State of California
Environmental Protection Agency
AIR RESOURCES BOARD

THE 2003 AMENDMENTS TO THE CALIFORNIA ZERO EMISSION VEHICLE PROGRAM REGULATIONS

FINAL STATEMENT OF REASONS

January 2004

Acronyms	
AFL-CIO	American Federation of Labor - Congress of Industrial Organizations
AFSCME	The American Federation of State, County and Municipal Employees
AIR	Air Improvement Research
ALA	American Lung Association
APA	Administrative Procedures Act
APCD	Air Pollution Control District
AQMD	Air Quality Management District
ARB	Air Resources Board
AT PZEV	Advanced Technology Partial Zero Emission Vehicles
ATTI	Advanced Transportation Technology Institute
BAAQMD	Bay Area Air Quality Management District
BMW	Bayerische Motoren Werke
Board	Air Resources Board
BTAP	Battery Technology Advisory Panel
C	Celsius
CA	California
CAFÉ	Corporate Average Fuel Economy
CAL ETC	California Electric Transportation Coalition
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCR	California Code of Regulations
CEC	California Energy Commission
CEERT	Center for Energy Efficiency and Renewable Technologies
Centro CHA	Centro Community Hispanic Association, Long Beach
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHARO	CHARO Community Development Corporation
CMPEG	California Miles per Equivalent Gallon
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CVAG	Coachella Valley Association of Governments
DC	DaimlerChrysler
EIR	Environmental Impact Report
EPA	Environmental Protection Agency
EPACT	Energy Policy and Conservation Act
EPCA	Energy Policy and Conservation Act
EPRI	Electric Power Research Institute
ETEC	Electric Transportation Engineering Corporation
EV	Electric Vehicle
EVI	Electric Vehicle Infrastructure Incorporated
FCV	Fuel Cell Vehicle
FMVSS	Federal Motor Vehicle Safety Standards
FSOR	Final Statement of Reasons
GC	Government Code

GM	General Motors
HEV	Hybrid Electric Vehicle
HSC	Health and Safety Code
ICE	Internal Combustion Engine
ILEV	Inherently Low Emission Vehicle
ISOR	Initial Statement of Reasons
JACCC	Japanese American Cultural & Community Center
KW	Kilowatt
LDT1	Light Duty Truck Category 1
LDT2	Light Duty Truck Category 2
LEV I	Low Emission Vehicle Regulations
LEV II	Low Emission Vehicle Regulations Amended
MAC	Manufacturer Advisory Correspondence
MOA	Memorandum of Agreement
MY	Model Year
NAACP	**The National Association for the Advancement of Colored People**
NERA	National Economic Research Associates
NEV	Neighborhood Electric Vehicle
NHTSA	National Highway Traffic Safety Administration
NiMH	Nickel Metal Hydride
NMOG	Non Methane Organic Gas
NOx	Oxides of Nitrogen
NRDC	Natural Resources Defense Council
OBD	On-Board Diagnostic
OEM	Original Equipment Manufacturer
PC	Passenger Car
PCL	Planning and Conservation League
PEM	Proton Exchange Membrane
PEVDC	Production Electric Vehicle Drivers Coalition
PM	Particulate Matter
PUC	Public Utilities Commission
PV	Photo Voltaic
PZEV	Partial Zero Emission Vehicle
ROG	Reactive Organic Gas
SCAQMD	South Coast Air Quality Management District
SCE	Southern California Edison
SF (Clean Cities Coalition)	San Francisco
SULEV	Super Ultra Low Emission Vehicle
SUV	Sport Utility Vehicle
TBD	To Be Determined
U.S. EPA	United States Environmental Protection Agency
UC DAVIS	University of California, Davis
UCS	Union of Concerned Scientists
USABC	United States Advanced Battery Consortium
VMT	Vehicle Miles Traveled
VW	Volkswagen
ZEM	Zero Emission Motorcycle
ZEV	Zero Emission Vehicle

