SULEVs by 2010. The Honda tested by the ARB exceeded both the NMOG and NO_x SULEV standards. The vehicle was tested only at 50,000 miles while the SULEV standard is a 120,000 mile standard. ARB assumed that hydrocarbon adsorbers would not be required on any of the 1.5 million SULEVs even though the only gasoline vehicle cited in ARB's report that comes close to meeting these standards employs this technology. Industry has proposed a more lenient sub-ULEV standard that will allow manufacturers to meet the proposed NMOG fleet average requirements. (AAMA)

Agency Response: Recent advances in automotive emission control technology have enabled manufacturers to achieve extremely low emission levels. Some manufacturers have presented staff with data from prototype vehicles meeting SULEV emission levels without the use of HC adsorbers or electrically heated catalysts (EHCs). At least one manufacturer is planning to market a SULEV in California in the 2000 model year without incorporating HC adsorbers or EHCs, four years in advance of LEV II implementation. In addition, due to the compliance flexibility allowed in LEV II, manufacturers can forego producing SULEVs until model year 2008 when the fleet average requirement for passenger cars and light-duty trucks less than 3751 lbs. LVW falls below the ULEV emission standard of 0.040 g/mi NMOG. Since the fleet average

requirement for the LDT2 class remains above 0.040 g/mi NMOG, manufacturers can comply without making SULEVs for this vehicle class.

(b) Technological Feasibility for Heavier Light-Duty Trucks (6,000-8,500 lbs. GVW)

3. **Comment:** We are opposed to the proposal that would require full size trucks and SUVs in the 6,000-8,500 lbs GVW class to meet the new very stringent standards for passenger cars. These heavier vehicles are designed for specific functional requirements, such as hauling heavy loads and towing boats and other trailers, that result in higher demands on their engines and emission control systems. Because of this, it is unreasonable and infeasible to make these vehicles meet the passenger car standards. Such a requirement will force manufacturers to decrease the functionality of some or all of these vehicles or forego marketing them in California. Businesses, farmers and other motorists who need the payload or towing capabilities of these vehicles will either have to buy larger, more expensive vehicles that are not subject to the most stringent emission standards, or keep their older, higher-polluting vehicles longer. (AAMA, GM, Ford, Chrysler, California Chamber of Commerce, Californians for Realistic Vehicle Standards, Associated Builders and Contractors, Inc., California Building Industry Association, California Association of Sheet Metal and Air Conditioning Contractors, California Landscape Contractors Association, California Travel Parks Association, California Business Properties Association, San Joaquin Farm Bureau Federation, California Wool Growers Association, California Association of Nurserymen, California Poultry Industry Association, National Association of Industrial and Office Properties (San Diego Chapter), Olive Growers Council, Stockton District Kidney Bean Growers, Blue Anchor Fresh Fruit Growers, and approximately 15 operators of Ford dealerships, 17 operators of RV parks and campgrounds, 20 other businesses operators, and 75 individuals)

ARB's proposal on full size trucks and SUVs does not recognize unique truck functional requirements such as load carrying, trailer towing, and off-road operation which require attributes such as higher weights, ride heights, gear ratios, and larger engines and transmissions. These required functional attributes result in higher exhaust throughput and temperatures, leading to more engine out emissions, higher catalyst volumes, and more severe catalyst aging conditions. Customers require that manufacturers design and build trucks to perform these work functions when needed. ARB has always recognized the unique functional requirements of trucks in their standards levels. In addition, full size trucks 6,000 - 8,500 lbs. GVW, which make up about 15% of the passenger car and light truck market, are currently tested at one-half payload to assure that they meet emission standards in work applications. Manufacturers believe that current and future improvements in emission control technology will make it possible to reduce, but not eliminate, the gap between car and truck standards. (AAMA)

Agency Response: When the light-duty truck and medium-duty vehicle categories were first established, the majority of vehicles in these categories were primarily used for work purposes. Since the larger load carrying capacity and potentially more rigorous duty cycle of these vehicles resulted in a more severe deterioration of their emission control systems, separate and numerically less stringent emission standards were developed. However, the current trend is

for these trucks and sport utility vehicles to be used primarily for personal transportation. Thus staff proposed that these vehicles be required to meet the same standards as passenger cars. The rationale for requiring them to meet a single standard is that all passenger cars are required to meet the same emission standards, even though the heaviest passenger cars can also be used for towing or carrying moderate loads. Given the trend toward the use of these vehicles for personal transportation, we believe that they should also be required to meet passenger car standards.

With respect to the concern that the emission control systems (primarily the catalysts used on these vehicles) would deteriorate more severely on the heavier trucks than on passenger cars, we believe that recent advancements in emission control technologies enable the proposed low emission levels to be maintained for the useful life of these vehicles. The advanced, high durability catalysts currently employed on passenger cars are less susceptible to deterioration from high exhaust temperatures. Further advances in catalyst technology are also expected. In addition, the more sophisticated fuel control and engine modifications currently used on passenger cars can also be used by manufacturers on their heavier trucks to meet the proposed standards and maintain in-use emission performance.

It is important to note that in recognition that some of the trucks in the 6,000-8,500 lb. category will be engineered for a higher work capacity (approximately 4% truck sales in California for this category) the adopted regulations allow these vehicles to be certified to a marginally higher NOx emission standard than other vehicles in this class. The criteria for being able to certify to this allowance is that the vehicles must have a minimum base payload rating of 2,500 lbs. or higher. This allowance further ensures that vehicle availability is not affected by the LEV II proposal.

As discussed in the response to the next comment, the ARB test program provided impressive evidence that manufacturers will be able to meet the standards for 6,000-8,500 lbs. GVW trucks and SUVs. Overall, we do not expect that the LEV II regulations will result in any reduction in model availability.

4. **Comment:** ARB did not demonstrate feasibility of the proposed standards for full-sized trucks in the 6,000-8,500 pound range. ARB tested only one model, a Ford Expedition with an advanced catalyst, for its full-sized truck feasibility demonstration. The test results with a catalyst aged to 50,000 miles exceeded the proposed LEV II LEV standards. Adding air injection and 20 miles of on-road preconditioning before every test, ARB was only able to marginally meet the proposed LEV standard for three out of 26 tests. On average, ARB's best effort vehicle was 12% higher than the proposed LEV NOx standard and 33% higher than the proposed LEV NMOG standard. Taking into account compliance margin, the test vehicle exceeded the required emission target by a much greater amount. (AAMA)

Agency Response: Since the Ford Expedition is one the heavier models in the revised LDT2 weight class, and achieves impressive baseline emissions performance with already-available, production emission controls, it was an appropriate model on which to evaluate the potential of additional emissions technologies.

The Staff Report explains that after the bench-aged advance catalyst systems were installed on the two test Expeditions, both vehicles exhibited gradually increasing emissions with normal FTP conditioning; the same phenomenon was observed when the advanced catalysts, bench aged to 50,000 in-use miles, were installed on two other rented Expeditions. Current advanced fuel systems cycle slightly rich and slightly lean of the target air/fuel ratio (stoichiometric) for optimum catalyst efficiency — oxygen is stored in the catalyst during the lean excursion and is used to convert HC and CO during rich excursions. With catalyst aging, the ability of the catalyst to store oxygen declines. But with proper adjustment of the fuel control, the efficiency of advanced catalysts can be maintained very well. Some manufacturers — including Ford — tailor the fuel system for aged catalysts by incorporating revised fuel look-up tables in the computer software. Catalyst suppliers have indicated to staff that with proper fuel tailoring adjustments, the latest technology palladium-rhodium designs lose virtually none of their emission capability after 100,000 miles of aging.

Unfortunately, staff had no capability to modify the software on the two test Expeditions to tailor the fuel system to the aged advanced catalysts. Instead, staff developed the modified preconditioning procedure that regained most of the initial good emissions performance of the test Expeditions. Running several on-road test loops with a “key-off” between loops to potentially stabilize fuel adaptive “learning,” NOx emissions were reduced significantly. Staff believes that the on-road operation during the modified preconditioning procedure yielded higher catalyst temperatures than FTP driving, and accordingly improved oxygen storage. It is essential to recognize that the staff’s modified preconditioning served only as an artificial, partial substitute for the computer software modifications to tailor the fuel system operation to aging catalysts. This gives the manufacturers the ability to achieve greater emissions reductions from the use of advanced catalysts than were achieved by staff.

Staff conducted a total of 26 tests on the optimized Expedition with an advanced catalyst and an electric air injection system. Of those tests, staff selected seven that represented the best fuel targeting staff could achieve without the capability of modifying the fuel control to match the new catalyst. The average of the seven tests, presented at the hearing, was 0.071 g/mi NMOG and 0.05 g/mi NOx, compared to the LEV II 50,000 mile LEV standards of 0.075 g/mi NMOG and 0.05 g/mi NOx. The LEV II standards begin phasing in with the 2004 model year, and it is expected that industry will typically certify the minivans, lighter SUVs and compact pickup trucks first. Vehicles the size of the Expedition may not be certified to the LEV II standards until the 2007 model year. In any case, the professional emission control calibrators and other automotive engineers working for the manufacturers will have the opportunity not only to optimize the fuel system calibration but also to choose among the various additional emissions control technologies described in the Staff Report.

The issue of compliance margin is addressed in the response to the next comment.

5. **Comment:** To properly demonstrate feasibility for full-size trucks in the 6,000-8,500 lbs. GVWR class, ARB staff would need data on a variety of vehicles with aged components.

Furthermore, component aging should be performed consistent with manufacturer procedures, by the same laboratories or by full-service catalyst suppliers and test results must demonstrate compliance with standards with reasonable compliance margin (headroom) to account for in-use, test to test, and production variability. (AAMA)

Agency Response: See the response to the comments immediately above and below. With respect to AAMA's concern with compliance margin, catalyst suppliers and some manufacturers have indicated to staff that these latest technology catalysts can maintain their emission conversion efficiency over more than 100,000 miles of aging. The emission results from staff testing demonstrated that the test vehicles met the proposed LEV II standards, although with a smaller margin than manufacturers typically build-in to their products to assure compliance. Manufacturers, however, have another seven years to meet the proposed standards for their most difficult to control vehicles. During this period, manufacturers will be able to achieve even lower emissions by taking advantage of the anticipated advances in catalyst technology, proper tailoring of the fuel-control strategy to match the requirements of advanced catalysts, and the use of other enabling technologies identified in the Staff Report. These measures will provide manufacturers with adequate compliance margin (headroom) to ensure that their vehicles will pass emission requirements in-use. In addition, manufacturers' concerns regarding test-to-test and production variability are misplaced since the emission performance of the vehicles in our test program were tightly grouped, demonstrating that these advanced catalysts and emission control systems markedly reduce emission test variability.

Staff applied the same aging procedure to the advanced catalysts installed in the test Expeditions that Fort itself uses to ensure its heaviest GVW work trucks will meet emission standards in-use. The catalyst aging procedure covers Ford trucks that tow up to 14,600 lbs. trailer weight. In addition, the 6,000-8,500 lbs. GVW vehicles in the test program were emission tested under the most rigorous conditions at their fully loaded test weight (curb weight plus one half carrying capacity - which represents their load carrying and towing capacity) rather than at the lighter loaded vehicle weight (curb weight plus 300 lbs. - which represents passenger car conditions) that manufacturers will use when they certify these vehicles. Furthermore, the supplemental federal test procedure requirements allow manufacturers to employ emission control strategies that will prevent catalyst degradation under extreme load and temperature conditions.

6. **Comment:** ARB deviated from Ford's aging procedures in a number of ways and achieved very different emissions results with considerably more variability than Expeditions with identical catalysts aged by Ford's certification aging supplier. Manufacturers have recommended and proposed alternate standards based on their own engineering assessment of future capabilities. (AAMA)

Agency Response: The bench aging of the advanced catalyst systems for the ARB's test Expeditions was performed by Southwest Research Institute (SwRI), a well-respected independent bench-aging facility, using the aging procedure supplied by Ford. Several automobile manufacturers use this same facility for aging their own prototype catalyst systems. Nevertheless,

in order to address AAMA's concerns, staff arranged a meeting between representatives from Ford and SwRI at which Ford failed to identify any significant deviation by SwRI from Ford's aging procedures. And no significant variations are shown from the continuous strip chart data taken during the aging process.

7. **Comment:** ARB staff did not even attempt to show that the ULEV and SULEV standards are feasible for full-sized trucks, even though their proposal assumes that in model year 2006 38% of these vehicles will meet ULEV standards and 6% will meet SULEV standards. (AAMA)

Agency Response: The commenter is referring to the implementation schedule for LDT2 in the Staff Report that manufacturers could use to meet the LEV II fleet average requirements for this vehicle class. Full size trucks comprise a small percentage of this vehicle class and manufacturers will likely certify these vehicles to only the proposed LEV standard for which staff did demonstrate technical feasibility. The majority of the vehicles in the LDT2 category (less than 6,000 lbs. GVW) will certify at lower test weights and will be able to achieve the proposed standards by incorporating the same emission control technologies used for passenger cars. It is worth noting that the manufacturers have indicated in their alternative proposal (see Comment 10) that the proposed standards are feasible for these vehicles. Furthermore, as mentioned above in our response to Comment 2, manufacturers can comply with the fleet average requirements for LDT2 without producing SULEVs.

8. **Comment:** ARB has not demonstrated feasibility of the significantly more stringent standards proposed for trucks in the 8,500-14,000 lbs. GVW weight range, and should defer action until a proper feasibility demonstration can be conducted. ARB has not tested any trucks in this weight range to determine the feasibility of its proposed standards. ARB's testing of a less than 8,500 lbs. truck at a heavier test weight is not technically justified and should not be considered as part of a feasibility demonstration. (AAMA)

Agency Response: The ARB test program to evaluate the feasibility of the LEV II standards for vehicles that will remain in the MDV category is described on pages II-51 - II-53 of the Staff Report. Staff performed several tests on a Ford Expedition with an aged catalyst system at a test weight representative of vehicles in the over 8,500 lbs. GVW category in order to develop the appropriate emission standards for LEV II MDVs (i.e., this high load test makes achieving lower emissions more difficult). Although the Expedition was not designed to be tested at this weight (e.g., catalyst volume was undersized for optimum emission reduction) the vehicle still met the proposed LEV II standards despite this handicap. Staff expects that for these vehicles manufacturers will also be able to utilize many of the strategies currently being used on trucks under 8,500 lbs. GVW.

9. **Comment:** ARB should harmonize its 8501-14,000 lbs. standards with U.S. EPA since trucks in this weight range are produced in low volumes, and requiring separate standards doubles

many of the fixed costs, such as development costs. These fixed costs can not be adequately spread over such low volumes. (AAMA)

Agency Response: Staff has consulted with U.S. EPA in an effort to harmonize the California and federal regulations for these categories. However, ARB is adopting more stringent emission standards for these categories ahead of U.S. EPA's action on its standards in order to achieve maximum feasible reductions of ROG plus NOx from light and medium-duty vehicles in California. These reductions are necessary to satisfy ARB's SIP commitments and to attain and maintain the state ambient ozone standard at the earliest practicable date. Moreover, staff believes that these standards can be achieved in a cost-effective manner by taking advantage of recent advances in conventional emission control technology.

(c) The Vehicle Manufacturers' Alternative Proposal on Exhaust Emissions

10. **Comment:** Industry has developed an alternative proposal that achieves about 90% of the emission benefits of the LEV II proposal while greatly improving feasibility and cost-effectiveness. The alternative proposal would retain the MDV class for 6,000-8,500 lbs. GVW vehicles with stringent, but numerically higher, standards that would assure the continued availability of these vehicles to consumers in California. This shift would be partially offset with standards, more stringent than those proposed by ARB staff, for the passenger cars and light-duty trucks under 6,000 lbs. GVW that make up more than 85% of the vehicles that would have been subject to staff's passenger car standards. The standards would also be revised and categories added to smooth manufacturer workload and provide compliance flexibility. Manufacturers would also be given the flexibility to combine ROG and NOx as ARB does in considering SIP commitments. (The proposed alternative standards are set forth at the end of this comment.) (AAMA)

AAMA's proposed alternative will achieve all of the reductions associated with SIP measure M2 and achieves an additional 58.6 tons towards the South Coast ozone "black box." We believe this significantly overachieves the NOx reductions contained in the black box, and achieves 78% of the ROG + NOx reductions needed for the black box (calculated using EMFAC7f consistent with the emissions model used by the ARB). Our alternative allows full-line manufacturers to remain competitive in small vehicle segments while removing the loophole that allows non-full-line manufacturers to apply less emission technology to their cars and small trucks. It also allows manufacturers the flexibility to achieve these air quality goals in a cost-effective and feasible manner. (AAMA)

We have suggested a proposal that will achieve 90% of the emission reductions of the LEV II proposal without jeopardizing the gains we have made in developing our partnership to improve air quality. The critical point of the LEV II program is the proposal to regulate most light-duty trucks as passenger cars. The proposal we have suggested puts that issue to rest and does it in cooperation, not in confrontation, with the industry. The difference between the results is quite small in percentage terms and if you're a small businessman or a farmer in the Central Valley, and

you can't buy a truck that meets your needs at a price you can afford, you're just not going to buy that truck. The old one stays with you longer, and the air doesn't get any cleaner. Given that type of situation, it would be bad public policy to try for those last few percentage points in this rule at the expense of forcing Californians to make those difficult and unnecessary choices. (GM)

The LEV II staff proposal produces for the industry an unprecedented level of workload in design and release, development and validation and research. That impact is disproportionate on full-line manufacturers who have to deal with the shift from medium-duty trucks to light-duty trucks. Additionally, the severity of the reduction, the ongoing shift from LEV to ULEV and beyond, superimposed evap roll-out and more. Removing the 6,000 - 8,000 lbs. GVWR vehicles from the proposed LEV II standards moderates the impact on workload. (GM)

We are opposed to the proposal that would require full size trucks and SUVs in the 6,000-8,500 lbs GVW class to meet the new very stringent standards for passenger cars. Instead, we urge you to adopt the industry alternative proposal which reduces 90% of the emissions without increasing costs and limiting consumer choices. (California Chamber of Commerce, Californians for Realistic Vehicle Standards, Associated Builders and Contractors, Inc., California Building Industry Association, California Association of Sheet Metal and Air Conditioning Contractors, California Business Properties Association, San Joaquin Farm Bureau Federation, National Association of Industrial and Office Properties (San Diego Chapter), and approximately 15 operators of Ford dealerships, 15 other businesses operators, and several individuals)

Agency Response: The differences of the industry alternative are substantial, and they would substantially reduce the air quality benefits of LEV II. The biggest change would be in the 6,000-8,500 lb. GVW class, which would remain subject to MDV3 standards rather than becoming subject to the passenger car standards. For these vehicles, compared the staff proposal, the industry alternative would:

- increase the proposed LEV NOx standard by a factor of six
- double the proposed ULEV NOx standard
- increase the proposed SULEV NMOG standard by a factor of four
- increase the proposed SULEV NOx standard by a factor of 2.5
- provide a more relaxed phase-in requirement for this weight class

The emissions from these vehicles represent a significant portion of the emission inventory. Although AAMA characterizes these vehicles as comprising only 15% of the fleet, the vehicles affected contribute almost 33% (or 17 tpd) of the NOx emission reductions that are anticipated in the LEV II proposal. The industry proposal for MDVs would result in a 5 tpd reduction in these LEV II emission benefits in 2010 in the SCAB.

AAMA proposes to offset the higher MDV standards with more stringent standards for vehicles under 6,000 lbs. GVW (85% of new and light- and medium-duty vehicles). But while industry proposes to reduce the ULEV NOx standard, the increased standards proposed for the LEV and

SULEV categories more than offset any emission benefit gains. Thus the industry alternative for passenger cars and the lighter trucks actually would reduce the air quality benefits of LEV II by an additional 2 tpd. Compared to the staff proposal, the industry proposal for these vehicles would:

- double the proposed LEV NO_x standard
- reduce the ULEV NO_x standard by one fifth
- double the proposed SULEV non-methane organic gas (NMOG) standard
- increase the proposed SULEV NO_x standard by 50%

The overall emissions impact of AAMA's tailpipe proposal would be a loss of 7 tpd ROG plus NO_x.

California needs the contribution that the additional 7 tpd reduction of ROG plus NO_x will contribute to the black box in the 1994 ozone SIP. We also need the emission reductions as part of our efforts to attain and maintain the state ambient ozone standard as early as practicable. The technological feasibility discussion in the Staff Report and the responses to various comments in this FSOR (particularly Comments 1-8) clearly demonstrates that the proposed LEV II standards demonstrate the feasibility of the proposal, including application of the passenger car standards to 6,000-8,500 lb. GVWR vehicles. AAMA has not stated the cost-effectiveness of the industry proposal, or the incremental cost-effectiveness of the ARB's LEV II proposal compared to the industry proposal. However, we project the cost-effectiveness of the staff proposal as about \$1 per pound of ROG plus NO_x, which compares favorably to other recently adopted control measures. Cost-effectiveness is discussed in the response to Comments 28 and 29.

(d) Work Truck Exemption

11. **Comment:** We strongly oppose the 4% exemption for so-called "work trucks" that is contained in the LEV II proposal. We believe ARB should adopt a single passenger car standard for vehicles of all weight classes, up to and including 8,500 lbs. GVW. A decade ago, auto manufacturers asked for, and received, leniency in the pollution standards for heavier light trucks and vans. At that time automakers said that these were primarily work vehicles, constituting only a small segment of our fleets. Since that time Californians, like other Americans, are increasingly buying and using larger vehicles for personal transportation. Auto companies are clearly marketing such vehicles to appeal to the light-duty passenger market, rather than as "work" vehicles. Advances in catalyst technology and other emission controls have occurred which, if applied to large SUVs and pickups, enable them to achieve the same low emission levels as cars. We disagree with the staff's proposal to allow "work" trucks to emit 40% more NO_x than other light-duty vehicles that meet LEV standards. We question the rationale for such an exemption given current technological advances, and are concerned about the possibility for perpetuating the existing light truck emissions loopholes. We urge ARB to end the lax treatment of SUVs and trucks, and establish a single, stringent standard for all personal vehicles. (Sierra Club, NRDC,

Cal-PIRG, Coalition for Clean Air, Union of Concerned Scientists, Environmental Health Coalition)

At the minimum, since we believe the 5% “work truck” exemption is a concession to the automakers, we recommend that automakers be required to be responsible for the increased pollution from the exemption. (Union of Concerned Scientists)

If you are going to consider the work truck exemption, we think at a minimum that your Board should place a sunset on this exemption, maybe a two-year sunset, and take that as an opportunity to study what is happening under that exemption and look at what kinds of cars are receiving that exemption. (Sierra Club)

All vehicles passenger cars and trucks under 8,500 lbs. GVWR, including working trucks, should comply with the same numerical emission standards. (SCAQMD)

Agency Response: The 4% exemption is appropriate because it provides flexibility to manufacturers in meeting the LEV II standards for the limited number of heavier trucks engineered for a more rigorous duty cycle (e.g., trucks designed to carry heavy loads). The impact on air quality will be minimal since the number of trucks affected is less than 25,000 vehicles annually and the proposed NOx standard is only 0.02 g/mi higher than the NOx standard for passenger cars and light-duty trucks, while the NMOG standards remain the same.

12. **Comment:** The 4% exemption for trucks with a payload of at least 2,500 lbs. is inadequate for manufacturer needs and does not acknowledge that all trucks, and particularly those over 6,000 lbs. GVW, are designed with unique functional requirements that make certification to passenger car standards inappropriate. The 2,500 pound payload requirement is too high to accomplish its stated purpose of providing exemptions to large under 8,500 pound vehicles that are comparable in design and work capability to over 8,500 counterparts. Neither Chrysler, Ford nor GM has an under 8,500 pound GVW truck with a 2,500 pound payload. (AAMA)

Agency Response: With respect to the statement that automobile manufacturers do not produce vehicles in this category, the 4% exemption was based on a review of 1997 certification data indicating that approximately 25,000 vehicles were introduced annually in California with a payload greater than 2,500 lbs. With respect to the appropriateness and feasibility of the passenger car standards for trucks below 8,500 lbs. GVWR generally, see the responses to Comments 3 and 4.

(e) Competitive Issues

13. **Comment:** By requiring full size trucks (6,000-8,500 lbs. GVW) to meet the same emission standards as passenger cars, manufacturers that produce a complete model line from passenger cars to full size trucks are placed at a competitive disadvantage relative to those

manufacturers that only produce passenger cars and small trucks. This is because full-line manufacturers will have to offset the higher emissions of full size trucks by certifying their lighter, smaller vehicles to more stringent emission standards using more costly emission control systems. This will not only provide a cost advantage to the non-full line manufacturers, but ultimately, result in comparatively higher emissions from their passenger cars and light trucks.

ARB must adopt regulations which will not favor some manufacturers over others based solely on market segment participation. ARB's proposal creates a competitive disadvantage for full-line manufacturers. A program like the industry alternative proposal could help alleviate this concern by maintaining a separate weight class for 6,000-8,500 pound vehicles. Full-line manufacturers will be required to offset the inherently higher emission levels of full-sized trucks with lower emissions on their lighter, smaller vehicles. Subsequently, a full-line manufacturer's passenger cars and small light trucks would need to be cleaner than those of non-full line manufacturers. Non-full line manufacturers will not only enjoy a cost advantage, but will be able to produce vehicles that will pollute more than their full line competitors. (AAMA)

Regulations should not favor one part of an industry over another. Fair play would require that all members of an industry be treated similarly. Regulatory approaches which, while seemingly neutral on their face, reward or penalize manufacturers based on the market segments they compete in are unfair and will ultimately distort the market by giving some manufacturers a competitive advantage not based on their emissions capability but based instead on the market segments in which they choose to compete. (AAMA)

ARB's proposal would create a major competitive disadvantage for Ford, its dealers and customers. It means extra cost in both trucks and cars to enable the combined car-truck average to meet the standards. It also could lead to restricting availability of popular trucks and options like higher ratio trailer towing axles, manual transmissions and larger engines. When this happened in the 1970's, there was a major customer backlash. Meanwhile, competitors that aren't big in trucks will not only enjoy a cost advantage, but will be able to produce higher-polluting vehicles. (Approximately 20 Ford dealerships, and Lincoln Mercury employees)

Agency Response: The commenters are referring to the provision allowing for the use of NMOG credits earned by exceeding the passenger car and LDT1 NMOG fleet average requirements to satisfy debits incurred in meeting the NMOG fleet average requirements for heavier vehicles in the LDT2 category. As stated above in the response to Comments 3 and 4, ARB has demonstrated that the proposed emission standards are technically feasible for the heavier trucks without the need to use credits generated by lighter vehicles. Accordingly, full-line manufacturers would only need offset higher emissions from their heavier trucks if they fail to incorporate the appropriate cost-effective emission control systems on these vehicles. Furthermore, the cost analysis in the Staff Report and described in the response to Comment 29 indicates that the retail cost increase for these vehicles represent less than one percent of the vehicle retail price. The added costs from emissions controls would likely be more than offset by

the large profit margins full line manufacturers are generating from their more expensive large SUVs and light trucks.