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

THE 2003 AMENDMENTS TO THE CALIFORNIA ZERO EMISSION VEHICLE PROGRAM REGULATIONS

Public Hearing Dates: March 27-28 & April 24, 2003
Agenda Item No.: 03-02-4

I. GENERAL

In this rulemaking, the Air Resources Board (ARB or Board) is adopting another set of major amendments to the California Zero Emission Vehicle (ZEV) program regulations, which had previously been amended in a 2001 rulemaking. The new amendments delay the start of the percentage ZEV requirements from the 2003 model year (MY) to the 2005 MY. They establish a new mechanism allowing large-volume auto manufacturers to choose one of two compliance paths. Under the primary path, a manufacturer may satisfy its ZEV obligations by meeting requirements that are similar to those in the ZEV regulation as amended in 2001. This involves a formula that initially allows a mix of credits from three categories of vehicles – 2 percent from "gold" pure ZEVs, 2 percent from "silver" advanced technology partial ZEV allowance vehicles (AT PZEVs), and 6 percent from "bronze" partial ZEV allowance vehicles (PZEVs). Under the alternative compliance path, a manufacturer may meet part of its ZEV requirement by producing its sales-weighted market share of approximately 250 fuel cell ZEVs by the 2008 MY; the remainder of the manufacturer's ZEV obligations could initially be achieved with a credit mix of 4 percent from AT PZEVs and 6 percent from PZEVs. In response to pending litigation, the amendments eliminate all references to fuel economy and vehicle efficiency. Consequently, the credit structure for ZEVs and AT PZEVs is being adjusted to reflect new regulatory incentives and encourage the sustainable commercialization of program vehicles.

The rulemaking was initiated by the January 10, 2003 publication of a Notice of a February 27, 2003 public hearing to consider ZEV program amendments as initially proposed by the staff. A Staff Report: Initial Statement of Reasons (ISOR) was also made available for public review and comment starting January 10, 2003. The ISOR, which is incorporated by reference herein, contained an extensive description of the rationale for the proposed amendments. The text of the proposed amendments to the ZEV regulation – section 1962, title 13, California Code of Regulations (CCR) – was included as Appendix A to the ISOR. These documents were also posted on January 10, 2003 on the ARB's Internet site for this rulemaking at http://www.arb.ca.gov/regact/zev2003/zev2003.htm, as was the text of the proposed

amendments to the “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” (the ZEV Standards and Test Procedures), which is incorporated by reference in section 1962(h).

In a February 14, 2003 Notice, the Executive Officer announced that, in response to comments from stakeholders, the ARB staff was planning to recommend significant modifications to the original proposal. The Notice stated that in order to maximize the ability of the public to provide considered comments on the proposed modifications, the hearing was being postponed until March 27, 2003. On March 5, 2003, the staff released the text of its proposed modifications, which was attached as Appendix A to a 33-page document entitled “Description and Rationale for Staff’s Additional Proposed Modifications to the January 10, 2003 ZEV Regulatory Proposal” (the March 5 Supplemental Staff Report). On that date the document and its Appendix were posted on the ARB’s website and notification of the posting was sent electronically to all parties on the ARB’s List Server for ZEV-related matters.

The Board heard comment on March 27 and 28, 2003, and then continued the hearing to April 24, 2003. At the conclusion of the April 24, 2003 hearing, the Board adopted Resolution 03-4, which initiated steps towards final adoption of the originally proposed amendments with a number of modifications. The modifications reflected the modified regulatory text that had been suggested by staff in the March 5 Supplemental Staff Report and that was included as Attachment C to the Resolution. Additional modifications were presented by staff at the April 24, 2003 continued hearing and were described on page 5 of Resolution 03-4 and in greater detail in Attachment D of the Resolution. The Resolution directed the ARB's Executive Officer to incorporate the approved modifications into the proposed regulatory text, 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.

In preparing the modified regulatory language, the staff made various additional revisions in an effort to best reflect the intent of the Board at the hearing. The staff also identified several additional modifications that are appropriate in order to make the amended regulation work as effectively as possible. These supplemental modifications were incorporated into the text of the proposed amendments, along with the modifications specifically identified in the Resolution.