(f) Lead Time

14. **Comment:** Appropriate consideration has not been given to the ability of manufacturers to develop and apply the requisite technology (for which feasibility has not been shown) within the time required. Workload and cost implications have not been considered. (AAMA)

ARB has failed to consider the lead time required to develop the necessary technologies, the work load facing manufacturers to meet the proposed requirements and the cost of doing it within the prescribed time period. The LDT2 fleet average NMOG requirement will require manufacturers to certify trucks to the LEV II or ULEV II standards rather than to TLEVs. (AAMA)

The LEV II requirements impose an excessive burden on the automobile industry because of the short time frame in which the proposal was developed and because the technological implications of the proposed amendments have not been given adequate consideration or study. We believe the proposal will dictate the design of motor vehicles and limit consumer choice. The ARB should establish emission standards for the various vehicles categories and a set of fleet average emission standards and leave it up to the vehicle manufacturers to determine the appropriate mix of vehicle concepts to satisfy the prescribed requirements. There is no need to impose sales mandates, market limitations on particular vehicle concepts, or other arbitrary conditions, as long as the manufacturers meet their compliance obligations. (VW)

Agency Response: ARB believes there is adequate lead time to implement the LEV II proposal. Implementation is not required until model year 2004 (five model years from the hearing) with full implementation scheduled for model year 2007 (eight model years from the hearing). Furthermore, ARB demonstrated feasibility of the LEV II standards using currently available technology, whereas manufacturers will have 5-8 years of development time and significantly larger resources available. Compliance flexibility is provided by the NMOG fleet average requirement in that manufacturers may choose the mix of vehicle categories that best fits their production capabilities. Further flexibility is provided in that manufacturers may develop an alternative phase-in as long as the equivalent emission reductions are achieved.

15. **Comment:** Requiring MDVs to certify as LDT2s will result in fewer MDV ULEVs and will adversely impact the manufacturer's ability to meet the MDV 60% ULEV requirement. This will cause a manufacturer to certify some models from LEVI LEV to LEV I ULEV in one year and then to LEV II standards in the next year. ARB should adopt regulations that maintain a separate 6,000-8,500 lbs. GVW weight class with separate standards that are phased in with the 6,000-14,000 lbs. GVW MDV weight class. (AAMA)

Agency Response: These vehicles (6,000-8,500 lbs. GVW) represent a small portion of the proposed LDT2 class and manufacturers will not have to certify them to LEV II standards until 2007, thereby minimizing the impact on their ability to meet the MDV requirements. ARB has demonstrated the technical feasibility for vehicles 6,000-8,500 lbs. GVW. Furthermore, as mentioned above, manufacturers are provided with considerable lead time and compliance flexibility in meeting the proposed light- and medium-duty vehicle standards.

16. **Comment:** ARB proposes two independent phase-ins for LEV II tailpipe standards PC/LDT1 vs. LDT2s. This limits manufacturer flexibility and the proposed phase-in requires less capable trucks to achieve higher proportionate emission reductions on multiple emission constituents (NMOG, CO, NOx) at the same rate as more capable cars that have only one constituent (NOx). Any phase-in should allow manufacturers to acquire experience on the most capable products first. In contrast, ARB's phase-in requires manufacturers to produce 6-cylinder trucks complying with the same standards as sub-compact cars in the very first year of the phase-in. Historically, ARB has either provided staggered phase-ins or, at a minimum, applied the percent requirements to the entire fleet of vehicles allowing manufacturers to acquire experience and manage their workload. The separate PC/LDT1 and LDT2 phase-ins should be combined into a single phase-in for the <8,500 lbs. GVW fleet. (AAMA)

Agency Response: Separate phase-in schedules are included for the PC/LDT1 and LDT2 classes to assure that emission reductions are achieved from both vehicle classes in a timely manner and to meet the SIP requirements. ARB expects manufacturers to begin phasing in their most capable products in the early years, thereby allowing manufacturers to acquire experience on the easier to control products first. As mentioned in the response to Comment 14, manufacturers have until 2007 (eight years lead time) to bring their more difficult to control vehicles into compliance. Furthermore, the LEV II regulations allow the NMOG credits or debits from both vehicle classes to be summed at the end of the model year.

17. **Comment:** The phase-in proposed by ARB for LEV II exhaust requirements (25/50/75/100%) beginning in model year 2004 is overly restrictive. The phase-in rates for the early years expose too much of a manufacturer's fleet to unacceptable in-use risk without any experience with the new technology. The phase-in is inconsistent with precedents such as the 1995-1998 Enhanced Evaporative emission phase-in requirements. ARB must revise the tailpipe phase-in to 10/30/50/100% beginning in 2004. (AAMA)

Agency Response: The LEV II proposal allows manufacturers to develop an alternative phase-in schedule as long as the equivalent emission reductions are met. The proposal by AAMA (10/30/50/100%) would fail to achieve equivalent emission reductions, adversely impacting our ability to meet the emission reduction targets of the SIP. In order to mitigate the impact of introducing vehicles to new emission standards, the LEV II proposal also includes intermediate in-use compliance standards for the first two model years of a vehicle model to allow manufacturers to gain real world experience.

18. **Comment:** Intermediate in-use compliance standards must be applicable to all vehicles certified to the LEV II standards through the 2007 model year and ARB should adopt intermediate in-use standards that are two times the certification standard for NMOG and NOx. LEV II standards will require the use of unproven technology and two model years do not provide sufficient time to fully understand the impact of the LEV II requirements on in-use vehicles. The magnitude of the reductions required by the LEV II standards, and the associated hardware needed to meet those standards, warrant more than two years of intermediate in-use standards. ARB has previously acknowledged this concern and allowed manufacturers nine years of intermediate in-use standards to meet ULEV under the LEV I program. Consistent with the LEV I program ARB should allow the intermediate in-use NMOG standards for trucks over 3750 LVW because these trucks will be required to meet more stringent NMOG standards under LEV II. (AAMA)

Agency Response: The purpose of intermediate in-use standards is not to provide manufacturers with a higher standards to which they can certify, but rather to provide manufacturers with a compliance margin should unexpected circumstances in the initial years cause the vehicles to exceed the standards by a small margin in-use. Given that ARB demonstrated feasibility of the LEV II standards with currently available technology, staff does not believe it is necessary to provide a less stringent in-use standard than provided or one that is applicable for a longer period of time. Staff is unaware of any provisions in the LEV I program that allow in-use compliance standard to be effective for more than the first two years of a vehicle model.

19. **Comment:** Small volume manufacturers are required to phase-in the evaporative emission requirements in 2006 and the exhaust emission requirements in 2007. This presents development difficulties and we would like the phase-in for both requirements adjusted to a single model year. (Association of International Automobile Manufacturers (AIAM))

Agency Response: Because of their limited resources small volume manufacturers are allowed the maximum lead time for compliance with the LEV II evaporative and exhaust requirements (a seven and eight year lead time respectively). Furthermore, the intermediate in-use compliance standards are applicable through model year 2007 and, consistent with the requirements for LEV I, small volume manufacturers are afforded a less stringent NMOG fleet average requirement than larger manufacturers. Accordingly, staff does not believe that the phase-in requirements present an undue burden to small volume manufacturers (see also response to Comment 49).

20. **Comment:** The LEV II proposal should be modified to produce additional ROG reductions by providing for an earlier phase-in of the hydrocarbon-based NMOG fleet average emission standards that are currently proposed for implementation through the 2010 calendar year. We believe that this is justified based on the very low exhaust emission levels that have been generated from ARB's LEV II technological feasibility demonstration. (SCAQMD)

Agency Response: While we believe that the LEV II standards are achievable, there is no doubt that they present a challenge to the automakers. The Board can use the biennial review process to determine if any subsequent acceleration of the phase-in timetable is justified.

(g) Hydrocarbon plus NOx Standards

21. **Comment:** ARB must incorporate NMOG + NOx tailpipe emission standards as an option for complying with the LEV II requirements. Current heavy-duty tailpipe emission standards and SFTP provide manufacturers NMOG + NOx standards as an option for complying with the requirements. In LEV II, the NMOG + NOx standards should simply be the sum of the individual NMOG and NOx standards. The NMOG standard should be counted toward fleet NMOG. For example, the ULEV NMOG + NOx standard would be 0.09 g/mi at 50,000 miles, and 0.125 g/mi at 120,000 miles, and would be assigned as 0.04 g/mi toward fleet NMOG. Combined standards will not adversely impact air quality. The SIP calls for NMOG + NOx reductions; however the ARB staff has elected to focus its reductions on NOx. (AAMA)

Agency Response: While combined NMOG plus NOx emission standards would provide additional flexibility to automobile manufacturers, it would hamper efforts to achieve specific air quality goals. Traditionally, ARB has adopted a combined NMOG plus NOx standard only for those sources where there is a preponderance of one criteria pollutant (e.g., NOx) relative to other pollutants (e.g., heavy-duty diesel trucks). In the case of LEV II standards where the vehicles emit similar amounts of NOx and NMOG, adoption of a combined standard could significantly diminish emission reduction from the “targeted pollutant,” which is NOx in the case of the LEV II rulemaking, make targeting specific pollutants for reductions in future rulemakings difficult. This could compromise the emission modeling and inventory estimates, resulting in greater uncertainty in predicting air quality conditions in specific regions.

(h) OBD Requirements

22. **Comment:** ARB has not demonstrated OBD II feasibility for the LEV II emission standards. Unless ARB specifically addresses the effect of LEV II standards on OBD II compliance and is prepared to modify its OBD II regulations accordingly, LEV II emission standards will significantly increase the probability of false illumination of the malfunction indicator light, and may subject manufacturers to inequitable deficiency rulings, penalties, and certification delays. (AAMA)

Agency Response: The OBD II requirements are not under consideration in this rulemaking. However, ARB is planning a board hearing next year to discuss OBD II-related issues including the OBD II requirements for LEV II vehicles. In any event, at least one automobile manufacturer has recently indicated that it would be possible to satisfy virtually all of the current OBD II requirements, even on vehicles certifying to the very stringent SULEV standards.

23. **Comment:** We don't believe that catalyst efficiency monitoring cut point for OBD II can be measured at SULEV levels. (AIAM)

Agency Response: One manufacturer has already received preliminary certification approval for a 2000 model year SULEV that will qualify for partial ZEV credit and which has an OBD system that meets all OBD monitoring thresholds, including the one for the catalyst. This indicates that the LEV II SULEV catalyst monitoring requirement is feasible. However, this issue can be explored in the upcoming OBD II rulemaking described in the response to the previous comment.

(i) TLEV Standard

24. **Comment:** Diesel vehicles should be required to meet the same emission standards as gasoline vehicles. The proposed TLEV standards would allow diesel vehicles to penetrate the light-duty segment in significant numbers. Since diesel vehicles emit NO_x and particulate matter at significantly higher levels than their gasoline counterparts, this would result in an increase in these emissions from the light-duty fleet. Furthermore, establishing a less stringent standard for diesel vehicles is inconsistent with ARB's recent action in declaring diesel particulate emissions a toxic air contaminant. We strongly oppose relaxation of the pollution standards to accommodate diesel light-duty vehicles. Reintroducing diesels into the passenger car market moves us backward in the fight for clean air.

All fuels and technologies should be held to the same pollution standards. Under the staff proposal, ARB would allow TLEV vehicles to meet only a 0.6 g/mi NO_x standard and a 0.04 g/mi PM standard at 120,000 miles. This would result in emission standards that are nine times less stringent for NO_x and four times less stringent for particulates than other passenger cars. We strongly oppose this differential emission standard that would give special status to diesel vehicles. Instead, all passenger cars (including SUVs) should be held to NO_x and particulate standards at least as stringent as the LEV standard, 0.07 g/mi for NO_x and less than 0.01 g/mi for PM. (Sierra Club, Coalition for Clean Air, Union of Concerned Scientists, NRDC, Cal-PIRG, Environmental Health Coalition)

We also strongly oppose the additional, optional 150,000 mile TLEV standard that appears to be added solely for the purpose of allowing the automakers to sell more diesel vehicles. (Sierra Club, Coalition for Clean Air, Union of Concerned Scientists, NRDC, Cal-PIRG, Environmental Health Coalition)

The proposed NO_x and PM standards for TLEVs are much weaker than the standards proposed for LEVs. The only reason those standards are higher is to accommodate a dirtier fuel. This agency for a long time has professed a principal of fuel neutrality, and yet here we are proposing standards to take effect five years down the road that clearly make a distinction between the standards and a dirtier fuel diesel. We ask you to consider seriously removing this piece of the proposal. This standard is clearly not necessary for gasoline vehicles. (Coalition for Clean Air)

All vehicles passenger cars and trucks under 8,500 lbs. GVWR, including diesel vehicles, should comply with the same numerical emission standards, regardless of fuel type. (SCAQMD)

We oppose less stringent emission standards that are designed to accommodate diesel vehicles. (Approximately 5 individuals)

Agency Response: The Board decided to eliminate the LEV II TLEV standards entirely, and to eliminate the LEV I TLEV standard after the 2003 model year. The reasons for this action are set forth in Section II.B.1.

25. **Comment:** VW is extremely concerned that, if there is an overall trend toward emission standards set at a level which are not attainable by diesel-powered passenger vehicles and light-duty trucks, development of advanced diesel technology for these vehicles classes will cease. VW believes the ARB should grant the diesel credit for extremely low NMOG, CO and evaporative emissions. The ARB should establish an optional category between the LEV and ULEV categories in the LEV II provisions for these vehicles. The NMOG and CO standards would fall between these two categories and the NO_x standard would be at the TLEV level of 0.6 g/mi. This would reduce the burden of compliance with the NMOG fleet average for diesel vehicles certified to the TLEV standards. (VW)

Agency Response: The Board decided to eliminate the LEV II TLEV standards entirely, and to eliminate the LEV I TLEV standard after the 2003 model year. The reasons for this action are set forth in Section II.B.1. One of the principal concerns was the adverse emissions impact of the TLEV NO_x standard.

26. **Comment:** Navistar will need additional flexibility in order to meet the LEV II standards specifically in the 2007 model year when the NMOG curve will prevent any significant sales of TLEVs forcing us to meet a LEV NO_x level 90% below that of the TLEV standard. This would prevent us from selling diesels in 2007. We believe the AAMA proposal is reasonable and will provide California with the benefits of diesel technology in the light-duty truck market. (Navistar)

Agency Response: The Board decided to eliminate the LEV II TLEV standards entirely, and to eliminate the LEV I TLEV standard after the 2003 model year. The reasons for this action are set forth in Section II.B.1.

(j) Regulatory Review

27. **Comment:** Because the standards are so challenging and the availability of technological breakthroughs is still uncertain, it is critical that ARB continue to monitor and report on progress being made as part of the technology review process. (EMA)

Agency Response: Recognizing these concerns, Resolution 98-53 states that in continuation of the mechanism established with the adoption of the original LEV regulations, the Executive Officer is directed to report to the Board at least biennially on the status of implementation of the LEV II amendments.

(k) Economic Impacts and Cost-Effectiveness

28. **Comment:** The ARB staff proposal hurts consumers, damages the economy and creates an illogical and unnecessary set of standards. It's illogical because it requires a full-size truck hauling heavy equipment to meet the same standards as a passenger car half its size. Because it is not possible to achieve the standards proposed by the staff proposal without reducing weight, pay load, and towing capacity, there will be a reduction in full-size vehicles available to consumers. These are the commercial workhorses of the California economy. Fewer full-size vehicles means consumers will lose the ability to haul loads and tow boats, or they could be forced to purchase more expensive, larger vehicles that are not subject to the new emission standards. The only way for industry to meet the new standards would require 25 percent of the vehicles sold in California to run on alternative fuels at an increased cost of \$7000 per vehicle. We are in an uncertain economic time. The staff proposal is the type of rigid policy that will stifle economic growth and jobs. (California Chamber of Commerce, Californians for Realistic Vehicle Standards)

Because the staff proposal will require 25% of all vehicles sold in California to be alternative fuel vehicles, these would be a cost increase of as much as \$7,000 per vehicle. Many farm operations own several trucks and a cost increase of this magnitude could hurt their businesses. (San Joaquin Farm Bureau Federation) The increased economic burden brought about by tighter emission standards would make our agriculture less competitive and potentially increase cost of food products to the consumer. (Olive Growers Council) The impact of the LEV II proposal on agriculture will be tremendous since light trucks, subject to such standards, will be unable to fulfill the demands that agriculture requires of them. (California Wool Growers Association) Without the capabilities of light trucking, California farmers will not survive. (Stockton District Kidney Bean Growers, Inc.) ARB should not approve a regulation that reduces vehicle choice for those who need and want trucks for their business pursuits. (Associated Builders & Contractors, California Building Industry Association, California Association of Sheet Metal and air Conditioning Contractors, and National Association of Industrial and Office Park Properties (San Diego Chapter))

The impact of the LEV II proposal on the recreation industry will be disastrous. (approximately 20 operators of RV parks and campgrounds) ARB should not approve the proposed regulations, which will increase costs and reduce choice for those who need and want vans or trucks for business pursuits. (approximately 20 business operators) The LEV II proposal will hurt California businesses and agriculture. (approximately 60 individuals)

We think that vehicles in the 6,000 - 8,000 lb. range will cost \$500 to meet the standards. This will drive people, we think, into bigger cars or they will go out of state and get a car with over 7,500 miles and import it in. This will have a negative impact on emissions. (California Motor Car Dealer's Association)

Agency Response: As discussed in the responses to Comments 1-8, we do not believe that the LEV II emissions standards will appreciably reduce model availability in California compared to today's models. It certainly will not force significant numbers of heavier pickups and SUVs to be operated on alternative fuels at an extra cost of \$7000 per vehicle. The emissions technologies described by staff — including the advanced catalysts and other improvements used in the ARB's truck test program — will enable a full range of gasoline pickups, vans and SUVs to be sold in California.

With respect to the cost of a LEV II truck, as mentioned above, ARB believes that the technology needed to comply with the LEV II standards will likely be the same basic emission control approaches being utilized on current passenger cars with only slightly more refinement and corresponding cost increases. Accordingly, as detailed in the Staff Report, ARB estimates that the retail cost increase attributable to the exhaust element will range from \$71 for passenger cars to \$279 for the heaviest LDT2 vehicles to meet the LEV II SULEV standards. Factoring in the costs for the evaporative element and the cost savings from CAP 2000, the overall per vehicle cost range is estimated to be from about \$68 to \$276 (\$206 without the production of LDT2 SULEVs; see the response to the next comment).

Although there have been great improvements in California's air quality, there can be no doubt that substantial additional reductions of emissions of NOx and hydrocarbon are necessary to achieve the national and state ambient air quality standards for ozone. A primary tool in evaluating the relative impacts of different emission control measures on the economy is to compare the cost-effectiveness of the measures, expressed in dollars per pound of emissions reduced. In fact, Health and Safety Code section 43018 directs the ARB to adopt "standards and regulations which will result in the most cost-effective combination of control measures on all classes of motor vehicles and motor vehicle fuels." Using the cost analysis described in the response to the next comment and the calculation of emissions reductions set forth in the Staff Report, we estimate the cost-effectiveness of the LEV II regulations to be no more than \$1 per pound of VOC + NOx reduced. This compares quite favorably to other control measures recently adopted by the ARB. (see page 4 of Attachment II to the first 15-day notice.) We believe that, ultimately, this is why the California Council For Environmental and Economic Balance (CCEEB) and the California Environmental Dialogue *support* the LEV II regulations. While LEV II will undoubtedly result in some increased costs to business and agriculture, the overall impacts are less than would result from likely substitute control measures or from the State's failure to meet its SIP commitments.

29. **Comment:** The California Trade and Commerce Agency estimates the cost of the staff proposal to California business and individuals would equal \$1.87 billion over a five-year period.

That's over \$350 million a year. The California Chamber and the coalition support an industry alternative that preserves the functionality of full-size vehicles and provides 90 percent of the emission reductions without the cost to consumers. (California Chamber of Commerce, Californians for Realistic Vehicle Standards)

Agency Response: The Trade and Commerce Agency's figure of \$1.87 billion for the cost of the overall proposal over a five-year period (about \$375 million per year) came from Section B. of the ARB's Economic and Fiscal Impact Statement (Form 399). Unfortunately, the original Form 399 — which also listed a projected average per vehicle cost of \$215 — contained preliminary, erroneous cost figures that significantly overstated the costs of the proposal. The correct estimated cost figures were discussed at the hearing and explained in Attachment II to the first 15-day notice. The final, revised Economic and Fiscal Impact Statement shows a cost of \$856 million over a five-year period (about \$170 million a year) and average per vehicle costs of \$107. The corrected cost estimates were calculated as follows.

The overall impacts from the proposal result from three elements: the LEV II exhaust emissions component, the LEV II evaporative emissions component, and CAP 2000. As indicated in the Staff Report, the cost of the evaporative emissions element is estimated to be \$25 per vehicle, and the CAP 2000 changes are expected to result in a cost savings of about \$28 per vehicle. Thus the overall per-vehicle costs are expected to be approximately \$3 per vehicle less than the estimated costs from the LEV II exhaust emissions element.

Pages II-54 to II-60 of the Staff Report and its Tables II-29 to II-38 set forth the cost analysis for the LEV II exhaust element. The cost analysis was quite thorough and was based on the same methodology used by staff in its 1996 Board review of the LEV I program. This methodology has been validated by the actual retail cost of vehicles meeting the requirements of LEV I. The estimated costs were summarized on page II-54 of the Staff Report in the following table, which shows the estimated incremental retail costs of ULEV II and SULEV vehicles compared to a ULEV I vehicle in different weight classifications:

Category	ULEV II (in \$)	SULEV (in \$)
PC	71	131
LDT 1	46	105
LDT 2	184	279
MDV 2	208	-
MDV 3	209	-
MDV 4	134	-

Although most 2003 model year LEV I light-duty vehicles are expected to be LEVs rather than ULEVs, the ULEV I standard is an appropriate baseline because most of the ULEV II incremental costs are attributable to additional oxides of nitrogen (NOx) controls and LEV I LEVs and ULEVs have the same NOx standard.

Estimated range of per-vehicle costs. The \$276 high end of the range of per vehicle costs in the Staff Report was derived from the estimated incremental cost of \$279 for a LDT2 (heavier light-duty truck) meeting the SULEV standard rather than the ULEV I standard. But the fully phased-in fleet average NMOG requirement for LDT2s, which drives the overall level of stringency for a manufacturer's LDT2 fleet, allows the manufacturer to comply with almost all vehicles meeting the ULEV II standard and no vehicles subject to the SULEV standard. Therefore the estimated incremental per vehicle cost of \$209 for the MDV 3 class to meet the ULEV II exhaust emission standard should be used in identifying the high end of the per vehicle cost range, resulting in an estimated cost of \$206 per vehicle after factoring in the evaporative emissions element and the CAP 2000 savings. The originally estimated \$68 per vehicle cost for the low end of the range of costs was appropriately derived from the estimated cost for passenger cars meeting the ULEV II standard.

Estimated average per-vehicle costs. As the LEV II requirements are phased-in between the 2004 and 2010 model years, ULEV II is expected to become the dominant emissions category for light and medium-duty vehicles. Accordingly, the average per vehicle costs for LEV II are appropriately derived from the incremental cost of moving from the ULEV I to the ULEV II standard. The estimated per vehicle costs for each weight category are combined based on the percentage each category represents in current sales: 54% PC, 9% LDT1, 27% LDT2, 5% MDV2 and 5% MDV3 (the 8501 lbs. GVWR and over "MDV 4" category was not included because it represents a very small percentage of vehicles). The resulting average cost is \$112.65, which staff rounded to \$110 and adjusted to \$107 per vehicle to reflect the evaporative emissions element and CAP 2000.

Estimated annual economic impacts on manufacturers. The annual economic impact of the fully implemented LEV II program is calculated by multiplying the estimated per vehicle cost of \$107 by the number of affected vehicles. Staff is using 1998 model-year data, showing sales of approximately 1.7 million vehicles in the affected categories. Since 10 percent of the approximately 1.2 million PCs and LDT1s are already required to be ZEVs in 2003 and subsequent model years, staff estimated annual sales of LEV II vehicles at 1.6 million. The resulting estimated annual cost is \$171.2 million, rounded to \$170 million per year.

As noted in the response to Comment 10, the manufacturers have not provided a cost-effectiveness value for their alternative proposal.

30. **Comment:** The Staff Report does not adequately consider the functionality of trucks and the need for that functionality. As a result, the report does not adequately address the potential impact on businesses and the economy within the state. (AAMA)

Agency Response: The cost and economic impact analyses in the Staff Report are appropriately predicated on our conclusion that manufacturers will be able to produce a full range of light trucks meeting today's performance criteria, especially with the 4% provision for work trucks.

(1) Fuel Quality

31. **Comment:** Clean fuels should be part of an overall strategy consistent with the tighter emissions standards of LEV II. Further improvements in fuel quality (i.e., reduced sulfur and other parameters) are believed to be necessary to enable compliance with either ARB's or the manufacturers' proposed LEV II standards. The Board should direct ARB staff, in concert with the automobile and oil industries to study the necessity and utility of improving the quality of fuel in California to aid the introduction of clean vehicles. Fuel improvement should precede introduction of LEV II standards. (AAMA) For us to be capable of achieving these low-emission standards, we absolutely have to have the fuels at the same time. (Chrysler)

New and cleaner fuels will have to be part of the equation as the new LEV II standards are implemented. This includes further sulfur reductions in gasoline, fuel changes to control combustion chamber deposits as well as other fuels that may be needed for more advanced technologies. (AIAM)

Separately from LEV II, we do believe that the ARB should consider strengthening the fuel standards where that is cost-effective. (Union of Concerned Scientists)

Agency Response: The ARB's technological feasibility demonstration for the proposed LEV II standards is based on emission testing using the current Phase 2 RFG certification gasoline, containing 30-40 parts per million (ppm) sulfur. Thus we believe that the LEV II standards have been shown to be technologically feasible without the need for a further reduction in sulfur levels in gasoline. We agree, however, that reductions in sulfur below the 30-40 ppm level will result in emissions reductions. The ARB is cooperating in a test program investigating the impact of lower sulfur levels. We expect that the upcoming rulemaking proposal for non-MTBE Phase 3 reformulated gasoline later this fall will include a reduction in the flat and averaging sulfur limits for commercial gasoline in section 2262.2, title 13, CCR.

32. **Comment:** Diesel engine manufacturers have achieved significant success in reducing engine-out emissions of NOx, particulate matter and hydrocarbons. There's an opportunity to replicate that success with aftertreatment technologies. However, there are significant technical barriers which must be overcome. These include the fact that compression ignition engines are lean burning. That is, their exhaust is relatively cool, and the most promising advanced

technologies are very sensitive to fuel sulfur. If these problems can be overcome, there will be an opportunity to optimize emissions performance, commercialize advanced technologies and apply those technologies to a wide range of diesel engine applications. (EMA)

To meet the emissions challenges, clean diesel fuel (sulfur content down to 30 ppm) will allow Navistar to leverage its advanced technology. (Navistar)

We believe the most cost-effective means for diesel engines to achieve the low-emission standards will involve significant engine modifications but will also necessitate fuel changes. Fuel sulfur becomes sulfate particulate in the exhaust and also adversely affects any type of lean NOx aftertreatment. (Cummins)

For lean-burn diesel engines to achieve a NOx emissions standard even lower than the proposed 0.5 g/mi 150,000 NOx standard, lean burn de-NOx catalysts are required. However, low sulfur diesel fuel is necessary to enable this technology. Since low-sulfur diesel fuel is not available in California, we recommend that the ARB mandate the sale of low-sulfur diesel fuel. (VW, Audi, Rolls-Royce, and Automobili Lamborghini).

The current level of sulfur in diesel fuel is a barrier to the introduction of some of the promising PM and NOx control technologies for diesel vehicles, including NOx catalysts, NOx adsorbers, and certain PM filter designs. Consequently, we recommend that the ARB initiate an evaluation of the air quality benefits that could be derived from establishing lower sulfur limits for diesel fuel. (MECA)

Agency Response: California already requires the cleanest diesel fuel in the nation. We agree that further reductions in the sulfur content of diesel fuel will result in further emission reductions. However, since heavy-duty vehicles are the major user of diesel fuel and a significant portion of the heavy-duty fleet operating in California are based and fueled out of the state, it is preferable for further diesel fuel improvements to be implemented nationwide. Accordingly, ARB is currently discussing the need and feasibility of cleaner diesel fuel with the U.S. EPA.

(m) Warranty and Durability Issues

33. **Comment:** We oppose the two elements of the proposal that would impose additional warranty requirements on vehicle manufacturers in exchange for additional credits in meeting the ARB's motor vehicle emission standards. The first proposal would allow manufacturers a so-called "option" of certifying vehicles to a 150,000 mile emissions durability standard in order to obtain additional NMOG credits. As a condition of receiving NMOG credits, the manufacturer would be required to offer a new, expanded eight year/100,000 mile warranty on higher priced emissions related parts rather than the seven year/ 70,000 mile warranty for these parts specified in Health and Safety Code section 43205. The second proposal would require manufacturers to certify that vehicles must meet a SULEV durability standard of 150,000 miles (currently at 120,000 miles) and to provide an emissions warranty of 15 years or 150,000 miles in order to

receive a partial ZEV credit. (Automotive Parts and Accessories Association, Automotive Service Councils of California, Lynn Cardwell, Auto Repair Coalition, California Service Station and Automotive Repair Association, California Automotive Task Force)

The future of thousands of independent auto repair businesses is at risk if this regulation is adopted without amendment. Advances in technology have now linked all vehicle computer controls, forming a tightly integrated system. Since it is impossible to carve out “emissions systems” from the whole computer system, our customers will become captives of dealer service centers, whether they like it or not. Unless amended, the regulation will create a virtual monopoly for dealers and independent service facilities will lose approximately 45% of our future market. The end result will be a loss of jobs, and insufficient number of providers to care for the number of California drivers. Deferred emissions maintenance will ultimately mean poor air quality. (Lynne Cardwell, Car Care Center)

The 34,323 independent automotive repair businesses in California currently represent 97% of the repair industry, compared to the 1,156 dealerships. The warranty proposals will give the dealerships a “cradle to grave” monopoly on the service of a significant portion of the vehicle fleet, and motorists will begin to lose their access to provider choice and competitive prices. The dealerships believe that existing extended warranties have already caused a shift from independents to dealerships. It has been estimated that independent “non-dealership” automotive repair businesses would experience between a 25% and 50% loss in revenue to be picked up by dealerships from the 15/150 extended warranty requirement. This would have a major adverse impact on the independents. And when marketplace competition decreases, consumer prices increase. If the capability and numbers of independent “nondealership” repair businesses are diminished by this proposed regulation, the dealerships will be left to largely dictate the prices of automotive services after their warranties have expired. (Automotive Repair Coalition)

Agency Response: The two extended warranty provisions represent measured efforts to assure extended durability of the emissions control systems of vehicles certified to optional standards with extended useful lives. First, vehicles that are optionally certified to the applicable 120,000 mile standard at 150,000 rather than 120,000 miles and qualify to use an NMOG value that is 85% of the 50,000 mile certification standard will need to carry an emissions warranty for high cost parts that runs for 8 years/100,000 miles rather than the normal 7 year/80,000 mile high cost part warranty specified in Health and Safety Code section 43205(a)(4) (Staff Report, pp. II-10 - II-12). Second, optional SULEVs qualifying for a partial ZEV credit and certified to a 150,000 mile useful life will have to provide an emissions warranty of 15 years/ 150,000 miles. In both cases, the warranties are directly tied to standards applying over extended periods, and are designed to assure that the manufacturer builds sufficiently systems that are durable for longer periods. The warranty for SULEVs is longer because the SULEV is providing partial ZEV credits that substitute for a ZEV that by definition will have no emissions during its lifetime.

Perhaps one of the more daunting issues associated with the smog check program is that lower-income owners of older vehicles are often overwhelmed by the repair costs of vehicles

failing the test. An extended warranty would greatly assist this segment of the population and help avoid the associated emission increases from unrepaired vehicles.

For the reasons stated on pages II-61 - II-63, we do not believe the warranty provisions will have result in a significant net shift from independent repair facilities to dealerships. We expect that in general the extended warranty vehicles will be designed to not require repairs during the extended interval because it is generally less expensive to improve the durability of a part than to replace it under warranty. In this case, fewer motorists may seek dealer repairs in the earlier years, and more likely patronize independent operators for nonwarranty maintenance during that period. Later on in the vehicle's life, warrantable situations may increase visits to dealerships. In addition, many potential vehicle problems — for example involving brakes or the transmission — may not be covered by the emissions warranty.

In any event, as described in the response to the next comment, the Board directed to staff to work with the independent automobile service and aftermarket parts industry to further evaluate the potential impact of extended emissions warranties.

34. **Comment:** The Automotive Service Council's 2,700 members, owners of independent automotive businesses throughout California, have placed considerable time and personal resources at risk in order to be partners in the state's Smog Check II program. The independent automotive repair industry is a central and important component of the state's efforts to clean the air. Therefore we urge first that the Board defer consideration of the warranty extension segment of these regulations for one year in order that ARB staff may identify the impact of the extended warranties on the added cost of new cars and on the continued operation of independent automotive businesses. Second, we request that ARB staff be directed to work with the after-market to mitigate the impact of these proposed regulations on California's thousands of small, independent, automotive-related businesses. (Automotive Service Councils of California)

As an alternative, we propose that the ARB staff pull consideration of the warranty extensions for one year such that the staff has the opportunity to develop some data on how to improve durability and consumer maintenance of vehicles. The study also should attempt to measure economic impact on our industry and on consumers of extending warranties. (APAA)

Agency Response: In order to address the concerns of this and other commenters on the extended warranty provisions, in Resolution 98-53 the Board directed staff to work with representatives of the independent automobile service and aftermarket parts industry and other interested parties, to assess the degree to which this industry may be adversely impacted by the extended warranties and to report back to the Board within 18 months with its findings and proposals, if appropriate, to help mitigate any adverse impacts so that the independent automotive service and aftermarket parts industry may continue to contribute to the State's efforts to reduce smog and to continue to provide our State's twenty-six million vehicle owners with a competitive automotive repair marketplace for their service-related needs. As a result, ARB is currently in the process of issuing a contract to assess the impacts, if any, of an extended emission warranty on

the aftermarket parts and service industry. This is a preferable approach to deferring action on the warranty provisions for a year, because the manufacturers need to know the package of certification requirements now so they can move ahead to satisfy the requirements.

35. **Comment:** We oppose the extended warranty provisions because they would do nothing to increase vehicle durability. The aftermarket has always strongly opposed mandated state and federal emissions warranties since their inception in the early seventies. The major pressure to build longer-lasting vehicles is in fact competition from other vehicle manufacturers. Further, recall liability that car companies face should they not live up to the durability requirements has proven to be a much more effective hammer on car companies than have warranties. If anything, warranties have served as a sales tool used by the car companies to lure customers into the showroom to purchase vehicles.

Based on past experience, there is no proof that emissions warranties provide car owners with incentives to obtain more timely maintenance of vehicles. Since ARB extended warranties in the late eighties to 7 years/ 70,000 miles from 5 years/ 50,000 miles on high priced parts, there has been no evidence to support the contention that the longer warranties actually improve maintenance of the vehicles during those two years. Warranties also do not improve maintenance because factors other than price, such as convenience and whether the vehicle will continue to operate without repairs, may play as big or larger role in pushing the car owners into the shop for maintenance. Extended warranties now offered on some high priced vehicles give car owners the secure feeling that there is nothing they need to do to their vehicle, leading to inadequate maintenance.

Further, there will clearly be an added cost both in developing longer-lasting parts and in servicing the warranted vehicles. In reality, ARB is forcing car owners to pay for at the time of the new car purchase, a warranty that the Agency hopes they will never use since the vehicle manufacturers are expected to build more durable vehicles for both regulatory and competitive purposes. The mandated warranty is really a new car tax, adding to the purchase price with little or no economic benefit accruing. (Automotive Parts and Accessories Association)

Agency Response: Emission control systems on new vehicles have become significantly more durable in the last 25 years. This has resulted from a number of factors, including extensions of the useful life period for the emissions standards, recall testing, and warranty requirements. We cannot quantify the contribution from warranties, but economic realities indicate that the extended warranty periods provide an incentive to the automaker to assure that the emission control system is sufficiently durable to avoid an increase in costly warranty repairs.

Since manufacturers have increasingly shown a sensitivity to costs in general, we believe they are sensitive to warranty costs and therefore would improve durability of emission-related components installed on the vehicle meeting extended warranty requirements. Furthermore, recent advances in conventional emission control technology have enabled manufacturers to

improve durability without incurring increased cost by employing improved production methods and processes. One such prominent example is today's advanced catalyst. This should help mitigate warranty costs increases, if any.

We are particularly concerned with the lifetime durability of SULEVs that qualify for a partial ZEV credit. The recall requirement will not help assure durability past 100,000 miles for these SULEVs. Beyond 100,000 miles, when vehicles are often with their second and third owner, the enhanced warranty requirements may be the only enforceable mechanism that would motivate manufacturers to install more durable emission control components.

We agree that a manufacturers' actions to build a more durable emissions control system as a result of the extended warranty provisions will carry some added cost. This is also the case with most of the other emissions-reducing actions that manufacturers will take as a result of the LEV II amendments. There is great public support for clean air efforts, as evidenced by the comments from citizens supporting the LEV II proposal.

In light of the concerns of the commenter and others, however, the Board directed to staff to work with the independent automobile service and aftermarket parts industry to further evaluate the potential impact of extended emissions warranties. See the response to Comment 34.

36. **Comment:** The ARB is expressly prohibited from expanding the statutory emission warranty requirements for vehicles certified to optional standards. ARB staff rely on the authority set forth in Health and Safety Code section 43101, which authorizes ARB to adopt and implement emission standards for new motor vehicles, as long as the Board makes a finding that the standards are necessary and technologically feasible. However, ARB's authority is limited to setting standards for emission of oxides of nitrogen. (Health and Safety Code §43101.5.) Under section 43101.5, ARB's authority to set standards applicable to 1983 and later model-year vehicles is limited by the standards specified in *this* section. Except that section 43101.5 does allow ARB to adopt more stringent standards *if it also adopts* optional standards which are not more stringent than the standards specified than the standards specified by the statute. More importantly, for any option adopted by ARB pursuant to section 43101.5 for vehicles prior to the 1986 model year, ARB is *specifically prohibited* from imposing *warranty requirements* of greater duration or stringency than those previously set forth in the regulations applicable to 1983 and later model years. This is evidence that, historically, the Legislature has given ARB only limited authority to change the emissions warranty requirements in specified situations, *and has granted ARB no specified authority in this instance to promulgate or adopt the regulation before you today.* (CATF)

Agency Response: Close analysis demonstrates that section 43101.5 actually provides *support* for the ARB's current authority to establish optional emission standards that include a requirement for a warranty period longer than that specified in section 43205. When section 43101.5 was enacted in 1981, section 43204 required manufacturers to offer an emissions warranty and identified a specific warranty period for the warranty. If sections 43204 and 43205

categorically prohibited the ARB from ever adopting optional emission standards that include a requirement for a longer warranty period than that specified in the warranty statute, then there would have no need for the Legislature to expressly *prohibit* a longer warranty for the optional standards referred to in section 43101.5. The fact that the Legislature found it necessary to expressly prohibit a longer warranty period in connection with the optional standard suggests that the ARB generally has the authority to craft optional emission standards with a longer warranty period than that specified in section 43205.

As discussed elsewhere, the authority for the extended warranty provisions for the optional standards comes primarily from Health and Safety Code sections 43013 and 43018.

37. **Comment:** The ARB has no authority to adopt motor vehicle emission control warranty requirements for periods longer than the warranty periods specified in Health and Safety Code section 43205. This statute requires manufacturers of 1990 and later model year to provide a three year/50,000 mile warranty on all emissions-related parts and a seven year/ 70,000 mile warranty on higher priced parts. The only instance in which the Legislature authorized ARB to make regulatory revisions to the section 43205 warranty is ARB's authority to revise the \$300 price cut-off for higher priced parts to reflect changes due to inflation. (CATF, Automotive Parts and Accessories Association APAA)

Agency Response: While we acknowledge that Health and Safety Code section 43205 precludes the ARB from establishing a longer warranty period for vehicles certified to the ARB's basic emission standards, we do not believe it precludes including a longer warranty period as part of an *optional* standard that manufacturers may choose to use if they wish. As discussed in the response to the previous comment, implicit in the section 43101.5 reference to an optional emission standard including a requirement for a warranty having a different duration is Legislature's assumption that the ARB would *have* this authority in the absence of the section 43101.5 prohibition. Moreover, section 43018(c) directs the ARB to adopt "the most cost-effective combination of control measures on all classes of motor vehicles and motor vehicle fuel." The two instances in which the ARB has identified optional emission standards that include a longer warranty period provide the manufacturer the flexibility to use the standard if that would be less costly (and thus more cost-effective) than certifying all vehicles to the primary standards.

38. **Comment:** While ARB staff may attempt to justify the warranty proposals by contending that they are "optional," in practical terms, this argument leaves no real choice for automobile manufacturers. The ARB has coupled other regulatory changes with the optional 150,000 mile standard and eight year/ 100,000 mile warranty for higher price parts; these other changes may, in effect, make it highly unlikely that a manufacturer can meet its fleet average without certifying to the 150,000 mile durability standard, and thus, having to meet the new warranty requirement. This is applicable to the SULEV warranty issue as well. Since the standards with the extended warranty requirements are not truly options, the warranty requirements legally may not diverge from those in Health and Safety Code section 43205. (CATF)

The entire LEV regulation is comprised of a menu of options that the vehicle producer may use to meet its NMOG and ZEV credits. If ARB can make the case that the NMOG and SULEV are only options and therefore are not covered by the warranty statute, then a similar case could be made for each of the menu of options now offered the car companies under the current program. This would not meet the intent of the Legislators who enacted the warranty provisions. (APAA)

Agency Response: A review of the entire LEV II proposal should make clear that the technical feasibility of the standards are not premised on the opportunity that manufacturers would have to use the compliance options that include a longer warranty period. For instance, neither technological feasibility analysis of the LEV II exhaust emissions proposal (pp. II-32 - II-53 of the Staff Report) nor the cost and cost-effectiveness analysis (pp. II-54 - II-60 of the Staff Report) is premised on manufacturers meeting the fleet average NMOG requirement by using NMOG credits for 150,000 mile durability vehicles with an eight year/ 100,000 mile warranty for high price parts. Since the regulations are technologically feasible without the warranty options, it follows that manufacturers will in fact have a real choice in deciding whether to use them.

While it is true that manufacturers are provided the flexibility to determine the precise mix of vehicles to be used to meet the NMOG fleet average requirements, none of the basic LEV ULEV and SULEV standards include a requirement for an extended warranty. Those are the sets of standards shown in the potential phase-in tables on p. II-14 of the Staff Report. In this context, the two limited certification options that include extended warranties are appropriately viewed as options.

39. **Comment:** If ARB concludes they are in a position to proceed on November 5, the regulatory proposal suffers from other APA-related deficiencies, specifically the Agency's failure to adequately address the impact of this proposal on small businesses in California. In fact, the Staff Report is fairly brief and dismissive regarding any possible impact on small business in California as a consequence of this proposal. The APA requires ARB to set forth "Facts, evidence, documents, testimony, or other evidence upon which the agency relies to support a finding that the action will not have a significant adverse economic impact on business." (Gov. Code § 11346.5(a)(5).) The Staff Report offers only opinion and no substantive support for the conclusion that improved durability results in lower overall costs to society than continuing repairs of frequently malfunctioning vehicles. ARB also fails to describe any alternative the agency has identified that will lessen any adverse impact on small businesses, as required by the APA, other than the possible increase in repairs due to proliferating comfort and convenience items on new vehicles.

There are three underlying, and factually unsupported presumptions articulated by ARB staff relating to small business impact, and consumer impact, of the proposal:

1. ARB presumes that consumers will make repairs to defective emissions parts sooner if these parts are under warranty. This assumes the consumer understands what parts are warranted.
2. ARB presumes that the savings to the consumer is greater if the consumer pays for the cost of a more durable vehicle in the purchase price of the vehicles, rather than having to pay for repair work after the warranty period has expired.
3. A presumption that the regulations would increase the number of consumer repairs done by the aftermarket because warranted parts would last longer and the consumer would have less of a reason to go back to the dealership for routine maintenance. (i.e., “Every time a warrantable part does not fail, that is an instance where the consumer will come to the independent repair shop.”)

As you know CATF does not believe there is adequate data to support these three ARB staff presumptions. Specifically, what evidence does ARB have (a) of a deficiency in the manufacturers’ ability to meet established fleet emissions standards that would dictate, and support, a move from the current 7-year/70,000 mile warranty to an 8-year/100,000 mile warranty or (b) that shows that consumers are responsive to the warranty and, in fact, secure repairs to warranted parts within the existing 7-year/70,000 mile warranty period? In addition, what analysis has ARB performed to measure the cost to consumers of requiring manufacturers to meet these expanded warranty periods? What analysis has ARB performed to measure the cost to the automotive aftermarket repair industry of requiring manufacturers to meet these expanded warranty periods? (CATF)

In the opinion of CATF, the adoption of regulations expanding the warranty requirements is legally without support in California law, is violative of the state’s Administrative Procedure Act, and is premature without ARB first assembling economic data which at a minimum help asses the effect of the regulations on the cost of the vehicle, the number of California small businesses affected, the lost of repair business to the aftermarket, the number of potential employees diverted from this occupation if repair business declines, and the effect on California’s consumers. CATF proposes that ARB delay hearing the proposed new warranty requirements for at least one year to collect data as evidence that the expanded warranty is really the answer to attaining a more durable vehicle. (CATF)

Agency Response: The potential economic impacts of the warranty provisions on small and other businesses are discussed on pages 10-11 of the hearing notice and pages II-61-63 and VI-2 of the Staff Report. With regard to the first identified presumption, we believe that the primary effect of the extended warranty will be to stimulate the automakers to make the emission control systems on the warranted vehicles more durable. To the extent that repairs of defective emissions parts are needed during the extended warranty period, we expect that repair and maintenance shops will advise the motorist of the warranty coverage. Since there would be no cost for repairs of the warranted parts, and the owner may be concerned about passing the

periodic Smog Check test, it is intuitively the case that some number of motorists will have the repairs done sooner with the extended warranty.

With regard to the second identified presumption, the cost analysis on pages II-56 - 60 and the tables attached to the Staff Report identify the cost of various technologies. Given the staff's overall cost analysis, the cost of producing an adequately durable emission control system will not significantly increase the production costs. Since the repair process is inherently less efficient, it is reasonable to conclude that the consumer's overall costs will not increase.

With regard to the third identified presumption, the Staff Report refers to a J.D. Power and Associates study indicates there are significant incentives for motorists to patronize independent repair facilities. Motorists are more likely to go to a dealer for the failure of a warranted part than for routine maintenance. To the extent there is a reduction in failures of those parts and the vehicle is brought to the shop for routine maintenance rather than failure of a warranted part, there is a greater chance that independent shops will get that business.

40. **Comment:** We applaud the emphasis on the proposed extension of "useful life" of a vehicle to 120,000 miles or 10 years in the LEV II proposal. We believe more must be done, however, to ensure that all emission-related components last for the entire vehicle life, since ARB data show that 20 percent of California vehicles are between 10 years and 15 years old. Otherwise, individual drivers will continue to shoulder the primary burden of repairing failed pollution control equipment on cars and trucks. (Sierra Club California, Coalition for Clean Air, Union of Concerned Scientists, CAL-PIRG, Environmental Health Coalition, NRDC)

Agency Response: ARB staff concurs that extending the useful life of motor vehicles would result in improved durability of emission-related components and that extending the warranty period would result in further emission reductions since vehicle owners are more likely to repair malfunctioning vehicles repaired under warranty than otherwise. Both of these measures achieve additional emission reductions.

(n) Low-Emission Measurement Techniques

41. **Comment:** VW recommends that the ARB should spearhead a task group, with full representation by the automotive industry, in a study of low-emission measurement strategies dictated by the LEV II proposal. It would be to the benefit of all to have a common understanding of existing methodologies that can accurately identify and measure exhaust and evaporative emission constituents at the low levels dictated by the LEV II proposal. (VW)

Agency Response: ARB has been and is currently working with the American Industry/Government Emissions Research Consortium (AIGER) to explore the development of new instrumentation and sampling techniques for low-emission vehicles (AIGER members are ARB, U.S. EPA, General Motors, Ford, and Daimler Chrysler). ARB continues to hold discussions with other members of the automotive industry on methods and instrumentation to

improve low-emission measurement. Furthermore, the manufacturers of emission measurement instrumentation are working to improve the measurement capability of their equipment. Accordingly, a significant effort is already being made by ARB and others to advance low-emission measurement capability.

42. **Comment:** ARB has failed to demonstrate that reliable test equipment exists to measure emissions at the low levels proposed in their Staff Report. In order for the LEV II program to go forward, it must be demonstrated that reliable, repeatable data can be generated by testing equipment. In particular, the industry has concerns about using conventional CVS/CFV sampling systems to accurately measure low emission levels. (AAMA)

Agency Response: ARB demonstrated technical feasibility of the proposed standards with currently available test equipment, thus indicating that reliable test equipment exists to measure at low-levels. Nonetheless, ARB recognizes that further improvements in emission measurement capability are worthwhile and will continue to work with industry and the U.S. EPA to improve emission test equipment and methods.

(o) Partial ZEV Credits

43. **Comment:** Good public policy requires that the Board apply common sense and fair play in adopting standards. Common sense would dictate that failed (or failing) regulatory requirements (e.g., the ZEV mandate) which were based on fanciful and hopeful views of technology development should not be “papered over” with new fanciful and hopeful views of technology development (e.g., the partial ZEV requirements). Replacing unachievable requirements with different but equally unachievable requirements is bad public policy and ultimately costs consumers money and wastes resources that could be utilized in productive activities. (AAMA)

We object to the ZEV sales mandate. None of the proposed vehicle substitutes have any volume sales potential by the 2003 timetable that has been established. None of the vehicles are ready that are feasible and meet all customer requirements. In addition, the benefit from the ZEV program comes to 1.6 tons per day by 2010 when you superimpose the benefits of the LEV II standards. It becomes very problematic as to whether you need the ZEV program when you consider SULEVs driven for 100,000 miles will emit one pound of hydrocarbons. (Chrysler)

Agency Response: The basic ZEV requirement is not part of this rulemaking and, therefore cannot be changed at this time. The ARB will be conducting its LEV I biennial review next year, and we expect the 10% ZEV requirement for model-year 2003 will be the primary focus of attention. Regarding the provision for partial ZEV allowances, a variety of low-emission vehicle technologies with some of the emission characteristics inherent to pure ZEVs — such as extremely low emissions, extended durability, or partial all-electric range — are emerging. ARB believes it is good public policy to encourage the development of these advanced technologies by providing them with the appropriate partial ZEV allowances. With respect to whether this

approach reflects fanciful and hopeful views of technology development, two manufacturers are currently planning to introduce hybrid electric vehicles and SULEVs in model year 2000.