The text of the proposed modifications to the amendments was made available for a supplemental 15-day comment period ending August 25, 2003 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 three attachments were posted on July 29, 2003 on the ARB’s Internet site for the rulemaking. They were also mailed by August 8, 2003

to all parties identified in section 44(a), title 1, CCR, along with various other interested parties.[1]

Attachment I to the first 15-day notice contained the proposed modified text of the amendments to sections 1962 and 1900, title 13, CCR, along with commentaries identifying and explaining all of the substantive modifications developed subsequent to the March 5, 2003 report – both those identified in Attachment D to the Resolution and those prepared by staff after the April hearing. The modified amendments to the incorporated ZEV Standards and Test Procedures were generally identical to the modified amendments to section 1962, and were therefore not separately shown in Attachment I. However, Attachment I did show the proposed amendments to the incorporated document that are supplemental to the section 1962. The complete text of the ZEV Standards and Test Procedures with the proposed modifications clearly shown was posted on the ARB's Internet site for the rulemaking. Attachment II listed for comment additional documents that the ARB was adding to the rulemaking record in accordance with Government Code section 11347.1. The first 15-day notice indicated that Resolution 03-4 and its attachments are available on the rulemaking's Internet site. Seventy written comments were received during the supplemental comment period ending August 25, 2003.

In light of the supplemental comments received, the Executive Officer determined that additional modifications were appropriate. A Second Notice of Public Availability of Modified Text (the second 15-day notice) and an attachment identifying the additional modifications were posted October 3, 2003 on the Internet site for the rulemaking and were mailed by October 10, 2003 to all parties identified in section 44(a), title 1, CCR (parties who had commented by email were sent the notice by email), along with various other interested parties. The comment period ended October 27, 2003, by which time 19 additional written comments were received.

After considering all of the comments received, the Executive Officer issued Executive Order G-03-069, adopting the amendments to title 13, CCR, and the incorporated ZEV Standards and Test Procedures reflecting the modifications that had been made available for supplemental comment.[2]

Incorporated Documents

The ZEV Standards and Test Procedures are incorporated by reference in section 1962(h), title 13, CCR. The ZEV Standards and Test Procedures in turn incorporate certification test procedures adopted by the U.S. Environmental Protection Agency (U.S. EPA) and contained in title 40, Code of Federal Regulations (CFR) Part 86.

[1] Persons who had commented by email were transmitted by email links to the first 15-day notice and its attachments on the Internet for the rulemaking; they were not separately sent the notice by postal mail.
[2] The adopted amendments contained a few nonsubstantial corrections to the text made available for second supplemental comment period. Those corrections are identified in Attachment A to this FSOR.

Section 1962(h), title 13, CCR identifies the incorporated ZEV Standards and Test Procedures by title and date. The ARB document is readily available from the ARB upon request and was 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 Registrar, National Archives and Records Administration, and is therefore reasonably available to the affected public from a commonly known source.

The ZEV Standards and 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 motor vehicle emissions test procedures incorporated by reference rather than printed in the CCR as 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. 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 ZEV Standards and Test Procedures incorporate portions of the CFR because some of the ARB requirements are substantially based on the federal emission regulations. Manufacturers typically certify vehicles and engines to a version of the federal emission standards and test procedures that have 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. Each of the incorporated CFR provisions is identified by date in the ARB test procedure documents.

Fiscal Impacts

The ARB has determined that this regulatory action will not create costs or savings, as defined in Government Code section 11346.5(a)(6), to any state agency or in federal funding to the state, costs or mandate to any local agency or school district whether or not reimbursable by the state pursuant to Part 7 (commencing with section 17500), Division 4, Title 2 of the Government Code, or other non-discretionary costs or savings to local agencies.

Consideration of Alternatives

The amendments proposed in this rulemaking were the result of extensive discussions and meetings involving ARB staff and motor vehicle manufacturers, environmental groups, and others. The ISOR, released and made available to the public on January 10, 2003, identified and rejected two potential alternatives to the staff proposal: (1) do not amend the ZEV regulation and (2) amend the regulation only to the extent necessary to address issues raised in the federal and state lawsuits.

Under the first alternative, manufacturers would ultimately need to produce and offer for sale vehicles sufficient to comply with the ZEV regulation as amended in 2001 – but only if the ARB and the Executive Officer prevail in the current litigation. If the ARB and Executive Officer are unsuccessful in the ZEV lawsuits, the "do nothing" alternative would result in the loss of the ZEV program until necessary amendments are adopted. Ultimate implementation of the preexisting ZEV requirements would impose a large cost burden on the manufacturers, who would need to price ZEVs aggressively to meet sales targets, and this would reduce the revenue available to the manufacturers to offset their costs. To the extent that the state provides subsidies in order to assist with vehicle marketing, such a large number of vehicles needing subsidies would result in large state expenditures.