44. **Comment:** Intermediate volume manufacturers should not have a ZEV mandate. (VW)

Agency Response: As noted above, the basic ZEV requirement is not part of this rulemaking and, therefore cannot be changed at this time. The ARB will be conducting its LEV I biennial review next year, and we expect the 10% ZEV requirement for model-year 2003 will be the primary focus of attention. However, recognizing that it would be cost-prohibitive for intermediate volume manufacturers to simultaneously develop advanced technology ZEVs and other advanced low-emission vehicles such as hybrid electric vehicles and fuel cells, LEV II provides these manufacturers with flexibility by allowing them to satisfy their total ZEV requirement using vehicles that qualify for partial ZEV allowances.

45. **Comment:** VW recommends that a slight downward adjustment in the NMOG fleet average for the 2003 model year would address air quality needs and serve as an alternative for a ZEV requirement. (VW)

Agency Response: As noted above, the basic ZEV requirement is not part of this rulemaking and, therefore cannot be changed at this time. Although adjusting the NMOG fleet average lower may offset the tailpipe emission benefits from the ZEV requirement, these benefits would be offset by other sources of emissions such as fuel-cycle emissions and the deterioration of vehicle emissions due to age. Moreover, taking into account the anticipated growth in the number of light-duty vehicles and the number of miles they travel, it is clear that we need to essentially eliminate emissions related to vehicle deterioration and fuel use from the light-duty fleet if we are to meet federal and state ambient ozone standards. ZEVs can accomplish this goal and therefore, their commercialization is important for the long-term success of California's clean air program.

46. **Comment:** We suggest the ARB remove the partial ZEV credits from LEV II and study more thoroughly and perhaps look into giving multiple ZEV credits to a fuel cell hybrid for example. (Chrysler)

Agency Response: Partial ZEV credits are provided to give the manufacturers greater flexibility in meeting their ZEV requirements and to encourage the development of very clean technologies. The use of partial ZEV credits is optional for the manufacturers. Regarding the commenter's suggestion that fuel cell hybrid vehicles receive multiple ZEV credits, fuel cell vehicles with on-board hydrogen storage meeting other requirements can qualify for maximum multiple ZEV credits under the provisions adopted in LEV II.

47. **Comment:** The proposed partial ZEV allowance provisions do not represent a reasonable alternative to ZEVs. As an intermediate volume manufacturer, in order to meet our

2003 model-year ZEV sales requirement using SULEVs, we will need to have 50 percent of our California sales be SULEVs by the 2003 model year. This eliminates the flexibility provided by the phase-in of LEVs and ULEVs and clearly represents an unreasonable burden when considering the development effort and cost. (VW, Audi, Rolls-Royce, and Automobili Lamborghini)

Agency Response: As noted above, a variety of clean technologies demonstrate ZEV-like emission characteristics and, therefore, may earn partial ZEV allowances. Several of these technologies may accrue significantly higher partial ZEV allowances than gasoline SULEVs. Similar to the fleet average requirements, manufacturers are free to choose which qualifying partial ZEV allowance technology to produce in order to meet their ZEV requirement. As mentioned in the response to the previous comment, the use of partial ZEV credits to meet the ZEV requirement is optional and, therefore, separate from the phase-in requirements for LEV II. Nonetheless, NMOG credits earned by certifying partial ZEV allowance vehicles may be applied to a manufacturers fleet average requirements, thereby providing additional compliance flexibility for LEV II.

48. **Comment:** While we support ARB's efforts to provide incentives to advanced technology vehicles that incorporate drivetrains, we oppose the proposal to allow non-electric drive, gasoline-powered SULEVs to qualify for a partial ZEV credit. ARB should only offer ZEV credits to "true" ZEVs (i.e., battery electrics and hydrogen fuel cell vehicles.) Allowing non-electric drivetrain vehicles to qualify for partial ZEV credit blurs the distinction between intrinsically clean vehicle technology and conventional cars. Battery electric vehicles are still the "gold standard" due to their extremely low fuel-cycle emissions and lifetime durability of their emissions control system components. Furthermore, battery electric vehicles can also reduce or eliminate the air toxics, water supply contamination, and greenhouse gas emission problems associated with refining and burning gasoline. (Sierra Club, Coalition for Clean Air, NRDC, Union of Concerned Scientists, Cal-PIRG, Environmental Health Coalition)

The Board should recognize that gasoline SULEVs do not have "ZEV-like characteristics" and, therefore, they should not receive partial ZEV credits. They are not "inherently clean" and they have very high fuel cycle emissions. They require durability monitoring for their life and, even with OBD II, will always have higher emissions than they did during certification. Off-cycle emissions continue throughout the life of a gasoline vehicle with no opportunity for emission-free driving. (California Electric Transportation Coalition) We strongly oppose the proposal to offer partial ZEV credit to low-emitting gasoline vehicles. Among other things, the "upstream" emissions associated with the refining and distribution of the gasoline greatly exceeds the power plant emissions associated with recharging the ZEV battery-operated cars in use today. (Planning and Conservation League)

We believe it is a mistake to provide ZEV credit for SULEVs. The ZEV mandate has been a separate component of the LEV program for good reason. While you may be able to identify a rationale for allowing gasoline powered vehicles to receive partial ZEV credit now even though

there are upstream emissions, the potential remains for deterioration and warranty issues. In the future, we will need true ZEVs because of increased VMT and increased population growth. Our concern is giving SULEVs credit moves you down a slippery slope that can undermine the technology-forcing aspects in a way they we will truly regret in 10 or 15 years. (Union of Concern Scientists)

While we understand the concept behind the partial ZEV allowance proposal to address some perceived difficulties, we believe that ARB should revisit this issue on a regular basis between now and 2003 to critically examine whether the mandatory sales percentage of ZEVs can be raised from its proposed “floor” of 4% to a level closer to 10%. (SCAQMD)

The ARB should not water down the ZEV requirement by allowing any gasoline vehicles to qualify for a partial ZEV credit. (Approximately 120 individuals)

Agency Response: We recognize that high-volatility fuels such as gasoline are responsible for significant fuel-cycle emissions, i.e., emissions that occur upstream from the vehicle due to production, transportation, and vehicle fueling. Furthermore, vehicles with internal combustion engines inevitably will exhibit increased emissions with age. For these reasons, we have limited the maximum partial ZEV allowance granted to a gasoline SULEV to 0.2. Furthermore, to address the commenters’ concerns, manufacturers will need to certify qualifying SULEVs to 150,000 mile emission durability, zero-evaporative emission requirements, stringent OBD requirements, and warrant their emission control systems for 150,000, miles. Vehicles meeting these requirements would exhibit very low lifetime emissions and are worthy of encouragement, since gasoline powered vehicles will likely constitute a major portion of the vehicle fleet for the foreseeable future.

We do not believe that allowing SULEVs to qualify for partial ZEV allowances would jeopardize true ZEV developments efforts. In order to address this concern, the LEV II amendments still require large volume manufacturers to satisfy at least 40 percent of their ZEV requirement with true ZEVs. We believe that this requirement would serve to ensure sufficient production volumes of advanced zero-emission vehicle technologies to assure their continued development and afford the economies of scale to help make ZEVs affordable and more competitive in the 2004 to 2010 time frame.

(p) Ultra-Small Volume Manufacturer Issues

49. **Comment:** COSVAM has 13 members, all of whom are “ultra-small volume manufacturers” (USVMs) — meaning that each company produces fewer than 5000 vehicles per year worldwide. ARB should adopt “USVM” as a new permanent category of manufacturer in consideration of the USVMs’ minimal effect on air quality and the financial and technological difficulties they face. This concept was recently embraced by ARB in conjunction with the delay of the California enhanced evaporative requirements. USVMs need a provision in the LEV II regulations that permits staff, through the discretion of the Executive Officer, to address USVM hardship relief on a case-by-case basis because these manufacturers may not have the resources necessary to meet the proposed regulations in the time frames specified. (COSVAM)

Agency Response: As has generally been the case in the past, the LEV II regulations include special treatment for “small volume manufacturers,” or SVMs. An SVM is defined, with respect to the 2001 and subsequent model years, as a manufacturer with California sales less than 4,500 of less than 4,500 new passenger cars, LDTs, MDVs and heavy-duty vehicles and engines, based on a three-year running average (§ 1900(b)(17), title 13, CCR). This definition includes all of the COSVAM members. The definition was the result of extensive discussions with the automobile industry (including the manufacturers represented by COSVAM) during development of the CAP 2000 provisions. At no point prior to COSVAM’s October 19, 1998 letter did they request special treatment for USVMs. There is considerable compliance flexibility already built into the LEV II program for small volume manufacturers, including a less stringent fleet average phase-in requirement, an eight year lead time for compliance, no zero-emission vehicle requirement and a greatly reduced certification and in-use test burden. We believe that ultra-small volume manufacturers should be able to meet the LEV II requirements in the time frames specified. The unique circumstances that justified a one-year delay in the enhanced evaporative emissions requirements for USVMs (§ 1976(b)(1)(B) note (3)) are not present for the LEV II program.

50. **Comment:** COSVAM urges that the LEV II program should incorporate incentives for large manufacturers to make NMOG credits available to smaller ones (a problem now being encountered in California’s LEV credit program). In addition, we are providing draft language that would authorize the Executive Officer to become involved in the transfer of credits to USVMs when the credits are due to expire. (COSVAM)

Agency Response: At this time, we do not believe it would appropriate to interfere with market mechanisms resulting from the credit program.

51. **Comment:** ARB should revise the assigned deterioration factors to accurately reflect real-world deterioration factors which are lower than ARB’s current assigned deterioration factors. (COSVAM)

Agency Response: The purpose of assigned deterioration factors (DFs) is to save the manufacturer the time and expense of developing a DF that is specific to a vehicle model. The current assigned DFs are purposely conservative to assure that air quality is not compromised by a DF that is too low, thereby allowing a vehicle to exceed the emission standards in-use.

52. **Comment:** COSVAM firmly believes that USVMs should be able to use credits obtained from the voluntary accelerated vehicle retirement program to meet the LEV II requirements. (COSVAM)

Agency Response: The use of voluntary accelerated vehicle retirement credits is not one of the subjects of this rulemaking; to date, no ARB motor vehicle program has provided for the use of such credits.

(q) SIP Benefits

53. **Comment:** The LEV II proposal was drafted to achieve not only the 25 tons per day of ROG + NO_x for measure M2 of California's 1994 Ozone SIP, but also a majority of the 75 tpd of ROG + NO_x in the black box for all sources as well. We object to reductions that are greater than the new vehicle "fair share" if such reductions are infeasible and not cost-effective. The industry alternative proposal significantly over achieves the NO_x reductions contained in the South Coast ozone "black box," and achieves 78% of the ROG + NO_x reductions needed for the black box. (AAMA)

Fair play means that one industry should not be expected to bear a disproportionate share or cost of improving air quality. The Board should consider all sources of emissions, not just automobiles, and assure that all sources are being equally tasked. Automobiles have been heavily regulated and have achieved significant air quality improvements in California while other sources have been unregulated or only marginally regulated. The automobile industry should not be expected to overachieve for the benefit of other sources and industries. In performing a fair play/fair share analysis, the level of progress by the source or industry in eliminating emissions should be considered as well as the cost effectiveness of the available actions. (AAMA)

Agency Response: The 1994 California SIP requires ARB to identify and implement all technically feasible and cost-effective mobile source measures in order to cover any shortfalls in other ARB measures and make progress on the black box. Consistent with that directive, ARB developed the LEV II program to achieve the maximum emission reductions from the light-duty and medium-duty new vehicle fleet that could be shown to be technologically feasible and cost-effective. We believe that the analysis contained in the Staff Report, the staff's presentation at the hearing, and in this FSOR provides a sufficient demonstration of technological feasibility of the program, and its definite cost-effectiveness in comparison with other recent air pollution control measures.

In addition, the LEV II regulations are necessary and appropriate to implement the Legislature's direction in Health and Safety Code section 43018 that the Board "endeavor to achieve the maximum degree of emission reduction possible from vehicular and other mobile sources in order to accomplish the attainment of the *state* [ambient air quality] standards at the earliest practicable date.

54. **Comment:** The "black box" of unidentified advanced technology emissions controls should be redefined using the latest knowledge of modeling and inventory to quantify the real contribution of LEV II and other measures towards meeting the federal and state air quality goals, and to facilitate future ozone SIP updates. After modeling and inventory changes concurrent with the 1997 South Coast Air Quality Management Plan, it appears that the area and stationary source "black box" from the 1994 SIP was eliminated by applying all of the "virtual benefits" associated with higher carrying capacities and lower inventory as if they were stationary and area reductions. In fact, these revisions should have led to a recalculation and reapportionment of the "black box" rather than a shifting of the entire burden to mobile sources. (AAMA)

Agency Response: ARB disagrees with the AAMA's conclusion that the SIP black box has been eliminated due to modeling and inventory changes. ARB's most recent modeling and inventory analysis demonstrates that significant reductions in the emission inventory are still required if California is to meet its SIP obligations.

55. **Comment:** The approaches ARB used to calculate the SIP benefits are flawed since they incorporate elements of the current EMFAC model that were not used to calculate the 1994 SIP benefits. Specifically staff used the EMFAC7g emissions factors fitted into the EMFAC7f model with the car/truck VMT assumptions that were in effect at the time of the 1994 Ozone SIP. ARB and manufacturers should seek consensus on "SIP currency" modeling methodologies. (AAMA)

Agency Response: As stated on page VII-3 of the Staff Report, once the U.S. EPA approved the 1994 SIP, the emissions inventories used in the SIP were frozen. Therefore, in order to compare the benefits of LEV II with the M2 commitment and other SIP commitments, the LEV II proposal must be evaluated using "SIP currency." Accordingly, staff included an estimate of the LEV II benefits using EMFAC7f and the car/truck VMT assumptions used for the 1994 SIP. However, the EMFAC7f model does not reflect the adoption of SIP Measure M3 (accelerated ULEV requirement for MDVs). Therefore, staff used the emission factors from EMFAC7g. Staff believes this is appropriate and provides an "apples to apples" comparison to the SIP commitment. Since this SIP analysis does not fully account for the benefits of LEV II, staff also included an estimate using EMFAC7g, the latest emission factor model, reflecting inventory improvements such as off-cycle emissions and the increased number of SUVs and trucks in the vehicle fleet.

(r) Ozone Reduction

56. **Comment:** Research recently completed by ENVIRON Corporation for the AAMA calls into question the usefulness of the NO_x reductions that would result from the LEV II proposal. Ozone is created by a combination of hydrocarbons and NO_x in the presence of sunlight. The hydrocarbon-to-NO_x ratio is very important in the process of ozone formation. At low ratios, reducing hydrocarbons will reduce ozone, but reducing NO_x will actually increase ozone. On the other end at high ratios of hydrocarbons to NO_x, reductions in NO_x will reduce Ozone. In the South Coast Air Basin, the lack of a commute on weekend mornings results in large reductions in early morning NO_x on the order of 30 to 50% while early morning HC is 20% less on weekends. However, on average, peak 1-hour ozone and 8-hour ozone levels are higher on weekends than on weekdays throughout the South Coast Air Basin. This is true despite the fact that This weekend vs. weekday phenomenon indicates that reducing NO_x more than HC increases ozone. Therefore, the large NO_x reductions from LEV II as currently proposed will increase both peak and overall exposure to 1-hour and 8-hour ozone concentrations above the air quality standards. ARB must commit to study the NO_x disbenefit issue in 1999. (AAMA)

Agency Response: This issue is addressed on pages II-63 and II-64 of the Staff Report as well as in its Appendix I. Several studies over the last two decades have documented that peak outdoor ozone concentrations are generally higher on weekends in the South Coast Air Basin (SCAB), when emissions of ozone precursors – NO_x and Hydrocarbons – are presumably lower. The "weekday-weekend difference" has recently been analyzed by ENVIRON International Corporation in a study sponsored by AAMA. Consistent with previous studies, the ENVIRON investigators found that outdoor levels of NO_x are lower (even more so than hydrocarbons) on weekend mornings than on weekday mornings. Based on what ARB believes to be an inconclusive analysis, they inferred that NO_x control is counterproductive to reducing ozone levels. However, there are observations reported by ARB staff and others that lead to different conclusions on NO_x control.

Many Sites in the SCAB show lower NO_x levels from 6 to 10 a.m. on weekends than during weekdays. While ozone peaks are generally higher on Saturdays than during the week, historically this has not been true at all monitoring sites. Furthermore, in a comparison of Saturdays to Sundays, lower morning NO_x coincides with lower ozone at some sites. These findings contradict ENVIRON's conclusion that lower NO_x invariably leads to higher ozone. Another observation that is inconsistent with ENVIRON's analysis is that ozone levels have declined in the SCAB – more than anywhere else in the world – in response to California's program to control emissions of both NO_x and hydrocarbons. Furthermore, over at least the past 15 years, ozone levels have declined on all days of the week and studies suggest that these reductions could not have been achieved through VOC controls alone.

The weekday-weekend effect is a complex, three-dimensional phenomenon that may be explained by differences in the amounts and timing of emissions during weekends as compared to weekdays. Anecdotally, traffic is higher on Friday night than during the rest of the week, and the resulting additional emissions may carry over to Saturday and create more ozone. Also, evidence is emerging that passenger cars are driven similar numbers of miles (within 80 to 90 percent) each

day of the week, but that the weekend activity occurs later in the day when ozone formation from NO_x is more chemically efficient. This observation would help explain why NO_x levels are lower on weekend mornings and ozone is higher, although it is also likely that NO_x emissions from diesel-fueled vehicles are reduced due to lower truck activity. Examination of diurnal patterns of ozone and NO_x supports this explanation, and evidence from recent smog chamber studies underscores the sensitivity of peak afternoon ozone concentrations to mid-day NO_x emissions.

In the absence of tested emission inventories for each day of the week, our current understanding of the weekday-weekend difference is far from complete. Thus, to state any conclusions on control strategies with certainty is not appropriate at the present time. The ARB funded two studies with the University of California at Los Angeles on the weekday-weekend difference, and staff conducted several analyses, but again no definitive conclusions could be reached without day-of-week emission inventories. During the summer of 1997, the ARB funded a study with the University of California at Davis to collect vehicle activity each hour of the week throughout southern California. This extensive database is currently being analyzed at Davis, and a more definite understanding of day-of-week emissions will be achieved within a year.

The statement that weekday-weekend differences may be the controlling factor for SIP attainment demonstration is incorrect. In 1998, a relatively clean year, there were 60 days when the standard was exceeded at one or more locations in the SCAB. Of these, the majority of exceedences of the federal 1-hour standard occurred on weekdays. Furthermore, a recent ARB study showed that at many SCAB locations the Friday-Saturday difference shrank during the 1990's as overall ozone concentrations decreased. This implies that as further progress toward attainment causes ozone concentrations to decrease, the difference between weekday and weekend concentration will likely shrink even more.

Studies suggest that while VOC controls may be effective in reducing ozone formation in upwind urban areas, a combined strategy of VOC and NO_x reduction is necessary to decrease ozone concentrations in both upwind and downwind areas. This has important implications for the new 8-hour ozone standard, since exceedences can occur in downwind areas which do not exceed the 1-hour standard. This also suggests that combined hydrocarbon and NO_x reductions are necessary to reduce overall ozone exposure.

A number of projects related to weekday-weekend differences are already underway. In concert with the emissions inventory studies mentioned earlier, modeling staff of ARB and the SCAQMD are incorporating day-of-week emission inventories in their modeling efforts to support the 2000 SIP. Pursuant to the discussion at the November 5, 1998 Board meeting, the ARB initiated several new research projects to specifically address the subject of weekday-weekend ozone variation. Staff recently completed a study to quantify weekday-weekend differences and examine spatial patterns in the South Coast, San Francisco Bay Area, and Sacramento Valley. In addition, staff will follow up with further statistical analyses of air quality data and are considering a number of possible research projects.

57. **Comment:** I recommend that you delay or cancel action on the new LEV controls because the standards are scientifically unjustified. Controlling NO_x is counter productive with respect to ozone levels under South Coast Air Basin (SCAB) conditions. NO_x emissions should be increased to reduce ozone concentrations, and thereby make the proposed control of hydrocarbons unnecessary. Furthermore, there is no proof that increased NO emissions would increase nitrate aerosol concentrations and particulate nitrate is a non-issue with respect to possible health effects. The ARB should review published modeling studies involving higher NO_x vs. hydrocarbon ratios under the proposed standards. (William Innes)

Agency Response: It is clear that increases in NO emissions increase downwind concentrations of ozone. NO_x emissions within an urban area determine the total amount of ozone that is formed after the air moves downwind and the chemistry has run to completion, while VOC emissions and their reactivity control the rate of initial buildup of ozone. In the SCAB, depending on the meteorology of the specific episode, there may be significant recirculation of photochemically-aged air, and “downwind” can include a variety of locations due to the complexity of land-sea and mountain-valley winds, including reversals in wind directions above the surface. While NO emissions can decrease *local* ozone concentrations, they will lead to higher concentrations in the downwind portion of the basin. Scientific evidence and California’s successful dual (NO_x and VOC) control program indicate that control of both NO_x emissions and HC emissions is appropriate and efficient for reduction of ozone concentrations that exceed the federal standards. Peak ozone concentrations are generally NO_x-sensitive in most regions. Furthermore, there is ample evidence that increased NO_x emissions will lead to higher nitrate concentrations. Therefore, control of NO_x is generally an appropriate option when particulate nitrate causes either the mass of PM₁₀ or PM_{2.5} to exceed federal health standards. Since current research results indicate that particulate mass is an appropriate metric for protection of public health from exposure to particulate matter, ARB does not believe that particulate nitrate is necessarily benign.

(s) Smog Index Label

58. **Comment:** It is important that consumers be aware of the differences in emission performance of all the new cars, and we urge you to try to improve the sticker that now appears on cars in a variety of mostly unintelligible fashions. The current implementation of the Smog Index label allows too much latitude to manufacturers. The result is information that is confusing, or worse yet, misleading. In LEV II, ARB should more exactly specify the look and content of the current “Smog Index label” in order to make it clear, uniform and concise. (California Council for Environmental and Economic Balance (CCEEB)).

Agency Response: The amendments to the Smog Index label requirements adopted in this rulemaking are designed to increase consumer awareness and understanding of the label, clarify the label format, and reflect the requirements of LEV II.

59. **Comment:** VW continues to question the value of the Smog Index Label. Under the existing Smog Label provisions, diesel vehicles had a favorable index of less than 1.00, resulting from low NMOG emissions and essentially no evaporative emissions component. The revised Smog Index applicable to essentially the same vehicle (Tier 1 diesel vehicles, evap exempt), in the 2000 through 2003 model years, is 1.82 for passenger cars and light-duty trucks. This is but one example of the confusion that may result from the revisions to the Smog Index label provisions. (VW)

Agency Response: The Smog Indices were adopted in 1995 to provide consumers with an indication of the relative contribution of new light-duty vehicles to smog formation based on exhaust NMOG, NO_x 50,000 mile emission standards and the evaporative HC emission standards to which these vehicle are certified. While diesel vehicles do not have evaporative HC emissions, Tier 1 diesel vehicles certify to an optional NO_x standard that is significantly higher than their Tier 1 gasoline counterparts. This was overlooked in the original Smog Index requirements and has been corrected in these amendments.

60. **Comment:** ARB should maintain a constant baseline. Changing the baseline will create confusion, especially given that vehicles from more than one model year vehicles will be on a dealer's lot at the same time. For example, some 2000 model year vehicles will have a higher smog index value than some 1999 model year vehicles even though the 2000 model year vehicles will be cleaner. The same situation will apply between 2003 and 2004 model years. This will undercut credibility of the smog index label. (AAMA, AIAM)

Agency Response: The baseline value for the smog indices represents the highest emission category to which a new vehicle can certify. Accordingly, when the Smog Indices were originally adopted in 1995, the baseline value was assigned to Tier 1 vehicles certified to the two hour evaporative standards. Beginning with the 1999 model-year, all new vehicles will be certifying to the new enhanced three day diurnal evaporative emission standards. Therefore, it is appropriate to reassign the baseline to reflect this change. Furthermore, since the TLEV category has been eliminated beginning in model-year 2004, it is appropriate that the baseline be reassigned in that model-year to LEV I LEV, the least stringent remaining emission category. With these changes to the baseline, the smog indices will more accurately reflect the relative emissions of vehicles in the new vehicle fleet. While the changes in the baseline for model-years 2001 and 2004 may result in a temporary discontinuity in vehicle smog index ratings, staff does not believe that this will diminish the value of the information provided to the consumer.

61. **Comment:** ARB's proposal to add the average smog index to the bar graphic will make it too difficult for customers to read the label where the average is close to the vehicles index. ARB should allow the average to be listed in the note below the graphic or other acceptable locations. (AAMA, AIAM)

Agency Response: We believe that there is enough flexibility in the label format requirements to accommodate the situation to which the commenter is referring. Staff will work with manufacturers to assure that the labels are clear and understandable to the consumer.

62. **Comment:** ARB's proposal to change the range of the bar graphic to 0-3 because the highest smog index of new vehicles is 2.64 inappropriately focuses the smog index on new vehicles only. Because customers may consider used as well as new vehicles, when making their purchase decision, the range of the bar graphic should be based on the range of both new and used vehicles. ARB certainly would not want a consumer to purchase a much higher polluting used vehicle instead of a new vehicle. In addition, the legislation that prompted ARB to require smog index labels focused on used as well as new vehicles. (AAMA, AIAM)

Agency Response: The smog index label requirements are applicable to new vehicles only. Accordingly, the proposed range for the bar graphic is appropriate.