The staff rejected the second identified alternative because, as noted above, staff believed that additional changes were warranted in light of the current status and trends in ZEV technology. There has not been a significant reduction in the cost of battery EVs, with only NEVs emerging as a commercial, although limited-use, product. In addition, projections regarding the pace of commercialization of fuel cell ZEVs, which were expected to provide a second ZEV technology late in this decade, have become less certain, although automakers remain fully committed and continue to invest heavily in the technology. In addition, the delay imposed by the June 11, 2002 preliminary injunction against the Executive Officer could have significantly affected manufacturers' marketing and production plans.

Following the release of the ISOR, the staff document entitled Description and Rationale for Staff's Additional Proposed Modifications to the January 10, 2003 ZEV Regulatory Proposal, released and made available to the public on March 5, 2003, recommended a third regulatory alternative. This third approach was substantially similar to the amendments as ultimately adopted, except that the minimum required Type III ZEV production needed to qualify for the alternative path in model years 2009-2011 was not specified. Rather, staff recommended that the minimum requirement for model years 2009-2011 be established by the Board at a future hearing, following a report on technology status by the Independent Expert Review Panel.

The Board rejected this alternative due to its strong belief that a firm, specific 2009 production target was essential in order to incentivize the necessary manufacturer research and development. Many stakeholders commented that in the absence of a specific target, automakers would limit their development efforts and then argue before the Independent Expert Review Panel and the Board that no further progress had been made. This would result in 2009 and subsequent production levels that fall short of what would have been possible given aggressive development work. In addition, comments submitted by National Economic Research Associates, Inc. and Sierra Research, Inc. (NERA/Sierra) noted that because the ZEV mandate establishes vehicle obligations based on manufacturer sales in previous years, manufacturers are forced to consider the *future* impact of the mandate on their *current* vehicle production and sales. Given these circumstances, the lack of a specific future ZEV obligation would require

manufacturers to make assumptions about the expected future form of the mandate. As a result, many manufacturers may be inclined to "prepare for the worst" in case they are required to produce relatively high numbers of ZEVs when the form of future regulations is fully specified. This would increase current manufacturer costs.

Finally, during the comment period Air Improvement Resource, Inc. (AIR) submitted a petition for amendment of the ZEV regulations. This petition outlined an alternative approach, the major features of which were to delay the start of the program until 2006; allow PZEV and AT PZEV vehicles to satisfy the gold requirement through 2011; postpone the start of the LDT2 phase-in until MY 2012; improve the emission performance of the conventional vehicle fleet through extended durability requirements; broaden the scope of the ZEV rule to allow a wider range of vehicles to qualify; and increase the flexibility available to manufacturers in generating and using ZEV allowances. AIR argued that this approach was more cost effective than the proposed modifications.

This alternative was rejected on the grounds that it would abandon the push towards zero emissions that is the foundation of the ZEV program. Specifically, staff determined that using the same calculation methodology and assumptions as are used in the staff proposal estimates of vehicle production, and a "free credit trading" approach, manufacturers could comply with the AIR proposal without introducing a single additional gold category ZEV until MY 2017. It is questionable, given California's vehicle population and vehicle miles traveled per year, whether air quality standards can be met without zero emission vehicles in our future vehicle fleet mix. As such, it would be inappropriate to allow manufacturers to substitute alternative emission reduction programs that would significantly delay the introduction of zero emission vehicles.

The AIR proposal, along with other more limited alternatives raised by manufacturers, is addressed in more detail in the comments and responses section of this Final Statement of Reasons.

The ARB has accordingly determined that none of the alternatives considered by the ARB would be more effective in carrying out the purpose for which this regulatory action is designed, or would be as effective and less burdensome to affected private parties than the action taken.

II. MODIFICATIONS TO THE ORIGINAL PROPOSAL

A. AN OVERVIEW OF THE ORIGINAL PROPOSAL

1. Background

The California ZEV regulation was originally adopted in 1990, as part of the ARB's first Low-Emission Vehicle (LEV I) regulations. It established an ambitious program to dramatically reduce the environmental impact of light-duty vehicles through the gradual introduction of ZEVs into the California fleet. As originally adopted, the ZEV regulation required that specified percentages of the passenger cars and lightest light-duty trucks (called the LDT1 category) produced by each of the seven largest auto manufacturers be ZEVs, starting in 1998. The percentages were 2 percent for the 1998-2000 MYs and 5 percent for the 2001-2002 MYs. A requirement of 10 percent ZEVs applied to all but small-volume manufacturers starting in MY 2003. The regulation also included a marketable credits system. Although the regulation did not require a specific technology, the expectation in 1990 was that the requirements would be met by the introduction of battery electric vehicles (battery EVs).