(t) Direct Ozone Reduction Technology

63. **Comment:** We urge ARB to drop any proposals to incorporate PremAir™ catalyst technology into the LEV II regulations at this time. ARB should conduct additional scientific analysis to evaluate the effectiveness and real world durability of the PremAir™ catalyst before recommending changes in regulations that would incorporate catalyst technology. First, ARB should test the PremAir catalyst to ensure that it can meet the same in-use durability and warranty requirements as conventional emission control systems. Second, ARB should conduct additional studies to evaluate the catalyst's overall contribution to strategies to achieve ozone and fine particulate air standards and the ability of current modeling programs to accurately predict ozone reductions that could be achieved by catalyst use. Until these studies are completed, it is premature to recommend any credits for PremAir catalyst use. We would like the process for finalizing the credit for ozone-eating technologies be a stakeholder open process. (Union of Concerned Scientists, NRDC, Sierra Club, Cal-PIRG, Coalition for Clean Air, Environmental Health Coalition)

Agency Response: Direct ozone reducing technologies are a recent development and quantifying the air quality benefits from their use presents a unique challenge. Accordingly, the provisions in section 1961(a)(12), title 13, CCR, for certifying direct ozone reducing technologies are designed to assure that the assigned NMOG credit is not overstated. The air quality benefits, therefore, must be quantified by an approved airshed model with the appropriate modifications. In addition, the certification requirements are patterned after the requirements applicable to any vehicle emission control system in that the manufacturer must demonstrate the performance and durability of the device, provide an appropriate warranty, and provide an on-board diagnostic (OBD) monitor.

64. **Comment:** With regard to the “ozone-eating” catalyst provision of the LEV II proposal, special consideration should be given towards the implementation details to ensure that the air quality benefits are real and quantifiable. (SCAQMD).

Agency Response: We agree, and plan to do so.

65. **Comment:** Since ozone reduction technologies may be better suited for continuous-use applications, such as rooftop office building air conditioning, the Board should direct staff to study the utility and durability of such technologies in continuous-use applications. (AAMA)

Agency Response: The ARB is currently monitoring several on-going studies designed to determine the effectiveness of direct ozone reducing technologies in continuous-use applications.

(u) Miscellaneous

66. **Comment:** ARB has failed to consider the effects of the LEV II NOx standards on fuel economy. Overly stringent NOx controls effectively prohibit the use of the most promising fuel economy improvement technologies. The most promising engine technologies for fuel efficiency operate at air fuel ratios leaner than stoichiometry which causes NOx reduction catalyst to perform less efficiently. (AAMA)

Agency Response: The Board received and considered comment and testimony from proponents direct-injection/lean burn engine technologies (both diesel and gasoline) that have greater fuel efficiency but emit greater levels of NOx. The Board concluded that it could not justify the substantial loss of NOx reductions that would result from a TLEV NOx standard on the order of eight times the NOx standard for LEV II LEVs. Since there are no new light-duty trucks and very few passenger cars are certified to California emission standards and marketed in California, the Board’s action does not eliminate fuel-efficient technologies now prevalent in that sector of the vehicle fleet.

While diesel vehicles are more fuel efficient and accordingly have lower greenhouse gas emissions, and also have inherently lower evaporative emissions than gasoline vehicles, these benefits come at the expense of higher NOx and particulate emissions. The Board needs to address those NOx emissions in order to meet our SIP commitments and move towards attainment of the state ambient ozone standard. However, the absence of diesel and GDI technologies would not mean that California must forgo improvements in fuel efficiency in the light-duty fleet. Other technologies such as gasoline-powered hybrid electric vehicles and fuel cell vehicles offer comparable fuel efficiency and still emit very low levels of regulated exhaust emissions. And since the LEV II evaporative requirements essentially eliminate fuel related evaporative emissions from all gasoline vehicles, the comparative evaporative emission benefits of diesels will become less significant.

67. **Comment:** The additional compliance and durability provided by 150,000 mile certification justifies setting the optional TLEV 150,000 mile standard at the 120,000 mile standard level (i.e., 0.156 g/mi NMOG and 0.6 g/mi NO_x for TLEV), not a lower value like ARB has proposed for NMOG and NO_x. Because of the additional compliance and durability provided by 150,000 mile certification, this option should be considered neutral from an air quality standpoint, and should be made available for all standard categories, not just TLEV. Therefore, AAMA recommends changing the 150,000 mile standards to be equal to the 120,000 mile standards for all constituents and making this option available for all standard categories (i.e., TLEV, LEV, ULEV and SULEV). Such vehicles would only have to comply with the 150,000 mile standard and would be eligible to receive supplemental fleet average NMOG credit of 15%. (AAMA, Chrysler)

Agency Response: Staff proposed the optional TLEV standard to accommodate diesel vehicles in the LEV II regulations. Diesel vehicles do not exhibit significant emission increases with mileage, rather their emissions are relatively flat over their useful life. However, since diesel vehicle emissions at low mileage are significantly higher than those of a comparable gasoline vehicle, setting the 150,000 mile standards equal to the 120,000 mile levels would not be neutral from an air quality standpoint. Therefore, to offset the higher low mileage emissions expected from diesel vehicles, the 150,000 mile standards were adjusted to be lower than the 120,000 mile levels. In any case, after considering the comments at the hearing, the Board decided to eliminate the TLEV standard beginning in 2004 for the reasons explained in Section II.B.1 above. Consequently, the optional 150,000 mile TLEV standard is no longer applicable.

Regarding the commenters suggestion that all emission categories be able to certify to a single 150,000 mile standard, discussions with automobile manufacturers, emission control system manufacturers and other industry experts indicate that the 50,000 mile standard is more difficult to meet than the 120,000 mile standard. This is because emissions from gasoline vehicles deteriorate more rapidly between 4,000 miles and 50,000 miles than between 50,000 and 120,000 miles. Therefore, dropping the 50,000 mile and 120,000 mile requirements would serve to increase vehicle lifetime emissions appreciably.

68. **Comment:** ARB revised its ZEV credit plan by increasing the credit for ZEVs with an extended range and deleting the existing provision that allows credits for batteries with high specific energy. While range is a critical customer acceptance criterion for widespread introduction of EVs, there are situations when range is less important (e.g., station cars). For these situations, manufacturers should continue to receive additional ZEV credits for using high specific energy batteries. Furthermore, continuing additional ZEV credits for using high specific energy batteries would provide an incentive to develop these batteries. Since some manufacturers utilized or plan to utilize the battery capacity option for acquiring early ZEV credits, ARB's action may adversely impact manufacturers' product plans by deleting this option at this late date. Vehicles that have quick charge batteries should also get credits because customers of these vehicles do not have to rely as much on extended range. (AAMA)

Agency Response: The LEV I program provided multiple ZEV credits to those ZEVs that were equipped with high specific energy batteries in order to incentivize the development and early introduction of these advanced batteries. However, based on discussions with environmental groups and other interested parties, consensus developed that the ARB should provide multiple credits to ZEVs based on vehicle performance rather than a technology-specific parameter such as specific energy. One such vehicle performance measure is the ZEV's all-electric range, which is one of the most important characteristics to consumers. Consequently, to encourage the development of EVs with significant range, we have staff dropped the provision to base multiple ZEV credits on specific energy.

To provide incentives in appropriate circumstances for batteries that have quick charge capability, we have incorporated the modification described in Section II.B.18.

69. **Comment:** The Advanced Lead Acid Battery Consortium has some ideas in terms of increasing the flexibility with regard to ZEVs and we've had discussions with staff and they've agreed to continue those discussions and move forward in terms of additional range and addressing the fast recharge capabilities. (Advanced Lead Acid Battery Consortium)

Agency Response: As a result of this comment, we have made the modification described in Section II.B.18.

70. **Comment:** The proposed Regulation Order and Exhaust Emission Standards and Test Procedures do not provide a mechanism for the disposition of vehicle equivalent NMOG credits and debits from the 2004-2006 model years. The regulatory text should be revised to reflect ARB intent to require all vehicle equivalent NMOG debits incurred from 2004-2006 to be equalized by 2007. (AAMA)

Agency Response: We agree. This oversight was corrected in the modifications to section 1961(c)(3)(A), title 13, CCR, and to section I.3.3.1 of the Exhaust Standards Test Procedures made in connection with the first 15-day notice (see p. 10 of Attachment I to the first 15-day notice).

71. **Comment:** The LEV and TLEV options of the LEV II exhaust emission standards in the Staff Report do not agree with the corresponding categories of the LEV II exhaust emission standards in Title 13, CCR and the Exhaust Standards and Test Procedures. After the LEV II standards are adopted, all pertinent documents should be corrected. (AAMA)

Agency Response: We agree. The appropriate corrections were included in the modifications to the tables in section 1961(a)(1), title 13, CCR, and in section E.1.1.2 of the Exhaust Standards and Test Procedures made in connection with the first 15-day notice (see p. 3 of Attachment I to the first 15-day notice).

72. **Comment:** We ask the staff to remove the requirement for the statutory low-emission vehicle label required by the state. This is redundant of the smog index label. (AIAM)

Agency Response: Although we agree it would be appropriate for the statutory LEV provisions in Health and Safety Code sections 43800 and 43802 are outdated, a change to the statutes is beyond the scope of this rulemaking.

73. **Comment:** We are all aware of the smog in metropolitan areas but those of us living in rural California do not need these added expenses in controls. Each county should be allowed to set their own standards for the residents that live there. (Pat Dahms, Frederick Barley)

Agency Response: Even though this rulemaking addressed the requirements of SIP Measure M2 which applies only to the South Coast Air Basin, all areas of the State will benefit from the emission reductions of LEV II. The authority to establish emission standards for new motor vehicles is vested with ARB at the state level. Moreover, it would be extremely difficult and burdensome to administer a program where vehicles sold in different parts of the state would be subject to different emission standards.

74. **Comment:** I oppose changes to the HEV Test Procedures. Continually changing and revising these standards makes producing this technology more difficult and uncertain. (John F. Quilter)

Agency Response: The revisions to the HEV Test Procedures were the result of extensive discussions with the automobile industry and we believe that a consensus has generally been achieved on the proposal presented to the Board.

75. **Comment:** The California Electric Transportation Coalition does not support the proposed requirement that an electric vehicle (EV) manufacturer submit DC energy data because it increases an EV manufacturer's certification burden. (CalETC)

Agency Response: This requirement has been included to enable the ARB to gather information regarding battery, charger and drivetrain performance, so that the efficiency and operating characteristics of the vehicle can be assessed effectively. An inefficiently designed electric vehicle could adversely impact air quality because it would require more energy to operate. This information can also be used to determine the deterioration characteristics of in-use EVs, thereby providing important information on the air quality benefits of these vehicles. We do not believe that this requirement significantly increases the manufacturers, certification burden, since they are already providing this information to gain additional ZEV credits under the terms of the 1996 ZEV Memoranda of Agreement. Furthermore, manufacturers will need to generate this data to monitor the performance of their EVs.

2. **Evaporative Emissions Requirements`**

(a) Technological Feasibility

76. **Comment:** ARB staff has not demonstrated feasibility for its proposed evaporative emission standards. ARB's proposed standards cannot be adopted because there has been no showing of feasibility. (AAMA/AIAM)

There are substantial disagreements between the industry and ARB staff on several issues associated with setting evaporative emission standards. The main difference is background emissions with additional differences in fuel-related evaporative emissions and the amount of necessary compliance margin. These differences exist primarily because existing data are sparse and inconsistent. (AAMA/AIAM)

ARB's proposal does not sufficiently account for background emissions or vehicle test variability. (AAMA)

The industry believes the best solution is to set standards based upon appropriate test data; however, such data do not currently exist. Thus, we proposed a test program with ARB to determine the ultimate level of evaporative emission control. The outcome of this program would lead to a consensus for changes in evaporative emission standards and procedures. (AAMA/AIAM)

We recommend that ARB adopt evaporative emission standards reflective of the capability of the industry. (VW)

We recommend that ARB enter into a comprehensive study with the auto industry to establish the appropriate values for non-fuel background emissions and determination of the true evaporative emission control capability for systems that are both technologically feasible and suitable for mass production. (VW)

Agency Response: ARB disagrees with the industry's assertion that the proposed evaporative emission standards are not based on a robust empirical demonstration. During the early stage of regulatory development, staff conducted public workshops and individual meetings with the major automotive manufacturers to gather information regarding current and advanced evaporative emission technology, non-fuel background evaporative emissions data, and other information pertinent to establishing appropriate evaporative emission standards. In addition, staff conducted a literature review to gather published information regarding potential evaporative emission reduction strategies. Besides this preliminary review of available data on evaporative emission control, staff conducted four test programs to supplement the available information. Including manufacturers' and literature data along with the ARB test data, more than 30 vehicles were evaluated and tested.

The first test program, described on pages III-7 - III-9 of the Staff Report, investigated potential emission reductions by improving evaporative emission control components on four 1998 model-year passenger cars.⁶ Evaporative emissions decreased, on average, 35 percent. A second test program was conducted after issuance of the Staff Report to address industry concerns that staff did not use production-type components to demonstrate feasibility. This study consisted of testing a 1998 model-year Toyota Camry modified with currently available lowest-emitting fuel and evaporative components. The results of the study were shared with industry and presented at the hearing — with state-of-the-art components compared to the original equipment manufacturer components, emissions decreased 58 percent from 0.53 to 0.22 grams per three-day diurnal-plus-hot-soak test. This level is well below the proposed LEV II standard of 0.50 grams per test.

The third test program evaluated non-fuel background emissions of a wide range of vehicle types from a compact passenger car to one of the largest sport utility vehicles. Vehicles representing 21 vehicle models were tested. The data, described on pages III-15 - II-18 of the Staff Report, were used to adjust the proposed evaporative standards to include the stabilized non-fuel emission levels from the different vehicle categories. An additional test program investigated emission variability by testing five different vehicles of a single vehicle model (Toyota Corolla) that already complies with the proposed standards. Industry representatives had continued to comment that the evaporative emission variability is so high that it is difficult to duplicate emission results from one vehicle to another. The test results, made available to industry and presented at the hearing, showed that variability from vehicle to vehicle was relatively low, and the headroom allowed in the proposed standard sufficiently accounts for the observed variability. Finally, the primary data set used to determine the compliance margin was an extensive study conducted by Ford Motor Company on nine current-technology Crown Victoria vehicles tested at various mileage points from 4,000 to 129,000 miles. The compliance margin estimated in this extensive study was used for the proposed evaporative standard. (Staff Report, Section III.C.5.)

Based on the comprehensive ARB test programs and manufacturers' data, the technological demonstration conducted by staff contained the key elements to sufficiently show the feasibility of the proposed evaporative standards. Thus, a second comprehensive test program, as recommended by industry, would not provide substantially greater insight to the feasibility demonstration of the proposed evaporative standards. Additionally, to continue to ensure that the proposed evaporative standards are feasible in the 2004 model-year time frame, the ARB will be conducting its biennial review of these evaporative standards.

77. **Comment:** We do not believe that picking one or two “star performers” is a prudent way to develop the proposed evaporative standard. At this point, we are not really sure how to get the rest of our lineup to look like the star performers. As such, we may be forced to limit our vehicle model lineup in the California market in order to comply with the proposed evaporative

⁶ Testing on a fifth vehicle — a Honda Civic — was not completed due to vehicle malperformance (as determined by Honda representatives).

regulation. We think there may be opportunities for improving the evaporative system, but we do not think ARB staff's suggestions present all the answers. (AAMA/AIAM)

Manufacturers believe that the proposed LEV II evaporative standards are not feasible for all vehicles. Although a handful of vehicles tested by ARB performed at the proposed standards, similar vehicles from the same manufacturer with identical evaporative control systems did not meet the proposed standards. (AAMA/AIAM)

Agency Response: As staff stated at the hearing, approximately 20 percent of the certified 1999 model-year passenger cars have certified evaporative emission levels lower than the proposed standards. In addition, one of the largest SUVs, the 1999 model year Chevrolet Suburban, complies with the proposed evaporative standard in its vehicle category.

The ARB test programs demonstrated the ability of improved materials and components to reduce evaporative emissions for compliance with the proposed evaporative standards. The evaporative standards were determined based on the reduced evaporative emission values obtained using these advanced evaporative/refueling components. While the feasibility was demonstrated for current model-year vehicles evaluated in the test programs, it would be very difficult to show in ARB test programs that all of the different vehicle models can comply with the proposed standards due to the tremendous amount of resources and time required. Manufacturers are given more than four calendar years for additional development of the advanced technologies tested in the ARB test programs and of other potential technologies that may be used in their vehicles. To ensure that the technology continues to advance and sufficient lead time is allowed, the ARB will be conducting a biennial review of the evaporative standards.

78. **Comment:** Many technologies used by ARB to reach its proposed evaporative standards are already widely used by industry or are not feasible. (AAMA/AIAM)

Many of the technologies suggested by ARB to reduce evaporative emissions have already been adopted or are not feasible from a technology, mass production, "repairability" standpoint. In addition, adoption of technology that may have the potential to better control evaporative emission losses may have a negative effect on vehicle utility and customer satisfaction. (VW)

Agency Response: Staff acknowledged in the Staff Report that some of the potential technologies required for compliance with the proposed evaporative standards were already being used on some vehicles today. These potential technologies, however, were not concurrently being used together on the same vehicle to achieve the lowest possible evaporative emissions. For example, one of the potential technologies was the use of an air intake carbon filter to reduce engine breathing loss emissions. General Motors had used a monolith coated with activated-carbon on a limited number of production 1995 2.2 liter Chevrolet Cavalier and Pontiac Sunfire vehicles. Although this improved component was used to reduce evaporative emissions, the fuel and evaporative components on the vehicle, such as the construction of fuel hoses, did not represent the lowest-permeation technology. Use of additional technologies to reduce

evaporative emissions would be required for compliance with the proposed evaporative standards. The fact that many of the potential technologies are already being used in today's vehicles shows that these technologies are viable and cost-effective. The use of combinations of the potential technologies together will allow compliance with the proposed evaporative standards.

79. **Comment:** We exclusively use plastic molded fuel tanks on our vehicles. However, the proposed standards are too stringent such that they are not currently achievable with plastic fuel tanks. So we actively have to see if we have to change over our cars to steel fuel tanks, causing a major redesign in the car. (VW)

Agency Response: As discussed on page III-12 of the Initial Statement of Reasons, several methods may be used to reduce evaporative emissions from plastic fuel tanks. Current certification data show that, on average, whole-vehicle evaporative emissions are approximately 0.8 grams of hydrocarbons per diurnal-plus-hot-soak test. It is estimated that about 0.2 grams of the total evaporative emissions are attributed to permeation losses of the plastic fuel tanks. Fuel tank emissions consist primarily of roughly 0.1 grams from the fuel tank shell and 0.1 grams from the joints of components attached to the tank. Currently, a barrier layer to fuel vapors made of ethylene vinyl alcohol (EVOH) is used in the multi-layer construction of plastic fuel tanks. To reduce emissions from the fuel tank shell, improvements to barrier layer technology are needed. The cost analysis in the Staff Report includes the added cost to improve the barrier layer to a lower-permeating barrier technology. Furthermore, reductions to permeation losses through the joints could be accomplished by using better sealing connections, lower permeation gaskets and seal, and low-permeation pieces for welding components to the plastic fuel tank.

Additionally, since the proposed evaporative standards are whole-vehicle standards, manufacturers have the flexibility to reduce emissions from sources where it would be most cost-effective and efficient without a major redesign of the entire fuel system. Thus, for vehicles with plastic fuel tanks, potential technologies are available to reduce tank emissions as well as to reduce emissions from other sources to comply with the proposed standards.

80. **Comment:** ARB's proposed 0.5 grams per test standard would require passenger cars to average 0.33 grams per test to provide for even half of the normal compliance margin. This contradicts their data which show average emissions will not go below 0.65 grams per test. (AAMA/AIAM)

Agency Response: Section III.C. of the Staff Report discusses the test programs conducted to develop the proposed evaporative standards. Nowhere in the report is it stated that average evaporative emissions will not go below 0.65 grams per diurnal-plus-hot-soak test. Average emissions on one of the test programs were reduced to 0.30 grams per test while average emissions on another test program were 0.20 grams per test. Test data from both these test programs were used to develop the evaporative standards. As discussed in the Initial Statement of Reasons, assuming a 1.5 times compliance margin (determined based on the nine-car Ford

Crown Victoria analysis), evaporative emissions would need to average 0.35 grams per test for passenger cars to comply with the proposed evaporative standards.

81. **Comment:** We are concerned that the methodology used to develop the non-fuel emission values in the ARB staff report is not representative. First, the data set is limited. Second, the test results depend only on the 24-hour diurnal emissions (with the exception of two vehicles that included hot soak results). ARB staff draws a conclusion regarding the influence of hot soak emissions on the passenger car data set from these results of the two vehicles that were subject to an alternative hot soak procedure. (VW)

Agency Response: The non-fuel background test data are described on pages III-15 - III-17 of the Staff Report. We believe that the non-fuel background data set sufficiently represents the levels from the majority of the population. Non-fuel background emissions are hydrocarbon vapors that originate from the vehicle tires, body paint, interior trim, and other sources. First, to evaluate the non-fuel background levels of vehicles, staff conducted a literature search, met with automotive manufacturers to solicit information, and performed a test program at the Hagaan-Smit Laboratory. As discussed in the Staff Report, 16 vehicle models were represented including seven passenger cars, six light-duty trucks, and three light medium-duty vehicle models. Vehicles representing an additional five vehicle models were tested subsequent to the publication of the Staff Report but before the Board Hearing. In all, test data from 26 vehicles were available for evaluation of non-fuel background emissions. Thus, the non-fuel emission data set includes a wide range of vehicle models.

Second, as noted by the commenter, hot soak non-fuel background data on gasoline-fueled vehicles were only available from two manufacturers on a total of two vehicles. Little industry data were available, most likely due to the assumption that hot soak background emissions are very small in magnitude compared to the diurnal background emissions because the hot soak test is so short (1 hour versus 24 hours diurnal test). At the ARB, hot soak background testing could not be conducted on a gasoline-fueled vehicle, due to the difficulty in eliminating the fuel evaporative sources during the test. Based on limited data from the two vehicles, non-fuel background emissions were estimated to be 0.04 grams per hot soak test. Data from an additional vehicle, a prototype Mitsubishi hybrid-electric vehicle, supported this estimate, because its fuel-plus-non-fuel hot soak emissions were only 0.03 grams per test (thus, non-fuel hot soak emissions must be less than 0.03 grams per test).

82. **Comment:** In the analysis of non-fuel background emissions, ARB determined that these emissions were between 0.19 and 0.47 grams per test. Elsewhere in the Staff Report, ARB considers a non-fuel background emission level of 0.35 grams per test appropriate for a vehicle certified to the proposed “zero” evaporative level. (VW)

Agency Response: The Staff Report does not state anywhere that non-fuel background emission range would be from 0.19 to 0.47 grams per diurnal-plus-hot-soak test. In the data set containing information from literature, manufacturers, and the ARB test program, the

ranges of non-fuel diurnal-plus-hot-soak emissions are 0.12 to 0.26 grams per test for passenger cars, 0.15 to 0.38 grams per test for light-duty trucks, and 0.23 to 0.70 grams per test for light medium-duty vehicles. The following methodology was used to ensure that the non-fuel emission levels used for the standards-setting purpose represented the vast majority of vehicles. First, the average value of the vehicle category was determined. Then, the standard deviation of the vehicle category data set was calculated and added to the average non-fuel emission value. Finally, a compliance margin that incorporates the main factors that contribute to emission variability was applied. For example, in the case of passenger cars, the average non-fuel emission value of seven vehicle models was 0.19 grams per diurnal-plus-hot-soak test. With a standard deviation of the passenger car data set at 0.05 and a 1.5 times factor compliance margin, the estimated non-fuel emission portion of the proposed 0.50 grams per test evaporative standard is 0.35 grams per test.

83. **Comment:** ARB has biased its evaporative study by only including those data points that support its proposal. Where the same vehicle had high and low data points, ARB chose to use only the low data points. (AAMA/AIAM)

Agency Response: In the ARB test programs, vehicles were tested and the final emission results were used without bias regardless of whether they were high or low values. Typically, duplicate testing was conducted to ensure accuracy of measurement, and the two tests would be averaged to obtain the final data value. The variability of the duplicate tests under the same conditions was normally very low. In unusual circumstances when duplicate tests were significantly different, further investigation would be conducted to determine the cause of the high variability. The commenters have not identified any specific instance in which only low data points were inappropriately used.

84. **Comment:** We know of no technology that could be mass-produced and comply with the zero-evaporative standard requirements proposed for super ultra-low emission vehicles (SULEVs) to generate partial zero-emission vehicle (ZEV) credits. The zero-evaporative standards are not achievable using steel or plastic fuel tanks. Thus, the zero-evaporative standards are not technologically feasible for the 2003 model year. VW recommends that ARB adopt the same evaporative emission standards for partial ZEV allowance SULEVs as those applicable to all other categories of LEV II vehicles. (VW)

Agency Response: The proposed zero-evaporative standards are optional standards that a manufacturer may choose to comply with for incentives, such as the partial ZEV credits. These optional standards would promote the use of advanced technologies such as improved fuel/evaporative systems that are capable of eliminating fuel evaporative emissions. Advanced technology may include but is not limited to negative or positive pressure fuel/evaporative systems and bladder fuel tanks.

Since the zero-evaporative standards are optional requirements, only a limited technology review was conducted for these standards. Staff tested a prototype Mitsubishi hybrid electric vehicle that would likely comply with the zero-evaporative requirements. Measured fuel plus non-fuel

evaporative emissions were 0.13 grams per diurnal-plus-hot-soak test. Although non-fuel emissions were not measured on the Mitsubishi vehicle, testing of a similar size Honda EV Plus showed non-fuel background emission levels of 0.08 grams per diurnal-plus-hot-soak test. If the Mitsubishi vehicle non-fuel emissions are similar to that of the Honda EV Plus, then the Mitsubishi fuel evaporative emissions would be approximately 0.05 grams per diurnal-plus-hot-soak test. Thus, the Mitsubishi vehicle is very close to complying with the zero-evaporative standards. Note that the Mitsubishi is a prototype vehicle and all of its technology may not be feasible for production purposes. Additionally, as mentioned in the response to Comment 43, two manufacturers are planning on producing a vehicle meeting the exhaust and evaporative partial ZEV requirements in model year 2000.

(b) The Vehicle Manufacturers' Alternative Proposal

85. **Comment:** Industry is offering an alternative evaporative emissions proposal that should be implemented pending completion of a cooperative ARB-industry test program that would determine appropriate evaporative emissions standards and test programs. The alternative proposal would reduce the diurnal + hot soak evaporative emissions standards by over 50% across the board for all vehicles <14,000 lbs. (see the table below). Emissions durability would be extended by 50% to 150,000 miles or 15 years, whichever occurs first. There would also be a modified phase-in schedule (AAMA/AIAM)

The risk if ARB staff is wrong is very high, with unknown cost, lead-time, and workload, even potentially precluding sales of some vehicles in California. The risk if the industry is wrong is only 0.4 tons per day in equivalent tailpipe non-methane hydrocarbon emissions in 2010.
(AAMA/AIAM)

AAMA/AIAM Proposed Evaporative Emission Standards^{1,2}

Class of Vehicle	Hydrocarbon Standards		
	Three-Day Diurnal + Hot Soak (grams per test)	Two-Day Diurnal + Hot Soak (grams per test)	Running Loss* (grams per mile)
Passenger Cars	0.50 <u>0.95</u>	0.65 <u>1.2</u>	0.05
Light-Duty Trucks (under 8,501 lbs. GVWR)			
under 6,000 lbs. GVWR	0.65 <u>0.95</u>	0.85 <u>1.2</u>	0.05
6,001 - 8,500 lb. GVWR	0.90 <u>1.2</u>	1.15 <u>1.5</u>	0.05
Medium-Duty Vehicles (8,501 - 14,000 lbs. GVWR)	1.00 <u>1.5</u>	1.25 <u>1.7</u>	0.05
Heavy-Duty Vehicles (over 14,000 lbs. GVWR)	1.00 <u>1.5</u>	1.25 <u>2.25</u>	0.05

* The running loss standards are unchanged from current requirements and are shown to illustrate the full set of evaporate standards for compliance purposes.

(1) Useful life requirement for evaporative emission standards are 15 years or 150,000 miles whichever occurs first. Similar to the procedure followed for exhaust compliance, the manufacturer would demonstrate full 15 year/150,000 mile useful life compliance for certification, backed up by an in-use compliance testing liability of 11 years/110,000 miles.

(2) Evaporative emissions are phased in 40% in model year (MY) 2004, 80% in MY 2005, 100% in MY 2006+ 25% in MY 2004, 50% in MY 2005, 75% in MY 2006, and 100% in MY 2007+.

Agency Response: We estimate that the staff's LEV II evaporative proposal will achieve emissions reductions of 2.4 tpd ROG in 2010 in the SCAB. A comparison with industry's proposed less stringent standards and phase-in schedule indicates the loss in emission would be considerable more than 0.4 tpd. The full projected emissions reductions are necessary for the 1994 SIP commitments and to attain the state ambient ozone standard in the SCAB at the earliest practicable date.

The regulatory process requires a showing of technological feasibility and cost-effectiveness of a proposal to reduce unreasonable risk to stakeholders. For the evaporative proposal, staff demonstrated the technological feasibility of the standards based on a robust data set of more than 30 vehicles. ARB test programs focused specifically on evaluating available technologies for reducing evaporative emissions. The estimated costs required for compliance with the proposed

standards were calculated based on the fixed and variable manufacturer costs, and dealership costs. The overall cost-effectiveness per unit of evaporative pollutants reduced was well within the acceptable range for mobile source control measures. Therefore, the comprehensive demonstration of the technological feasibility of the proposed evaporative standards, and the demonstration of cost-effectiveness, will significantly reduce the manufacturers' risk for complying with the proposed evaporative standards.

86. **Comment:** The phase-in of industry's proposed alternative evaporative emission standards is aligned with those of the exhaust emission standards (25/50/75/100% beginning in model year 2004). (AAMA/AIAM)

The misalignment of the evaporative and exhaust emission phase-ins creates development difficulties, especially for small volume engine families. Coordination of the phase-in schedules at 25/50/75/100% beginning in model year 2004 would be more appropriate from a development-timing development. (VW)

The evaporative phase-in requirements in the staff proposal (40%/80%/100% beginning in model year 2004) are overly and unnecessarily restrictive, and do not provide sufficient time to coordinate improved evaporative systems with normal manufacturer product cycles. In addition, the 40 percent requirement for the first year exposes too much of a manufacturer's fleet to unacceptable in-use risk. ARB must revise the evaporative phase-in to a four-year phase-in of 10/30/50/100% beginning in 2004. (AAMA/AIAM)

Modifications to the existing fuel system necessary to comply with the proposed evaporative emission systems would require a major redesign of the vehicle and could not be accomplished under the required time frame. (VW)

Agency Response: The first year of the required phase-in of the proposed LEV II evaporative standards — 2004 model year — allows more than four calendar years for manufacturers to modify vehicles to comply with the standard. Many of the projected advanced technologies for evaporative standards compliance are available today and already used on some vehicles. Thus, the 2004 model year time frame is a reasonable date for implementation of the standards. The compliance schedules for the exhaust and evaporative standards are different because most of the exhaust and evaporative emission control components are separate and do not interact with each other. Accordingly, the exhaust and evaporative emission control systems do not necessarily need to be modified together. However, there is significant overlap of the required phase-in schedules of the exhaust and evaporative proposals so that a manufacturer may still modify both the exhaust and evaporative components at the same time to comply with the LEV II requirements.

To provide additional flexibilities for the compliance of the proposed standards in addition to an allowance of a phase-in schedule, alternative phase-in schedules are allowed (§1976(b)(1)(F), note (3)(b)). Any alternative phase-in schedule that achieves at least equivalent credits as the

required schedule is allowed, where additional weighting is given for early introduction of compliant vehicles. In addition, compliance with the required and alternative phase-in schedules may be met with any mix of the applicable vehicles. In previous enhanced evaporative phase-in schedules, compliance was met based on two separate vehicle groups. Allowing compliance based on the entire fleet will provide increased flexibility for a manufacturer. Finally, the intermediate useful-life compliance standards will reduce in-use compliance risk for 2007 and earlier model year vehicles certified to the new standards. This allowance permits in-use emissions to be 1.75 times the adopted standards for the first three model year vehicles of a new evaporative family introduction (§1976(b)(1)(F), note (4)).

(c) Other

87. **Comment:** At present, there are still not a sufficient number of vehicles in-use certified to the enhanced evaporative emission standards at 10 years/100,000 miles. On this basis, Volkswagen suggests that it is premature to increase the useful life period for evaporative emissions. (VW)

Agency Response: The LEV II evaporative emissions proposal increases the durability requirements of the evaporative standards from 10 years or 100,000 miles, whichever first occurs, to 15 years or 150,000 miles, whichever occurs first. Current data show that more than 20 percent of the vehicle fleet in California is between 10 and 15 years old. Although these older vehicles are usually driven relatively less, substantial evaporative emissions continue to be emitted. In addition, the ARB's emission inventory shows that almost 20 percent of the total vehicle miles traveled in California are driven from vehicles that have accumulated between 100,000 and 150,000 miles.

The feasibility of the increased durability is shown from currently available in-use industry data and certification data. First, in a study conducted by Ford Motor Company, nine Crown Victoria vehicles were tested at various mileage points ranging from 4,000 to 129,000 miles. The data showed an average decrease of evaporative emissions from 4,000 to 100,000 miles of 0.25 grams per diurnal-plus-hot-soak test. (Staff Report, pp. III-19 - III-20.) These data suggest a possible decrease of evaporative emissions with mileage. This decrease may be attributable to "settling" of components, and to a decrease in vehicle background emissions with age.

Second, current certification durability testing shows an average deterioration factor of 0.14 grams per diurnal-plus-hot-soak test per 100,000 vehicle miles. (Staff Report, p. III-20.) Of note is that many of the deterioration factors reported were actually negative, indicating that evaporative emissions at the 100,000 miles were lower than at 4,000 miles. By convention, negative deterioration factors were reported as zero rather than the actual negative number. If the negative deterioration factors were factored in, the average certification deterioration factor would be far lower than 0.14 grams per test per 100,000 vehicle miles. The explanations for a decrease in evaporative emissions with age may again be due to the "settling" of components as the vehicle ages and to a decrease in non-fuel emissions with vehicle age.

88. **Comment:** We recommend that ARB establish evaporative and refueling emission standards based on NMOG emissions. (VW)

Agency Response: The current evaporative and refueling emission standards are based on total hydrocarbon emissions. Conversion of a given standard from total hydrocarbon to NMOG emissions requires substantial data to ensure a standard of equal stringency. Currently, insufficient data exist to adequately develop the correct conversion.

89. **Comment:** We would like to see the ARB consider specifying standardization of gas caps and a standardization of the materials used in the fabrication of gas caps. Misuse and the inability to tighten of gas caps, resulting in loose gas caps, can result in a significant emissions problem, contributing five million tons of gasoline vapors a year in the United States. (Dick Shaw)

Agency Response: Currently, gas caps are standardized at their interface with the vehicle fuel fill pipe to ensure compatibility with the refueling nozzle. The LEV II evaporative requirements do not propose additional specifications or emission criteria on fuel caps. Rather, the LEV II evaporative proposal requires additional control of evaporative emissions through whole-vehicle performance-based standards, which would include emissions from fuel caps. Performance-based standards, rather than specific design standards, allow greater flexibilities for manufacturers to use the most cost-effective methods to comply with the evaporative emission standards. It is likely that manufacturers will choose the lowest permeating materials for fuel caps and fuel hoses to comply with the stringent LEV II evaporative standards.

With regard to the concern of loose fuel caps, currently several measures are in place to minimize loose fuel caps. First, the evaporative leak check of the OBD II system can effectively detect if the fuel cap is loose and alert the driver. Second, in recent years automotive manufacturers have developed fuel caps that are easier to open and close, and this will reduce loose gas cap incidences. Finally, for those who have difficulty in opening and closing the fuel cap, currently available ergonomic devices may be used. These existing measures should be sufficient to satisfy concerns about loose fuel caps.

90. **Comment:** The table specifying evaporative emissions standards inadvertently omits 6,000 lbs. GVWR vehicles. This should be corrected by specifying the standards are applicable to vehicles less than or equal to 6,000 lbs. GVWR. (AAMA)

Agency Response: An appropriate correction to the standards tables in section 1976(b)(1)(F), title 13, CCR, and to section I.E.1.(d) of the Evaporative Emissions Standards and Test Procedures was included with the first 15-day notice (see p. 16 of Attachment I to the first 15-day notice).

3. CAP 2000

91. **Comment:** We believe the staff missed an important opportunity to accomplish greater reductions in workload, testing documentation and related staffing on the certification part of the compliance process. Recognizing that the proposed increased reliance on in-use testing, a process more approaching self-certification could better achieve the stated goals of CAP 2000. (AAMA, AIAM)

VW believes that even more can be done to alleviate the burdens associated with the certification process. Further transfer of responsibilities to the manufacturer and reduction in administrative burden would be in the spirit of certification streamlining and represent a move towards a true self-certification process. A mechanism for periodic review of the emission certification process and results should be undertaken on a regular basis. (VW)

Agency Response: CAP 2000 was the result of three years of intensive negotiation between U.S. EPA, ARB and the automotive industry. We believe that the proposed CAP 2000 modifications are the best compromise achievable between all the affected parties. Further, consistency with the U.S. EPA requirements is one of the objectives of the CAP 2000 Program, and the approach taken in the ARB test procedures, are to the extent feasible, identical to the final federal requirements published in the May 4, 1999 Federal Register (64 F.R. 23906).

92. **Comment:** We believe that staff should strengthen the manufacturer testing requirements of CAP 2000. California has laboratory analysis and testing capabilities that go beyond what EPA is able to require at a national level. Therefore, California's program should go beyond CAP 2000. California's testing program should include: assembly-line testing of engines, in-use testing of low mileage vehicles to insure on-road compliance before 2004; requirements to insure that in-use testing will cover a large enough number of engines to get statistically significant results; and requirements for sampling of engines from each model type, not just each engine family. While some of these elements are reflected in existing ARB protocols, they are not included in the CAP 2000 proposal before the Board. (Union of Concerned Scientists, NRDC, Sierra Club, Coalition for Clean Air, CAL-PIRG, Environmental Health Coalition)

Agency Response: We believe that the final CAP 2000 provisions strike an appropriate balance. Although the ARB staff plans to maintain its ongoing program for in-use testing of engine families identified as posing the greatest risk of violating the ARB's emission standards, it is not necessary for these tests to be formally included as part of the CAP 2000 program. One of the benefits of the CAP 2000 program is that it will enhance the staff's ability to focus its in-use testing on the highest risk vehicles.

The reason for discontinuing assembly-line testing is that with today's sophisticated electronic controls, emission testing at zero miles is not a good indicator of the ability of a vehicle to meet the standards in-use. In addition, the 100% functional test of all emission control components will still remain in effect and any misbuilds or any parts that are not operating within design parameters would continue to be detected by on-board diagnostic system checks conducted on the assembly-line. In-use testing at low mileage is also not a good indicator of a vehicle's ability

to meet the standards at high mileage. Manufacturers build a compliance margin into their emissions targets and it is expected that few, if any, vehicles will fail at low mileages unless there is a design flaw which would be detected by the functional test or OBD system on the assembly-line.

We agree that testing a statistically significant number of vehicles would provide definitive results on a vehicle's emissions; however, using a variety of predictive tools the ARB is currently able to identify approximately 90% of vehicle models that are failing in-use. Under CAP 2000, that percentage is expected to increase because of the addition of manufacturer-conducted in-use testing.

Finally, while we agree that receiving test data from every vehicle model would provide the best indicator of vehicles that do not meet the standards in-use, this would be a time-consuming and costly effort that would only provide a marginal benefit because manufacturer-conducted and ARB-conducted testing would cover the vast majority of all vehicle models. Again, using the predictive tools available to the ARB, any suspect vehicle model could be tested by the ARB even if not covered by manufacturer-conducted testing.

93. **Comment:** VW does not believe that the projected savings from CAP 2000 are proportionally distributed among the regulated manufacturers. In the case of VW, we have been unable to identify any savings resulting from CAP 2000. Although there are potential savings from elimination of the two percent quality audit, the requirements imposed by the federal fuel economy program will bring the total number of emission data vehicles and fuel economy data vehicles back to current levels. Moreover, elimination of the two percent quality audit does not necessarily mean that manufacturers will cease the practice of assembly-line testing.

VW does not currently possess, nor have a contractual agreement with, facilities capable of running the full range of tests required by the in-use test program. Moreover, additional personnel will be required to administer this program. (VW)

On the whole, we agree that there are some cost savings from CAP 2000. The cost savings are not uniform throughout the industry. In the aggregate, many manufacturers may incur a net increase in costs. Though each manufacturer will be affected differently by these changes, all are supportive of EPA and ARB regulatory harmonization. (AAMA, AIAM)

Agency Response: Staff believes that there are substantial savings from elimination of the 2% quality audit testing requirement. Any fuel economy requirements that manufacturers may have are implemented by the federal government and are not under the authority of the ARB. Even though it is expected that manufacturers will conduct some level of quality-audit testing, it will no longer be required by the ARB. Most manufacturers that do not have test facilities in California will need to contract with an outside contractor for in-use testing and will need additional personnel to administer the in-use test program. However, there will be a decrease in personnel needed for certification. These considerations were taken into account in determining

the costs of the CAP 2000 program, and staff believes on the whole the CAP 2000 program will provide substantial cost savings and a net decrease in the amount of personnel required to administer the program. The inherent differences among manufacturers with regard to product mix and sales volume necessarily means that a program such as CAP 2000 will not affect all manufacturers equally.

94. **Comment:** VW believes that the unique OBD certification application requirements represent an administrative burden that can be lessened. VW requests that ARB revise their extensive OBD systems description requirements to correspond with the reporting requirements proposed by U.S. EPA in CFR §86.1840. (VW)

Agency Response: Staff intends to review the OBD certification requirements at a hearing scheduled for early 2000 that will address industry concerns.

B. RESPONSES TO COMMENTS RECEIVED DURING FIRST 15-DAY COMMENT PERIOD

1. Elimination of the TLEV Categories — In General

95. **Comment:** ARB staff proposed TLEV emission standards with NO_x and particulate levels that would allow manufacturers the flexibility to continue to offer and further refine direct injection/lean burn technologies. In a suggested change presented at the November 5, 1998 hearing, staff recommended that these standards be increased in stringency in model year 2007 to address concerns regarding the long term impact of NO_x and particulate emissions from diesel vehicles. According to the staff, these standards would stimulate aftertreatment technologies that hold long-term promise for diesels and, we suggest, for other advanced direct injection/lean burn technologies. However, the Board failed to see the value in allowing this flexibility, voting to eliminate the LEV II standard entirely and eliminate the TLEV standard after the 2003 model year. (Alliance/AIAM,⁷ VW)

The net effect of eliminating TLEV standards is the preclusion, indeed the outright ban, of all diesel-fueled engines from the light-duty marketplace, the similar preclusion of certain gasoline technologies (e.g., direct injection), the elimination of much needed flexibility, the increased stringency of the LEV II standards, and the corresponding increase in costs in complying with the LEV II standards. (EMA)

While the TLEV standard is the most likely standard to be met by diesel-powered passenger cars and light-duty trucks in the near term, it is also necessary for other direct-injection/lean burn

⁷ The Alliance of Automobile Manufacturers (Alliance) superseded the American Automobile Manufacturers Association (AAMA) for purposes of participating in this rulemaking after the November 1998 hearing. During the first 15-day comment period, the Alliance filed joint comments with AIAM.

engine technologies (both gasoline and diesel), as well as conventional gasoline-fueled vehicles having larger displacement engines and higher weights. The TLEV category provides the necessary flexibility, with respect to NOx emission standards, to allow manufacturers the time to further develop current technologies and introduce advanced fuel-efficient technologies. Manufacturers are subject to the fleet average NMOG requirements, which become increasingly stringent in 2004. The increased stringency, as well as the phase-out of the LEV I standards, will have a limiting effect on the number of TLEV vehicles that could be offered. Accordingly, we request that ARB reconsider the elimination of the TLEV category for LEV II, and for LEV I in model year 2004, and provide manufacturers with the flexibility to continue to offer and further develop advanced direct injection/lean-burn technologies. (Alliance/AIAM)

Volkswagen currently produces and markets diesel-powered passenger cars and is able to do so with the flexibility afforded by the TLEV category. Other marques within the Volkswagen Group produce vehicles that are in higher weight classes and/or have large displacement engines. Elimination of the LEV I TLEV standard during the phase-in of the LEV II requirements will no longer afford Volkswagen the flexibility to offer diesel-powered passenger cars and heavier/large displacement vehicles beyond the 2003 model year and will hinder the development of advanced diesel technology. (VW)

Agency Response: The considerations justifying the Board's action on TLEVs are set forth in Section II.B.1. above. After considering the staff's analysis and recommendations, as well as the comments of both manufacturers supporting the TLEV standards and most environmental groups opposing this element of the proposal, the Board voted to eliminate the LEV II TLEV standard, and to eliminate the LEV I TLEV standard after the 2003 model year. Staff had originally proposed continuation of the TLEV standard in order to facilitate the development of advanced diesel emission control technology that could be used on both light- and heavy-duty vehicles, and to provide a measure of flexibility to manufacturers for their heavier gasoline vehicles. However, since the feasibility for the heavier gasoline vehicles to meet the LEV II standards had been demonstrated, the Board concluded that the emission benefits of the LEV II program should not be compromised by including an emission category drafted to accommodate a particular technology — diesel vehicles — which is not presently being used for new light-duty trucks or appreciable numbers of passenger cars. In a rulemaking targeting NOx reductions, the TLEV standards allowed *eight times* as much NOx as the LEV II LEV standard, as well as allowing four times as much particulate, and the ARB typically has not allowed such large disparities.

Under the staff proposal, the declining fleet average NMOG would ultimately have precluded a sizeable representation of TLEVs in the later years of implementation. But while manufacturers are compelled to meet the fleet average requirements for NMOG, thereby assuring quantifiable NMOG reductions from the program, LEV II has no similar requirements for fleet average NOx emissions. As noted by Board member Edgerton at the hearing (transcript p. 173) the TLEV NOx standard is proportionally much higher than the LEV, ULEV, and SULEV NOx standards (eight times higher than the LEV/ULEV NOx standards and twenty times higher than the SULEV

NOx standard). Therefore, manufacturers could produce significant numbers of TLEVs and still meet the NMOG fleet average requirements by producing the requisite number of vehicles meeting a lower emission category. Because of the disproportionately between the NMOG and NOx standards for the different emission categories, the potential existed for a substantial increase in fleet NOx emissions. While this increase in the NOx inventory would be mitigated over time by the decreasing NMOG fleet average, the resulting increase could substantially impact the NOx light-duty vehicle emission inventory for 2010 when attainment to federal ambient air quality standards for the SCAB is mandated. Therefore, the Board's action on TLEVs helps to preserve staff's originally projected emissions reductions from LEV II.

96. **Comment:** Working with partners like Ford, Navistar is embarking on an ambitious program to adapt diesel technology to light-duty SUVs. Over the long-haul, the higher volumes of the light-duty market will provide engine manufacturers with greater financial resources to develop the most advanced emissions technology. Navistar also expects that its significant R&D expenditures required to meet standards for light-duty vehicles would provide additional technological breakthroughs available to the entire Navistar heavy-duty line.

Navistar, however, cannot justify the large anticipated investment in light-duty technology if emission standards are set at levels that prevent Navistar from participating in the light-duty market. As the ARB staff stated in its report, and as the Board observed during its November 5, 1998 hearing, it is technologically infeasible for diesel manufacturers to meet the proposed LEV standards. Importantly, ARB staff's LEV II proposal would have retained the TLEV classification included in the LEV I program. The TLEV category, in turn, would have permitted diesel powered vehicles, including SUVs, to be marketed in limited quantities while still meeting the State's overall targets for reducing NOx emissions. The staff's proposal would also have required diesel vehicles to meet progressively more stringent emission control standards and eliminated the TLEV category entirely by 2007, at which time Navistar believes that it may be technologically feasible to develop diesel engines that meet LEV standards provided that ultra-low (5 ppm) sulfur fuel is available. (Navistar)

Agency Response: The ARB ultimately determined that, given the impressive emissions performance expected for the gasoline technologies that currently make up the SUV fleet, it was not appropriate to provide a much less stringent TLEV NOx standard with the objective of encouraging diesel vehicles certifying to those standards into the California market. This is reinforced by the fact that, with the TLEV particulate standard being much less stringent than the particulate standard for LEVs, the introduction of TLEV diesel light-duty trucks would increase emissions of diesel particulate, which has been identified as a Toxic Air Contaminant. And the current heavy-duty diesel engine market should be sizeable and important enough to justify the development of advanced technologies for these engines without first testing the technologies on light-duty trucks now being sold only in gasoline configurations.

97. **Comment:** There are environmental benefits associated with direct injection/lean burn (gasoline or diesel). These technologies offer the best opportunity to significantly reduce fuel

consumption and the emissions of greenhouse gases in the near future. In the case of diesel direct injection, the advantages also include inherently low NMOG, CO, cold start, and evaporative emissions. The intensive process used by government and industry participants in the Partnership for a New Generation of Vehicles (PNGV) project has determined that four-stroke direct injection is the most promising near term technology for meeting PNGV fuel economy goals. These direct injection/lean burn technologies, however, present formidable emission control challenges. Today's catalytic converters cannot achieve the level of NOx control needed to meet a very tight standard and the fleet average requirement could restrict the number of units that can be sold. ARB's LEV II would therefore prevent the fruits of the PNGV program from being used to meet the future energy efficiency targets of California. (Alliance/AIAM)

Diesel is also playing a large part in future planning policy since diesel technology continues to offer important environmental benefits relative to gasoline. For instance, The Partnership for a New Generation of Vehicles between the U.S. Government and the Big Three auto manufacturers has identified advanced compression-ignition (diesel) technology as the best near-term technology path to high-efficiency/low-polluting light-duty vehicles — and thus as a key ally in efforts to curb greenhouse gas emissions. Diesel technology is superior to gasoline technology in other respects. Hydrocarbon emissions from diesel-fueled vehicles are much lower than those from gasoline-fueled vehicles, resulting in reduced contribution to ozone formation, especially from evaporative emissions during vehicle start-up, refueling and operation. Also, diesel emission controls are more durable than those of gasoline engines, and diesel CO emissions are generally lower than those of gasoline, natural gas, propane. (Navistar)

Advanced diesel and other forms of direct-injection/lean-burn technologies offer environmental advantages, including significantly reduced fuel consumption and reduced CO₂ emissions, an important component for a global warming control strategy. (VW)

Agency Response: While diesel vehicles are more fuel efficient and accordingly have lower greenhouse gas emissions, and also have inherently lower evaporative emissions than gasoline vehicles, these benefits come at the expense of higher NOx and particulate emissions. The Board needs to address those NOx emissions in order to meet our SIP commitments and move towards attainment of the state ambient ozone standard. However, the absence of diesel and GDI technologies would not mean that California must forgo improvements in fuel efficiency in the light-duty fleet. Other technologies such as gasoline-powered hybrid electric vehicles and fuel cell vehicles offer comparable fuel efficiency and still emit very low levels of regulated exhaust emissions. And since the LEV II evaporative requirements essentially eliminate fuel related evaporative emissions from all gasoline vehicles, the comparative evaporative emission benefits of diesels will become less significant.

In evaluating the potential environmental impacts of the Board's action on TLEVs, it is important to recognize that the Board's action applies only to passenger cars and the expanded category of light-duty trucks. There are no new diesel light-duty trucks, and almost no new diesel passenger cars, currently being marketed in California. Thus to the extent the Board's action reduces or

eliminates diesel light-duty trucks and passenger cars in California after the 2003 model year, that would not have any significant impact on global warming in comparison to the vehicles currently being sold in the state.

98. **Comment:** COSVAM is deeply troubled by the Board's deletion of the TLEV category, without notice and comment, effective MY 2004. The TLEV category is very important to USVMs for two reasons. First, if a USVM *buys* an engine from a large manufacturer, and that large manufacturer is the USVM's only supply source, (a situation that in fact exists for a number of USVMs) — then the USVM could be put out of business if the engine being supplied is a TLEV engine and the engine's production ceases as of the end of model-year 2003. Second, a USVM that *builds* its own engines had every right to rely on the pre-November 5, 1998 LEV I regulations under which the USVM could continue using the TLEV category up to MY 2007 before having to cease production of a given engine.