In 1996 the ARB amended the ZEV regulation to allow additional time for the technology to develop. The requirement for 10 percent ZEVs in MYs 2003 and beyond was maintained, but the percentage ZEV requirements for MYs 1998 through 2002 were eliminated. At the same time, the ARB entered into Memoranda of Agreement (MOAs) with the seven largest auto manufacturers. Under the MOAs the manufacturers agreed to place more than 1,800 advanced-battery EVs in California in 1998 through 2000, and the ARB agreed to work with state and local governments to help develop ZEV infrastructure and remove barriers to ZEV introduction.

As part of the 1998-1999 "LEV II" rulemaking, the Board adopted amendments that allowed manufacturers to use partial allowances of 0.2 or more generated from vehicles with extremely low emissions (PZEVs) to meet the 10 percent ZEV requirement. To be certified as a PZEV, a vehicle had to meet the ARB's most stringent exhaust emission standards, have zero evaporative emissions, and be covered by an emissions warranty for 15 years or 150,000 miles, whichever occurs first. However, a large-volume manufacturer was required to have a minimum of 4 percent of its California fleet of passenger cars and lightest trucks classified as "full" ZEVs.

2. The 2001 Amendments to the ZEV Regulation

Following a January 2001 hearing, the ARB adopted major amendments to the ZEV regulation that were designed to maintain progress towards commercialization of ZEVs while recognizing the market constraints created primarily by the cost of battery technology. The amendments maintained a core ZEV component, but significantly reduced the cost of the program – primarily through a reduction in the number of vehicles required in the near term and a further broadening in scope of the vehicle

technologies allowed. The key elements of the 2001 amendments pertinent to this rulemaking are described below.

Reducing the number of ZEVs needed in the near term. Several amendments reduced the number of ZEVs required in the early years of the program. The amendments established multipliers that provided extra credits for ZEVs in the early years. ZEVs introduced before the 2006 MY received early introduction multipliers of 4.0 for the 2001 and 2002 MYs and 1.25 for the 2003-2005 MYs. A separate "NEV discount" multiplier reduced the credits earned by Neighborhood Electric Vehicles (NEVs) – which have a top speed of no more than 25 miles per hour – to 0.625 for the 2004 and 2005 MYs because of their limited functionality. For 2006 and subsequent years the credits earned by NEVs were further reduced to 0.15. The early introduction multipliers for ZEVs in a given model year and the extended range multiplier described below were only available to ZEVs that not only were "delivered for sale" but were also "placed in service." The ISOR for the rulemaking indicated that to earn multiple allowances, manufacturers would be required to certify to the Executive Officer the number of vehicles placed in service during the course of the model year.

Reducing the number of PZEVs needed in the near term. The amendments added PZEV early introduction multipliers that reduced the number of PZEVs needed to meet the maximum PZEV allowance amount to 25 percent of the preexisting requirement in MY 2003, 50 percent in MY 2004, and 75 percent in MY 2005. Manufacturers were also provided two years to make up a PZEV shortfall rather than the one year previously allowed.

Allowing advanced technology PZEVs to satisfy one-half of the "pure ZEV" requirement and increasing their allowances. Qualifying advanced technology vehicles that were not ZEVs were permitted to satisfy up to one half of the four percent "pure ZEV" portion of the ZEV requirement. These were known as AT PZEVs, defined as any PZEVs earning a ZEV allowance of more than 0.2, not including the early introduction multiplier. One category of AT PZEVs consisted of PZEVs such as grid-connected hybrid electric vehicles (HEVs) with an all-electric range of 10 miles or more; the additional "zero emission vehicle miles traveled (VMT) allowance" for these vehicles varied from about 0.4 to 2 depending on the electric range. Another category of AT PZEVs – those using a fuel such as compressed natural gas (CNG) with very low fuel-cycle emissions – qualified for an additional allowance of up to 0.2, depending on the degree to which the vehicle uses that fuel.