If the Board feels compelled to delete the TLEV category, the way to do so without imposing a grave injustice on USVMs would be to add a proviso that permits CARB staff, through the discretion of the Executive Officer, to address USVM hardship relief on a case-by-case basis, including permitting a USVM to use the TLEV category (as set out in LEV I) after MY 2003 and up to and including MY 2006. (COSVAM)

Agency Response: The reasons for deletion of the TLEV category is set forth in Section II.B.1. In taking this action, the Board concluded that all manufacturers should strive to achieve the maximum emission reductions possible from their vehicles. Small volume manufacturers remain subject to the less stringent 0.075 fleet average NMOG requirement in 2004 and subsequent years. (§1961(b)(1)(C)1., title 13, CCR.) Particular 2004-2006 models may be certified to either the LEV I or LEV II LEV standards. Those standards are technologically feasible in those model years, and accordingly a USVM may seek out a supplier who can supply complying engines. We are not aware of any basis for COSVAM's claim that USVMs building their own engines have a right to implementation of the original staff proposal.

2. Elimination of the TLEV Categories — Legal Issues

99. **Comment:** The Board's modification eliminating the LEV II TLEV standard, and the LEV I TLEV standard after the 2003 model year, was done without prior notice to the regulated community, and the action therefore contravened governing provisions of California law. (See Cal. Gov. Code § 11346.8(c).) At no time prior to the November 5, 1998 hearing was any notice provided that the basic form and structure of the LEV program would be changed by the wholesale elimination of the TLEV category. To the contrary, the Mail-Out, the Staff Report and the proposed modifications to the LEV II standards all proposed the preservation, and indeed the enhancement of, the TLEV emission standards. Consequently, manufacturers had no notice that a wholesale elimination of the TLEV standards was slated for consideration at the November 5th hearing. (Alliance, EMA)

Agency Response: Government Code section 11346.8(c) governs the degree to which an agency is authorized to adopt final regulations that differ from the original proposal, without issuing a new 45-day notice. It authorizes a state agency to adopt a regulation which has been changed from that made available with the hearing notice, as long as the changes are “sufficiently related to the original text that the public was adequately put on notice that the change could result from the originally proposed regulatory action.” An OAL regulation — section 42, title 1, CCR — further interprets this requirement by providing that,

Changes to the original text of a regulation shall be deemed to be “sufficiently related,” as that term is used in Government Code Section 11346.8, if a reasonable member of the directly affected public could have determined from the notice that these changes to the regulation could have resulted.

A core principle of administrative procedure is that the reason for conducting a public hearing is to enable the decision-maker to consider and, where appropriate, adopt changes to the originally-noticed proposal. In the leading California case in this area, the court explained:

[E]ventual adoption of a regulation differing from that described in the pre-hearing notice is an objective of the hearing process. Fairness too is a statutory desideratum. After an opportunity for participation in a hearing considering the subject or issue evoked by the pre-hearing draft or summary, affected interests cannot claim unfairness when the agency’s consideration of new information and views persuades it into a different enactment dealing with the identical subject or issue. To confine the agency to the terms of its pre-hearing proposal would negate a basic purpose of the hearing. To require a new notice and hearing would tie the agency into time-consuming, circular proceedings transcending the statutory objective.

Schenley Affiliated Brands Corp. v. Kirby, 21 Cal.App.3d 177, 193 (1971), cited approvingly in *Western Oil and Gas Ass’n. v. Air Resources Board*, 37 Cal.3d 502, 526 (1984).

The originally-noticed LEV II proposal was comprehensive and necessarily complex. The three key elements of the exhaust emissions component of the proposal were (1) applying passenger car emission standards to light- and some medium-duty trucks, (2) establishing new LEV II emission standards for the various emissions categories, and (3) imposing new, more stringent fleet average phase-in requirements starting with the 2004 model year (including elimination of the LEV I TLEV standard after the 2006 model year). A reasonable member of the directly affected public could have determined from the notice that changes to the levels of stringency of the LEV II standards, and to the phase-in requirements for all 2004 and subsequent model light- and medium-duty vehicles, could have resulted from the public comment process.

Clearly various environmental groups concluded from the hearing notice and originally proposed regulatory text that changes to or elimination of the TLEV standards were appropriate topics for

comments, and that sufficiently persuasive comments could result in substantial changes to the TLEV provisions. This is evident from the fact that in the October 30, 1998 joint comment letter from the Sierra Club, Coalition for Clean Air, Union of Concerned Scientists, NRDC, Cal-PIRG and Environmental Health Coalition, the very first topic was opposition to TLEV standards which the groups stated were designed to accommodate the increased introduction of diesel light-duty vehicles. Moreover, in the Conclusion of its separate written comments presented at the hearing, the Union of Concerned Scientists' first recommendation for strengthening the proposal was that "the TLEV standards should be eliminated or lowered to reflect gasoline levels." That is what the Board ultimately decided to do, starting with the 2004 model year when the LEV II phase-in was required to start.

Even if the focus of the manufacturers was such they did not expect from the notice that changes could be made regarding the TLEV standards, the comments of the environmental groups should have made the manufacturers aware that continuation of the TLEV standards was a topic appropriate for comment. Just as the environmentalists commented extensively on AAMA's "alternative LEV II proposal," the manufacturers had the opportunity in their comments to the Board to address the environmentalists' recommendations on TLEVs.

Finally, it is worth noting that the 15-day notice has provided the manufacturers and other public members to comment on the proposed TLEV modifications, and it has been the ARB's responsibility to consider those comments and address them in this FSOR.

100. **Comment:** In eliminating all TLEVs after the 2003 model year, the ARB has impermissibly adopted emission standards that are not technologically feasible for diesel-fueled light-duty passenger cars and trucks (including SUVs). There is a broad requirement under California law that ARB establish emission standards that are technologically feasible. (HSC §§ 43013(a), 43101.) The statutory framework is addressed to motor vehicles and includes at least two recognized classes of light-duty motor vehicles — diesel and gasoline. This rulemaking unlawfully eliminates one of those classes (namely, light-duty diesel motor vehicles).

Indeed, the regulatory scheme in California is replete with diesel-specific requirements, and plainly evinces the Legislature's intent to condition ARB's authority to establish new emissions standards that purport to regulate diesel-powered vehicles on a finding that such standards are technologically feasible for such diesel-powered vehicles. The technology feasibility requirement ensures that diesel manufacturers can meet new emissions standards and thus introduce new automobiles into the marketplace. It also assures that, over time, diesel manufacturers will continue to develop technologies that fulfill the Legislature's intent that mobile source emissions be reduced and, ultimately, eliminated. (Navistar)

The elimination of TLEVs amounts to a ban on the use of diesel-fueled engines in light-duty vehicles, since the alternative LEV standards are not feasible for any diesel-fueled engine. This is contrary to California and state law because it is arbitrary and capricious and exceeds ARB's statutory authority. (Alliance)

Agency Response: Only a small number of new passenger cars are currently sold as diesels (models from VW and Mercedes which are certified to the Tier 1 standard to be sunsetted after model-year 2003), and no new diesel light-duty trucks are currently being sold in California. There are also no current California diesel models in the lighter medium-duty vehicle categories that will ultimately be treated as light-duty trucks under LEV II; the diesel pickup trucks now being sold are in the MDV4 and MDV5 weight categories that will not become subject to the passenger car standards (and for which there are no TLEV standards).

At a time when no new light-duty trucks and very few passenger cars are certified to California emission standards and marketed in California, we do not believe that the Health and Safety Code prohibits the ARB from adopting stringent new emission standards for these vehicles unless the standards contain sufficient exceptions to allow diesel vehicles to enter the state's light-duty vehicle market. Given that diesel-fueled engines are the dominant technology in the heavy-duty market, it is not surprising that the Health and Safety Code contains diesel-oriented provisions such as section 44011.6 on the heavy-duty diesel roadside smoke inspection program. But the commenter has not pointed to any provisions in state law that mandate less stringent NOx emission standards that are tailored to diesel passenger cars and light-duty trucks.

101. **Comment:** The staff's analysis of the technological feasibility and cost-effectiveness of the LEV II standards was premised on the continuation of the TLEV standards first developed in the LEV I program. Indeed, the Staff recommended that the TLEV category be included as part of the LEV II package. Thus, the Staff did not and could not factor the elimination of the TLEV standards in its requisite analysis of the LEV II standards. Consequently, there is no longer any valid or even relevant analysis of the cost-effectiveness — or complete lack thereof — of the LEV II standards. (EMA)

It is evident that ARB has not considered whether its decision to eliminate TLEV will be cost-effective, as required under Health and Safety Code section 43013(a). It is equally apparent that ARB has not considered whether its decision to eliminate TLEV results in the most cost-effective mix of controls, which certainly is not the case, as required under Health and Safety Code section 43018(c). In particular, diesel engines use significantly less fuel per mile as their gasoline counterparts, and in that respect represent a significantly less costly alternative than gas engines. Therefore, ARB's decision to eliminate TLEV clearly results in a less cost-effective mix of control measures with no corresponding benefit in terms of attaining the 1-hour ozone standard. (Navistar)

Agency Response: We believe that the cost-effectiveness analysis for the LEV II program remains appropriate and valid following the Board's action on TLEVs. As discussed in Section II.B.1., the staff's cost-effectiveness analysis demonstrated that each element of the LEV II program compared to the equivalent LEV I element (i.e. ULEV II compared to ULEV I or SULEV compared to ULEV I) was cost-effective and that the LEV II program is therefore cost-effective. Removing an element such as the TLEV category does not affect the overall cost-

effectiveness of the LEV II program since all other elements remaining in the program are individually cost-effective. To calculate the cost-effectiveness of each LEV II emission category staff calculated, the incremental cost per vehicle of achieving the LEV II standard and divided it by the lifetime emission benefits of a LEV II vehicle compared to LEV I vehicle. The cost-effectiveness of the TLEV standard was previously demonstrated under the LEV I program and since the TLEV standard did not change between the LEV I and LEV II programs, staff used the same cost-effectiveness ratio for the LEV II program as well. Virtually all major elements of the LEV II program had a cost-effectiveness of approximately \$1 per pound of emissions reduced, which compares well with other mobile source emission control programs adopted by the Board.

Given the great prevalence of gasoline passenger cars and light-duty trucks, the staff's cost-effectiveness analysis did not include an adjustment to reflect the fuel economy differences of potential TLEV diesel vehicles, so again the action on TLEVs did not invalidate the cost-effectiveness analysis.

102. **Comment:** ARB has failed to evaluate the impact of its action on TLEVs on the State's economy, including the effect of the standards on motor vehicle fuel efficiency, as required by Health and Safety Code sections 43018(e) and 43101. There is no doubt that diesel engines represent a far more fuel efficient alternative than gasoline engines. (Navistar)

Agency Response: The Board received and considered comment and testimony from proponents of the TLEV standard and diesel-fueled passenger cars and light duty trucks. The testimony included statements regarding the fuel economy advantages of diesel engines. Since there are no new light-duty trucks and very few passenger cars are certified to California emission standards and marketed in California, the Board's action does not eliminate fuel-efficient technologies now prevalent in that sector of the vehicle fleet.

103. **Comment:** ARB's decision to eliminate the TLEV standards in no way facilitates the State's ability to demonstrate reasonable further progress for attaining the National Ambient Air Quality Standards (NAAQS) for ozone applicable to the findings made by the staff (which standards were the purpose of the LEV II rulemaking). Notably, the staff concluded that its recommended LEV II program (which included TLEV) would reduce emissions by more than is needed to satisfy the State's obligations for demonstrating reasonable further progress towards meeting the ozone NAAQS standards. In that respect, the ARB obtains the necessary air quality benefits with the TLEV standards. Thus the action to eliminate TLEVs is arbitrary and exceeds ARB's statutory authority. (EMA)

Inclusion of the TLEV classification would not adversely affect the State's objective in the LEV II rulemaking — namely to address air quality objectives associated with the 1-hour ozone standard. By proposing to retain the TLEV standard in a modified form, ARB staff concluded that its proposed LEV II package would do more than ensure reasonable further progress in attaining the 1-hour ozone standard. (Navistar)

Agency Response: The Staff Report explained that the purpose of the LEV II rulemaking was to address the requirements of SIP measure M2 and to achieve additional emission reductions needed for the SCAB. While the expected emission reductions from the original LEV II exceeded the M2 requirements and helped address the “black box,” they in no way precluded the Board’s authority to modify the proposal to achieve additional NOx and PM emission reductions. The source of the complete 75 tpd on reductions in ROG and NOx have not yet been identified, and we have not yet adopted control measures sufficient to attain and maintain the state ambient air quality standard for ozone.

104. **Comment:** Although the LEV II rulemaking has nothing to do with toxic air contaminant (TAC) emissions, the ARB eliminated TLEV solely on the basis of the designation of particulate matter from diesel-fueled engines as a TAC pursuant to Health and Safety Code sections 39657. (See hearing transcript at 184, 283.) California law is clear, however, that the ARB may not take action to regulate a TAC, including taking steps to curb TAC emissions from motor vehicles, unless it first complies with the requirements in Health and Safety Code section 39655 applicable to newly designated TACs.

Particulate matter from diesel-fueled engines, however, has not been listed by regulation as a TAC. Moreover, ARB has not completed the “needs assessment,” as required law after a constituent has been designated a TAC by regulation, and prior to taking action to control newly designated emissions from motor vehicles. Only after this process has been completed, and only then to the extent that the foregoing process demonstrates a need for additional control (as well as the availability of feasible technology), may ARB consider revising emission standards for vehicular sources in order to address TAC emissions.

Further, ARB simply has no authority in this rulemaking to regulate particulate emissions from diesel-fueled engines on the basis of a TAC listing, because the purpose of the LEV II rulemaking is confined to the State’s obligation to demonstrate reasonable further progress towards achieving compliance with the national 1-hour ozone standard. (Navistar)

At a July 30, 1998 hearing on listing diesel exhaust as a TAC, the Board’s Chairman stated that in the risk management phase the ARB would not consider banning diesel fuel or engines. The Board resolution approving the TAC listing provided that “recognition should be given to changes in diesel engine technology and fuel formulations that may reduce public exposure to harmful combustion constituents.” And the ARB specifically established a diesel emissions risk management working group to advise the staff in connection with its risk management efforts. The ARB’s action eliminating the TLEV standards bypasses ARB’s own process for controlling TACs and circumvents California’s statutory requirements for review of TACs. It therefore is in violation of California law. (Alliance)

Agency Response: As discussed in Section II.B.1. above, the Board’s action regarding TLEVs was not predicated solely on the toxicity of particulate emissions from diesel-fueled engines and the listing of those emissions as a TAC. The primary vehicle for identifying the

rationale for modifications to the original proposal is the Final Statement of Reasons (see Gov. Code §11346.9). The discussion in Section II.B.1. of this FSOR demonstrates that the rationale for eliminating the LEV II TLEV category, and sunsetting the LEV I TLEV category after the 2003 model year, was also included the need to reduce NOx emissions (in order to achieve federal and state ambient ozone and PM standards), and PM emissions (in order to achieve the state PM standards).

The commenter's assertion that the ARB's authority in the LEV II rulemaking is limited to achieving reductions in ozone concentrations (or the even more limited objective of demonstrating reasonable further progress towards achieving compliance with the national 1-hour ozone standard) is incorrect. The need to reduce particulate emissions is expressly identified in the Staff Report as a basis for the proposed emissions standards for particulate from diesel vehicles. (Staff Report, pp. II-10-11.) Similarly, the need to reduce NOx emissions in order to help achieve ambient PM standards is discussed on page I-1. Further, one of the Health and Safety Code sections expressly identified in the Notice and in the Authority and Reference Notes for title 13, CCR, sections 1960.1 and 1961 as a statute being implemented, interpreted, or made specific is Health and Safety Code section 39667, which directs the ARB to consider revisions to its motor vehicle emission standards to reduce public exposure to TACs.

The Board's amendment to section 93000, title 17, CCR, identifying particulate emissions from diesel-fueled engines as a TAC was approved by OAL and filed with the Secretary of State on July 21, 1999 (OAL File No. 99-0610-03 S) — before the Executive Order adopting the LEV II amendments was executed. The ARB is not statutorily precluded from amending its motor vehicle emissions standards pursuant to Health and Safety Code section 39667 to reduce exposures to a TAC that has been formally listed under section 39662 but for which the section 39665 needs assessment has not been completed. Section 39666 provides that an ARB-adopted airborne toxic control measure to reduce emissions of a TAC from nonvehicular sources is to be designed in consideration of the factors the ARB must address in the needs report for the TAC. In contrast, section 39667, which directs the ARB to adopt revisions to vehicle emission standards to reduce exposure to TACs, does *not* expressly refer to consideration of the factors addressed in the needs report prepared pursuant to section 39665.

In this LEV II rulemaking, it is necessary for the Board to make a decision now, one way or the other, on whether to maintain after the 2003 model year TLEV standards that allow eight times as much NOx and four times as much particulate than the next more stringent standard. Nothing in the ARB's risk management activities regarding diesel particulate exhaust legally precludes the Board from taking the action it has on TLEVs.

105. **Comment:** The ARB's unilateral action regarding TLEVs eliminates the availability of compression-ignition, diesel-fueled engine technologies, and so is violative of the federal Clean Air Act. Under Health and Safety Code section 43013(a), the Board is not empowered to promulgate an emission standard that is preempted by federal law. While CAA section 209(a) generally preempts all attempts to promulgate emission standards for motor

vehicles, section 209(b) authorizes the U.S. EPA Administrator to waive preemption for California standards if, among other things, they are consistent with CAA section 202(a). In order to be consistent with section 202(a), a proposed emission standard must be technologically feasible, since section 202(a)(2) states that “Any regulation . . . shall take effect after such period as the Administrator [or qualifying State] finds necessary to permit the development and application of the requisite technology, giving appropriate consideration to the cost of compliance within such period.” Under *NRDC v. U.S. EPA*, 655 F. 2d. 318, 322 (D.C. Cir. 1981), this means that emission standards must be shown prior to promulgation to be technologically feasible. The Board has not met this obligation with regard to the action on the TLEV standard.

In 1973, the Board’s attempt to ban an entire class of light-duty trucks by imposing standards that were not technologically feasible was found to be a violation of the CAA’s technological feasibility mandate. (38 F.R. 30136 (1973); *see also* 49 F.R. 18887, 18892 (1984). Accordingly, because the Board’s technologically infeasible proposal results in the ban of diesel passenger cars and light-duty trucks in the California market, the Board’s proposal is preempted by federal law and violates the CAA. (Alliance)

The federal CAA does not permit the wholesale, unilateral elimination of a whole class or category of vehicles. (see CAA §202.) ARB’s actions in eliminating the TLEV standards violate the requirements of the CAA because they would improperly would eliminate a whole class or category of light-duty diesel vehicles. These actions are inconsistent with CAA section 202(a). (EMA)

Agency Response: U.S. EPA’s November 1, 1973 waiver action (38 F.R. 30136) in no way supports the commenter’s position. In that matter, the Administrator found that imposition of the standards in question would have forced manufacturers out of the California market for *all light-duty trucks, regardless of the fuel used*. In fact, the Administrator’s May 5, 1984 diesel particulate waiver decision expressly distinguishes that situation from ones “where certain models were eliminated but the ‘basic market demand’ was satisfied.” (49 F.R. 18892). The considerations provided in the response to Comment 100 demonstrate that the Board’s action on TLEVs was not inconsistent with CAA section 202(a).

106. **Comment:** The Board’s action to eliminate the TLEV standard violates the requirements of CAA section 209 because it exceeds the Board’s statutory authority. (EMA)

Agency Response: As discussed in the response to Comments 100-104, the action on TLEVs does not exceed the ARB’s statutory authority under California law.

107. **Comment:** The Board’s action to eliminate the TLEV standard violates the requirements of CAA section 209 because it is arbitrary and capricious. (EMA)

Agency Response: The rationale for the action on TLEVs, described in Section II.B.1, is clearly reasonable. It is not arbitrary and capricious.

108. **Comment:** The Board’s action to eliminate the TLEV standard violates the requirements of CAA section 209 because it is not necessary to meet compelling and extraordinary conditions in California. (EMA)

Agency Response: CAA section 209(b)(1)(B) authorizes the Administrator to deny a waiver for California emission standards on a finding that California “does not need separate state standards to meet compelling and extraordinary conditions.” The Board’s action on TLEVs clearly is not relevant to this finding. The finding pertains to whether California needs its own motor vehicle pollution control program to meet compelling and extraordinary conditions, not whether any given standards are necessary to meet such conditions. (see, e.g., 49 F.R. 18887, 18889-18890 (May 3, 1984).) The Administrator has expressly determined that the phrase “compelling and extraordinary conditions” refers to

. . . certain general circumstances, unique to California, primarily responsible for causing its air pollution problem [including] . . . geographical and climatic factors [as well as] . . . the presence and growth of California’s vehicle population, whose emissions were thought to be responsible for ninety percent of the air pollution problem in certain parts of California.

* * * *

It is evident . . . that ‘compelling and extraordinary conditions’ does not refer to levels of pollution directly, but primarily to the factors that tend to produce them: geographical and climatic conditions that, when combined with large numbers and high concentrations of automobiles, create serious air pollution problems.

(49 F.R. at 18890.)

109. **Comment:** The CAA provides that Phase II regulations for light-duty vehicles and trucks must be based on an examination of the availability of technologies and the costs thereof. (see CAA §202(i).) The ARB has expressly disavowed any consideration of the available technologies for diesel-fueled engines and, similarly, has failed to assess the cost-prohibitive results of this unilateral action on the manufacturers and distributors of diesel-fueled engines and vehicles. Indeed, the ARB’s precipitous action on TLEVs is a *de facto* ban on all available diesel technologies, and so is in clear violation of the CAA’s requirements that Phase II regulations take into consideration the feasibility and cost-effectiveness of obtaining further emissions reductions. (EMA, Alliance)

Agency Response: CAA section 209(b)(1) authorizes U.S. EPA to deny a section 209(b) waiver for California standards and accompanying enforcement procedures that are not consistent with section 202(a). This does not require ARB standards and enforcement procedures to be consistent with each of the thirteen subsections that follow section 202(a). Thus in *Motor & Equipment Manufacturers Ass’n [MEMA] v. Nichols*, 142 F.3d 449 (D.C. Cir. 1998), the court held that in granting a section 209(b) waiver for California’s OBD II regulations, U.S. EPA was

not required to consider whether the California regulations were consistent with the OBD provisions in section 202(m). The court based this conclusion on three considerations: (1) the consistency requirement in section 209(b)(1) on its face refers only to section 202(a), and not to the subsequent subsections in section 202 (*MEMA*, 142 F.3d. at 462-3); (2) requiring consistency with the subsequent subsections would be “contrary to the legislative history of the waiver provision emphasizing that California is to have the ‘broadest possible discretion in selecting the best means to protect the health of its citizens.’” (*MEMA*, 142 F.3d. at 463); and (3) “Requiring California to meet the standards of each subsection of section 202 would eviscerate much of the flexibility of the waiver program, in contravention of Congress’ purpose in creating it” (*MEMA*, 142 F.3d. at 464).

It is particularly obvious that Congress did not intend to impose upon California the same constraints it imposed on U.S. EPA by sections 202(g), (h) and (i) regarding its Phase I and Phase II exhaust emission standards for light-duty vehicles and light-duty trucks. Section 202(g) and (h) expressly prohibited U.S. EPA from enforcing standards before the 2004 model year that were any more stringent than California’s average standards for the 1994 model year. Thus requiring consistency would have totally preempted California’s LEV I program, notwithstanding provisions elsewhere in the CAA specifically premised on California’s administration of that very program (CAA § 243(e).)

3. Other Issues

110. **Comment:** The Specialty Equipment Market Association (SEMA) opposes the LEV II proposal that passenger car exhaust emissions standards apply to SUVs, trucks and mini-vans. This proposal effectively deprives consumers of some of the function and options they otherwise expect when buying light-duty trucks, mini-vans or SUVs. Vehicle manufacturers anticipate a decrease in engine power in order to produce vehicles which comply with the proposed regulations. Owners of light trucks, mini-vans and SUVs often require power from their vehicles — for towing or hauling heavy loads — that neither performance parts makers nor vehicle manufacturers will be able to deliver under this proposed standard. Further, the fuel economy of vehicles equipped with diesel engines will likely be lost. (SEMA)

For a variety of reasons, SUVs should not be subject to the same standards as passenger cars. (Peter Brown)

Agency Response: These comments generally do not address any changes covered by the 15-day notice. The appropriateness of making SUVs, light trucks and minivans subject to the passenger car standards was discussed on pages II-4 to II-6 of the Staff Report, and in the responses to Comments 3-8 above. With regard to the fuel economy benefits of diesel engines, see the response to Comments 97 and 102.

111. **Comment:** We request that the ARB revisit the partial ZEV credit attributed to fuel cell vehicles with an on-board methanol reformer. As currently proposed, this would yield a

0.7 ZEV allowance even though tailpipe emissions for this class of vehicle are nearly non-existent. We believe that this severely penalizes a technology that makes great strides in achieving the ZEV objectives of the state of California. The modest infrastructure costs of liquid methanol fueling stations could greatly accelerate the widespread introduction of these environmentally sound vehicles.

We understand that this credit was reduced primarily due to potential evaporative emissions from the on-board liquid fuel tank. However, there is ample evidence that evaporative emissions of liquid methanol fuel can be practically eliminated with sound engineering techniques of the fuel storage system. We propose the following rewrite of that ZEV credit: “A Fuel Cell vehicle with an on-board reformer which has no NOx emissions shall receive a ZEV allowance of 0.7. Vehicles of this class with sealed fuel storage shall receive a ZEV allowance of 1.” In this manner, the ARB encourages the development of a vital technology while putting developers on notice that the evaporative emission issue must be addressed and solved. (Nova BUS, Incorporated)

Agency Response: Vehicles must meet the zero-evaporative emissions requirement among others before they qualify for any partial ZEV allowance. Therefore, unless the methanol reformer fuel cell has a sealed fuel storage system or other equivalent system which meets the zero evaporative emissions requirement, it would not qualify for any partial ZEV allowance.

Additionally, the partial ZEV allowance for methanol fuel reformer/ fuel cell vehicle was limited to 0.7 primarily because it anticipated that the reforming (partial oxidation) of hydrogen from methanol would produce significant amounts of hydrocarbons due to the combustion process. However, if the vehicle were to use a direct-methanol fuel cell, which would not employ any combustion process to reform methanol, then the vehicle would qualify for a partial ZEV allowance of 1.0.

112. **Comment:** VW notes that with the elimination of the TLEV category, ARB has reassigned the 1.00 baseline value for the smog indices to the LEV I LEV category. Volkswagen fails to see the value of the smog index label particularly when the baseline moves from one model year to the next sending an inconsistent signal to the consumer. We are particularly concerned that diesel-powered vehicles certified to the Tier 1 standards were formerly assigned a smog index value of less than 1.00 and will now be assigned a value of 1.82. (VW)

Agency Response: The baseline value for the smog indices represents the highest emission category to which a new vehicle can certify. Since the TLEV category has been eliminated beginning in model-year 2004, it is appropriate that the baseline be reassigned in that model-year to LEV I LEV, the highest remaining emission category. Even with the change in baseline category, consumers will be able to make a valid comparison between vehicles certified to the different emission categories.

Regarding the smog index value for Tier 1 diesels, staff did not include a value for these vehicles when the smog index label requirement was adopted in 1995. The assigned value is appropriate in that it reflects the higher NOx standards to which these vehicle certify.

113. **Comment:** The LEV II requirements provide for a separate NOx phase-in for PC/LDT1 as opposed to LDT2 vehicles. For manufacturers with few LDT2 test groups this may become essentially a 50 or 100% phase-in requirement for the first year when actually the requirement is 25%. Therefore, Nissan recommends the phase-in requirement of the two categories be combined to form one phase-in category. (Nissan)

Agency Response: The requested modification would allow the manufacturer to delay the introduction of LDT2s subject to the more stringent LEV II standards. This would not only adversely impact air quality because the dirtier trucks would be on the road for a longer period of time, but it would also give an unfair competitive advantage to manufacturers that have only a few LDT2 test groups. For these reasons, we are not incorporating the requested change.

114. **Comment:** The regulation allows an interim in-use compliance factor of 1.75 for vehicles produced prior to the 2007 model year which is also limited to the first three years of introduction. For vehicles introduced prior to the 2004 model year, we recommend the interim in-use compliance factor of 1.75 apply through the 2006 model year. This serves as an additional incentive for the early introduction of advanced evaporative emission control systems. (Nissan)

Agency Response: The early introduction of both zero and “near-zero” evaporative emission standards is encouraged under the regulations approved by the Board. These vehicles will be given additional phase-in credits toward the phase-in compliance with the new evaporative emission standards through the use of alternative phase-in schedules. A three-year interim in-use compliance factor should be sufficient to accommodate unanticipated problems encountered in the field during introduction of an evaporative family subject to the more stringent LEV II evaporative emission family. For these reasons, additional incentives such as the requested interim in-use compliance factor are not necessary.

115. **Comment:** We request that the intermediate in-use compliance standards for SULEV NMOG and NOx be corrected to the original proposal of 0.02 g/mi and 0.03 g/mi, respectively. (Alliance/AIAM)

Agency Response: The ARB agrees and has made that correction in connection with the second 15-day notice.

116. **Comment:** We recommend that the ARB revise the proposed intermediate in-use compliance language to clarify that the intermediate in-use standards apply for the first two model years after introduction of a new test group. (Alliance/AIAM)

Agency Response: The ARB agrees and has made that correction in connection with the second 15-day notice.

117. **Comment:** For partial ZEV credit zero-evaporative vehicles, we request ARB to determine a numerical value for the emission conversion factor of a unit of exhaust hydrocarbon emissions for a unit of evaporative emissions and include this factor in the regulation. The Alliance, AIAM, and our members would be happy to assist ARB staff in determining the appropriate value. (Alliance/AIAM)

Agency Response: After the publication of the Staff Report, manufacturers requested the consideration of an allowance in which zero-evaporative fuel emissions would be increased for an equivalent amount of exhaust emission decrease. The staff suggested that such a provision be included, as a new second paragraph in section 1976(b)(1)(E). Due to the lateness of manufacturers' request, there was insufficient time to develop a specific conversion factor and thus, it was not included in the regulatory proposal. Currently, staff is working on developing this numerical value. Once the Executive Officer identifies the appropriate conversion factor, manufacturers will be notified of both the conversion factor and the methodology used to develop the factor.

118. **Comment:** We request that the ARB allow manufacturers three years to equalize vehicle emission debits for LEV II MDVs in the same manner as is allowed for equalizing NMOG credits for PCs and LDTs. (Alliance/AIAM)

Agency Response: The ARB agrees and has made that correction in connection with the second 15-day notice.

119. **Comment:** To protect 2000 model year smog index labels that have already been produced under the existing LEV regulations, we recommend an additional note specifying that the new title and other additions to the smog index label provisions become effective starting with the 2001 model year. (AAMA, AIAM)

Agency Response: The ARB agrees and has made that change in connection with the second 15-day notice.

120. **Comment:** To ensure that all manufacturers are working toward a consistent durability procedure to 150,000 miles for the LEV II evaporative emission standards, ARB should adopt a durability test procedure. We ask to be involved in the development of these procedures. (Alliance/AIAM)

Agency Response: The first paragraph of section 1976(b)(1)(E), title 13, CCR provides that vehicles subject to the zero-fuel evaporative emission standards are to have a useful life of 15 years or 150,000 miles whichever occurs first. In lieu of conducting the three-day and two-day diurnal-plus-hot-soak tests, the regulation authorizes the manufacturer to submit for

advance Executive Officer approval a test plan to demonstrate that the vehicle has zero fuel evaporative emissions throughout its useful life. A manufacturer may base its plan on elements of the durability procedures in the “California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Year Vehicles.” At this stage of development, the adoption of a specific durability test procedure would be too limiting to allow for the variation in technology and usage patterns of the many different model vehicles from different manufacturers. As in the past, staff will continue to work with manufacturers to develop and evaluate acceptable durability test procedures suitable to a manufacturer’s vehicles.

121. **Comment:** For zero-evaporative vehicles used to generate partial ZEV credits, a new provision allows slightly higher evaporative emissions if the exhaust emissions are reduced by an amount determined by the Executive Officer. Although the zero-evaporative fuel standard requires measuring evaporative emissions to two significant digits (i.e., 0.xx grams per test), the trading of exhaust to evaporative emissions allows only one significant digit (i.e., 0.x grams per test). The increment should be changed to 0.01 for consistency. This change will have no environmental impact but will provide manufacturers greater flexibility. Additionally, it will encourage research and development in advanced technology and will reduce cost of compliance. (Alliance/AIAM)

Agency Response: The increment of evaporative emission trading was proposed at the same number of decimal places as the proposed emission standard. Since the zero-evaporative emission standard is 0.0 grams per test, the appropriate increment is 0.1 grams per test. In this case, the measured evaporative emissions, at two decimal places, would be rounded to one decimal place for comparison to the zero-evaporative fuel standard of 0.0. If the measured evaporative emissions are greater than 0.0, then each additional increment of 0.1 could be traded for an equivalent unit of exhaust emissions. Thus, providing increments of 0.1 is appropriate.

122. **Comment:** We understand it was the intent of staff’s proposal that vehicles certifying to the zero evaporative emission standard will be required to meet two evaporative standards: a non-fuel evaporative standard (for paints, tires, upholstery, etc) and a fuel evaporative test. To clarify the fuel evaporative emissions requirement, we recommend that the “test” be defined as the three-day and two-day diurnal-plus-hot-soak tests, and that submittal of a test plan for demonstrating that the vehicle has zero-evaporative emissions throughout its useful life be allowed as an alternative to the diurnal-plus-hot-soak tests. (Alliance/AIAM)

Agency Response: Staff concurs with the suggested clarification and has included the modification with the second 15-day notice.

123. **Comment:** The Alliance and AIAM strongly oppose ARB’s zero-emission background standards. And ARB should eliminate the requirement to separately test for fuel and non-fuel evaporative emissions. (Alliance/AIAM)

Agency Response: This comment is not pertinent to the changes made available with the first 15-day notice.

124. **Comment:** The zero-evaporative useful life requirement of 15 years or 150,000 miles creates a disincentive for manufacturers to research and develop very low evaporative emission systems because of the inherent difficulty of assuring absolute zero fuel evaporative emissions over the full useful life. In addition, equipment measurement issues compound the problem. With the new provision detailed in Section B.1.(E) of the 15-Day Notice, measured fuel evaporative emissions are allowed but must be offset by a corresponding improvement in exhaust NMOG performance. This provides manufacturers with a more reasonable stretch goal. While we support this revision, we believe the increments should be 0.01 grams per test rather than 0.1 grams per test. (Alliance/AIAM)

Agency Response: The zero fuel evaporative emissions level is appropriate where partial ZEV credits are being generated because ZEVs have zero evaporative emissions. With respect to the appropriate increments for credits used in determining compliance with the zero fuel evaporative emissions standard, see the response to Comment 121.

125. **Comment:** We encourage ARB to allow flexibility in meeting all tailpipe and evaporative emission requirements, specifically allowing manufacturers to trade between exhaust hydrocarbon emissions and evaporative emissions. As in the flexibility allowed for partial ZEV credits in trading exhaust for evaporative emissions, there is no loss of environmental benefits. (Alliance/AIAM)

Agency Response: The trading of exhaust for evaporative emissions is allowed for vehicles certifying to both the stringent zero-evaporative and SULEV exhaust standards, to provide incentives for the development of advanced technologies and flexibilities in complying with these stringent new requirements. However, unlike the stringent zero-evaporative and SULEV standards, higher emission standard categories have many available technologies to choose from and sufficient flexibility for compliance. Therefore, the trading of exhaust for evaporative emissions for all standards categories is not appropriate at this time.

126. **Comment:** We would like to confirm the applicability of the in-use compliance standards as follows: For evaporative families certified to a new standard starting in the 2004 model year, the in-use compliance standard shall be 1.75 times the certification standard for 2004, 2005, and 2006 model year vehicles. For evaporative families certified to a new standard starting in the 2005 model year, the in-use compliance standard shall be 1.75 times the certification standard for 2005, 2006, and 2007 model year vehicles. For evaporative families certified to a new standard starting in the 2006 model year, the in-use compliance standard shall be 1.75 times the certification standard for 2006, 2007, 2008 model year vehicles. Likewise, for evaporative families certified to a new standard starting prior to the 2004 model year, the in-use compliance standard shall be 1.75 times the certification standard for the first three years. (Alliance/AIAM)

Agency Response: The commenter's characterization of the proposed phase-in schedule for the evaporative standards is correct and the regulatory language is unambiguous on this point.

127. **Comment:** We request clarifying language as to the evaporative test sequence for hybrid electric vehicles to confirm that for the 2-day diurnal only a three phase test (without sampling) is conducted during the test sequence shown in Figure 3a or only a four phase test during the test sequence shown in Figure 3b. (Alliance/AIAM)

Agency Response: In connection with the second 15-day notice, clarifying language was inserted into Part III. Section D. 1.12 of the California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles, stating that emission sampling is not required for the standard cold start test and hot start test (standard three phase test) in the supplemental two-day diurnal sequence shown in Figure 3A.

128. **Comment:** We recommend that two typographical errors be corrected: the cold CO weight category for LEV I and Tier 1 medium-duty vehicles and the fleet average value for Tier 1 LDTs. (Alliance/AIAM)

Agency Response: The ARB agrees and has made the corrections in connection with the second 15-day notice.

129. **Comment:** The bar code provisions in the Emission Control Label Specifications do not designate alpha characters that will differentiate vehicles certified to the LEV I standards from those certified to the LEV II standards. We recommend assigning characters to differentiate these vehicles. (Alliance/AIAM)

Agency Response: The ARB agrees and has made this correction in connection with the second 15-day notice.

130. **Comment:** We recommend providing additional credits in the alternative LEV II phase-in for LEV II vehicles introduced prior to the 2004 model year. (Alliance/AIAM)

Agency Response: The ARB agrees and has included provisions for additional credits for LEV II vehicle introduced prior to the 2004 model-year in connection with the second 15-day notice.

131. **Comment:** We request that the phase-in schedule for the on-board vehicle refueling emission standards be modified so that the existing vehicle categorization is retained, similar to the treatment in the supplemental federal test procedure standards. (Rover Group)

Agency Response: Staff concurs with the comment. As a result of the LEV II classification of vehicles, the current category of medium-duty vehicles 6,000 - 8,501 lbs. GVWR

will be reclassified as light-duty trucks. This inadvertently modified the refueling standard phase-in requirements of medium-duty vehicles. The second 15-day notice identifies corrections to revert to the prior vehicle classifications for purposes of the phase-in schedule for the on-board vehicle refueling emissions standards (§ 1978(a)(3), title 13, CCR).

C. RESPONSES TO COMMENTS RECEIVED DURING SECOND 15-DAY COMMENT PERIOD

132. **Comment:** The OBD regulations reference an alternative phase-in that requires manufacturers to meet or exceed a cumulative total by the end of the last year of the scheduled phase-in, but allows manufacturers an additional year to complete the phase-in (§1968(n)(21.0), title 13, CCR). The LEV II regulations are at least as challenging as the OBD regulations, and as with the OBD phase-in, the ARB should allow an additional year in order to provide greater flexibility. (Alliance)

Agency Response: We acknowledge that the LEV II requirements are challenging, and therefore have included a four year phase-in with an alternative phase-in option. Allowing an alternative LEV II phase-in schedule similar to that provided for the OBD requirements would permit manufacturers to certify their larger trucks to the LEV II standards one year later than currently required. This would result in a loss of emission benefits, since these vehicles currently certify to a higher standard than passenger cars and light trucks. Since ARB has demonstrated the feasibility of the requirements for the larger vehicles, we believe the proposed phase-in schedule and five to eight year lead time is adequate for manufacturers to meet the LEV II requirements.

133. **Comment:** In the Proposed Regulation Order, the applicability of cold CO standards for LEV I and Tier 1 medium-duty vehicles is in error. The Proposed Regulation Order should be modified to be the same as in the proposed 2001+ LDV/MDV Exhaust TPs Part I, Section E.1.5 titled “Cold CO Standards.” In this document, the applicability of cold CO standards to LEV I and Tier 1 MDVs is listed as “6,000 - 8,500 lbs. GVW.” Further clarifying the intent, the document states that “medium-duty vehicles with a gross vehicle weight rating greater than 8,500 lbs. are exempt from these standards.” Trucks covered by the cold CO standards under California regulations must be harmonized with trucks covered by the cold CO standard under federal regulations. (Alliance)

Agency Response: We concur, and nonsubstantial corrections to address this are included in the adopted version of section 1961(a)(5), title 13, CCR, and Section E.1.5 the 2001+ LDV/MDV Exhaust TPs. The text in both instances states that the cold CO standards apply to “LEV I and Tier 1 MDVs 8,500 lbs. GVW and less.”

134. **Comment:** The “California Motor Vehicle Emission Control and Smog Index Label Specifications,” section 3.b require manufacturers to place a machine-readable VIN bar code on the vehicle emission label. The regulation requires manufacturers to design these to the specifications contained in SAE J1892 (OCT 1993) and J1877 (JUL 1994) as appropriate for the

label material. However, the most recent version of J1892 is September 1998. The Alliance requests ARB to update this reference to the more recent version. (Alliance)

Agency Response: It is impractical to make this regulatory change at this late a date in the rulemaking process. The ARB will propose updating the SAE J1892 reference in the next rulemaking that makes changes to the Label Specifications.

135. **Comment:** COSVAM is deeply troubled by the Board's deletion of the TLEV category, without notice and opportunity for comment, effective MY 2004. Unfortunately, Mail-out MSC 99-11 does not even mention COSVAM's comments or concerns. COSVAM incorporates by reference its April 16 comments and requests that they be properly addressed. (COSVAM)

Agency Response: The Final Statement of Reasons is the appropriate document for ARB's response to COSVAM's concerns, and those concerns are addressed in the response to Comment 98.

136. **Comment:** The seventh item in the second set of modifications appears to dilute the ZEV requirement severely and I urge the Board to either retract or strengthen it. This modification allows, in lieu of requiring the vehicle to pass a specified test, the manufacturer to "submit for advance Executive Officer approval a test plan to demonstrate that the vehicle has zero (0.0) grams of fuel evaporative emissions throughout its useful life." This wording does not require that the test actually ever be carried out, nor does it specify that passing the test is required for the vehicle to be in compliance. If the Board wishes to retain this option, I recommend that the following requirements be added:

The test plan must be made available to the public without restriction from the moment it is received (not merely when approved by the ARB).

The test plan must actually be carried out, within the same time period as would be required for the standard test and by the same entity as would be executed by the standard test, and must be passed in order for the vehicle to be in compliance.

(Peter Deutsch)

Agency Response: We believe it will be sufficient for submitted test plans to be subject to the California Public Records Act (Gov. Code §§ 6250 et seq.) For any test plan approval, one of the conditions will be that the plan is carried out. It would not be appropriate to always require that the alternative test plan be carried out in the same time period as the approach specified in the regulation, because in some instances a different time period may be acceptable.

Attachment A

**NONSUBSTANTIAL MODIFICATIONS TO THE REGULATIONS
AND INCORPORATED DOCUMENTS MADE AFTER
THE SECOND 15-DAY COMMENT PERIOD**

Final Regulation Order, Title 13, California Code of Regulations

Page 25, § 1961(a)(5) table, last line of Vehicle Types, “LEV I and Tier 1 MDVs 3751 lbs. - 8500 lbs. ALVW” changed to “LEV I and Tier 1 MDVs 8500 lbs. GVW and less”. See corresponding change to the table on Page E-11, Section E.1.5 of the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.” These corrections have been made pursuant to Comment 132.

Page 26, § 1961(a)(8)(B), line 3: “criteria set forth in section D.2” changed to “criteria set forth in C.3”.

Page 26, § 1961(a)(8)(B), added at end: “,” incorporated by reference in section 1962(e).”

Page 34, § 1961(d), lines 3 and 4, added quotes around “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles”.

Page 43, § 1962(d)(7), line 4, changed “§” to “section”.

Page 56, § 1978(b), lines 4 and 5, struck out: “~~adopted April 24, 1996, effective June 19, 1996~~”.

Page 64, § 2112(l)(17), line 3, changed “medium-duty” to “passenger car and light-duty truck” (§ 2112(l)(17) pertains to passenger cars and light-duty trucks; § 2112(l)(9) pertains to medium-duty vehicles).

Page 76, § 2145(b)(3), changed “Section 86.1839-01” to “Section 86.1839-01, as adopted May 4, 1999”.

California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles

Second page, the Note identifying other documents to be used in conjunction with this document has been expanded.

Page B-3, Section B.2., in the definition of “Medium-duty vehicle,” change “super-low-emission-vehicle” to “super-ultra-low-emission-vehicle”.

Page E-11, Section E.1.5 table, last line of Vehicle Types: changed “LEV I and Tier 1 MDVs, 0-8,500 lbs. ALVW” to “LEV I and Tier 1 MDVs 8,500 lbs. GVW and less”. See corresponding change above on page 25 of the Final Regulation Order.

Page E-22, Section E.4.1, last sentence, change “shall be waived through the model year for SULEVs” to “shall be waived through the 2001 model year for SULEVs”.

Page E-24, Section 4., make the changes shown below in underline and strikeout, comparing the final adopted text to the version made available in connection with the second 15-day notice. Title 13, CCR, § 1960.1(g)(1), Note (6) establishes intermediate in-use compliance standards for LEV I ULEVs in the passenger car and light-duty truck classes for the 1999-2002 model years. Title 13, CCR, § 1960.1(h)(2), Note (9)⁸ establishes intermediate in-use compliance standards for LEV I ULEVs and SULEVs in the medium-duty vehicle class through the 2002 model years. These intermediate in-use compliance standards were inadvertently omitted from the “California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.” The corrections make the treatment in the Test Procedures consistent with the regulation.

“4. Intermediate In-Use Compliance Standards.

4.1 LEV I Intermediate In-Use Compliance Standards.

4.1.1 LEV I ULEV Standards for PCs and LDTs. For 2001 and 2002 model year PCs and LDTs certified to the ULEV standards in Section E.1.1.1, including fuel-flexible, and dual-fuel vehicles when operating on an available fuel other than gasoline, the following intermediate in-use standards shall apply:

⁸ Note 6 of the table in title 13, CCR, § 1960.1(g)(1), and Note 9 of the table in title 13, CCR, § 1960.1(h)(2), are not amended in the LEV II rulemaking and accordingly have not been shown in the Final Regulation Order.

<u>Vehicle Type</u>	<u>Durability Vehicle Basis (miles)</u>	<u>Intermediate In-Use Compliance Standards (g/mi)</u>		
		<u>NMOG</u>	<u>CO</u>	<u>NO_x</u>
<u>PCs, 0-3750 lbs. LVW LDTs</u>	<u>50,000</u>	<u>0.055</u>	<u>2.1</u>	<u>0.3</u>
	<u>100,000</u>	<u>0.075</u>	<u>3.4</u>	<u>0.4</u>
<u>3751-5750 lb. LVW LDTs</u>	<u>50,000</u>	<u>0.070</u>	<u>2.8</u>	<u>0.5</u>
	<u>100,000</u>	<u>0.100</u>	<u>4.4</u>	<u>0.7</u>

4.1.2 **LEV I Standards for MDVs.** The following intermediate in-use compliance standards for 50,000 miles and 120,000 miles for MDVs from 3751-14,000 lbs. ALVW certified to the LEV I standards in Section E.1.1.1, including fuel-flexible, bi-fuel and dual-fuel vehicles when operating on an available fuel other than gasoline, shall apply for the specified model years only. In-use compliance with standards beyond 50,000 miles shall be waived through the 2001 model year for SULEVs.

<u>Intermediate In-Use Compliance Standards*</u> (in grams per mile)										
<u>Emission Category</u>	<u>Model Year</u>	<u>Durability Vehicle Basis (mi)</u>	<u>3751-5750 lbs.</u>		<u>5751 - 8500 lbs.</u>		<u>8501-10,000 lbs.</u>		<u>10,001-14,000 lbs.</u>	
			<u>NMOG</u>	<u>NO_x</u>	<u>NMOG</u>	<u>NO_x</u>	<u>NMOG</u>	<u>NO_x</u>	<u>NMOG</u>	<u>NO_x</u>
<u>ULEV</u>	<u>-2002</u>	<u>50,000</u>	<u>0.128</u>	<u>--</u>	<u>0.156</u>	<u>--</u>	<u>0.184</u>	<u>--</u>	<u>0.240</u>	<u>--</u>
	<u>-2002</u>	<u>120,000</u>	<u>0.160</u>	<u>--</u>	<u>0.195</u>	<u>--</u>	<u>0.230</u>	<u>--</u>	<u>0.300</u>	<u>--</u>
<u>SULEV</u>	<u>through 2002</u>	<u>50,000</u>	<u>0.072</u>	<u>0.3</u>	<u>0.084</u>	<u>0.45</u>	<u>0.100</u>	<u>0.5</u>	<u>0.130</u>	<u>0.7</u>
	<u>2002</u>	<u>120,000</u>	<u>0.100</u>	<u>0.4</u>	<u>0.117</u>	<u>0.6</u>	<u>0.138</u>	<u>0.65</u>	<u>0.180</u>	<u>1.0</u>

* Dashes mean that the standards in Section E.1.1. apply.

4.1.4.1.3 **Intermediate In-Use Compliance Standards for Fuel-Flexible, Bi-Fuel and Dual-Fuel Medium-Duty LEV I SULEVs Operating on Gasoline.** For fuel-flexible, bi-fuel and dual-fuel 2001 model year MDV SULEVs operating on gasoline, the following intermediate in-use compliance standards for NMOG emissions at 50,000 miles, apply:

Fuel-Flexible, Bi-Fuel and Dual-Fuel MDVs Intermediate In-Use Compliance Standards		
Test Weight (lbs.)	Vehicle Emission Category	50,000 (g/mi)
3751-5750	SULEV	0.128
5751-8500	SULEV	0.156
8501-10,000	SULEV	0.184
10,001-14,000	SULEV	0.240

Compliance with the standards beyond 50,000 miles shall be waived for the 2001 model year for SULEVs.

4.3 4.2 Intermediate LEV II In-Use Compliance Standards. For test groups certified prior to the 2007 model year, the following intermediate in-use compliance standards shall apply for the first two model years the test group is certified to the new standard. For SULEVs certified prior to the 2004 model year, the following intermediate in-use compliance SULEV standards shall apply through the 2006 model year.

Emission Category	Durability Vehicle Basis	LEV II PCs and LDTs		LEV II MDVs 8500 - 10,000 lbs. GVW
		NMOG	NOx	NOx
LEV/ULEV	50,000	n/a	0.07	n/a
	120,000	n/a	0.10	0.3
SULEV	120,000	0.02	0.03	0.15

Page H-1, Section H.3.2 — change “For and subsequent model year TLEVs . . .” to “For TLEVs . . .”

California Motor Vehicle Emission Control and Smog Index Label Specifications

Page 1, Section 2.(b), last line: hyphenation of "model-year" deleted.

California Exhaust Emission Standards and Test Procedures for 2003 and Subsequent Model Zero-Electric Vehicles, and 2001 and Subsequent Model Hybrid Electric Vehicles, in the Passenger Car, Light-Duty Truck, and Medium-Duty Vehicle Classes

Page C-5, Section C.3.6, line 3, changed "in a give model year" to "in a given model year".

Page C-6, Section C.4.2(a), line 6, change "for a large manufacturers" to "for a large volume manufacturer".

Page D-1, Section 2, line 2, change "(40 CFR §1839-01(c))" to "(40 CFR §1843-01(c))". This corrects a failure to reflect U.S. EPA's renumbering of sections. There is no subsection (c) of 40 CFR §1839-01, and the Test Procedures section on "Information Requirements" was obviously intended to reference 40 CFR §1843-0, "General information requirements," rather than 40 CFR §1839-01, "Carryover of certification data."