A third category of AT PZEVs included vehicles that employed "advanced ZEV componentry" but did not qualify for a zero-emission VMT allowance – vehicles such as a non-grid connect gasoline HEV. For this category, the amendments established three alternative performance-based paths that the manufacturer could use to calculate the allowance: (1) CO_2 savings, (2) vehicle efficiency, or (3) through MY 2007 only, the percent of peak power that comes from the battery. The calculations for the first two methods relied on the vehicle's fuel economy as measured by U.S. EPA. The vehicle had to meet a threshold performance level to qualify for any allowance; for qualifying

vehicles the amount of the allowance increased with the vehicle's performance. The amendments also provided an additional allowance of 0.1 for vehicles that use gaseous or hydrogen fuel storage.

Expanding ZEV range credits and adding an efficiency multiplier for ZEVs and AT PZEVs. Modifying ZEV extended range credit provisions that had been added in 1996, the amendments reduced the minimum range needed for multiple credits to 50 miles, with credits increasing with range up to 10 credits for a range of 275 miles or more. Because a vehicle with a refueling time of less than 10 minutes earned the maximum credit regardless of range, a hydrogen fuel cell vehicle earned 10 credits, not including any phase-in multiplier.

A ZEV or AT PZEV having an efficiency at least 50 percent greater than the average for its size class qualified for a new efficiency multiplier. All vehicle efficiencies (gasoline, CNG, electric) were converted into the common units of California Miles per Equivalent Gallon (CMPEG). The multiplier earned was the larger of 1.0 or the vehicle CMPEG divided by the baseline. For ZEVs, the efficiency multiplier partially replaced the range multiplier on a phased-in basis beginning in MY 2005, and the combined value of the range and efficiency multipliers was gradually reduced, resulting in larger numbers of vehicles in later years. For AT PZEVs, the efficiency multiplier took effect beginning in MY 2002.

Increasing the percentage ZEV requirement in later years. The 10 percent ZEV requirement for large and medium-duty manufacturers was ramped up to 11 percent for the 2009-2011 MYs, 12 percent for the 2012-2014 MYs, 14 percent for the 2015-2017 MYs, and 16 percent for 2018 and subsequent MYs. During these ramp-ups, the portion of the ZEV requirement that could be satisfied by 0.2 allowance PZEVs was held at 6 percent. Thus the pure ZEV portion gradually increases from 4 percent in the 2003 through 2008 MYs to 10 percent by 2018. Up to one half of this pure ZEV portion could be satisfied with allowances from AT PZEVs.

Phased addition of LDT2 vehicles to the base for calculating a manufacturer's ZEV obligation. At the January 2001 hearing the Board decided to modify the originally proposed amendments to phase in a new requirement that "LDT2" vehicles be included in the base for determining a manufacturer's full percentage ZEV obligation, along with the passenger cars and LDT1 vehicles that had always been included. The LDT2 category includes most sport utility vehicles (SUVs), minivans, and larger pickup trucks. The addition of LDT2 vehicles was phased in beginning in the 2007 MY, when 17 percent of the manufacturer's California LDT2 production would be counted. The percentage increased by 17 percent increments through the 2011 MY, with a 100 percent requirement starting in the 2012 MY. Full inclusion of LDT2 vehicles increases the base across all manufacturers by an average of about 70 percent, although the impacts differ among individual manufacturers.

Restricting the future use of "banked" credits earned by NEVs. To avoid the possibility that manufacturers could place large numbers of NEVs in these early years and thereby

amass enough credits from NEVs alone to avoid producing ZEV program vehicles for a number of years, the amendments capped the use of such credits in future years. NEV credits earned in prior years could only be used to satisfy 75 percent of a manufacturer's ZEV obligation in MY 2006 and 50 percent in MY 2007 and beyond.

Miscellaneous other changes. Various other changes made by the 2001 amendments included permitting additional ZEV credits for ZEVs, AT PZEVs and PZEVs placed as part of a transportation system in MYs 2001-2007. Additional credits were also authorized for a vehicle in California service for more than three years with an extended battery or fuel cell stack warranty.

3. Litigation and Other Developments

When this 2003 ZEV rulemaking was initiated, there had been three lawsuits filed by General Motors (GM) and DaimlerChrysler challenging the 2001 ZEV Amendments and their implementation; the first two also named some Fresno-area auto dealers as additional plaintiffs.

The federal preemption lawsuit. One of the cases was filed in January 2002 in federal district court in Fresno, asserting that the provisions pertaining to AT PZEVs that are gasoline hybrids are related to fuel economy standards and accordingly are preempted by the Energy Policy and Conservation Act of 1975 – the law that directed the National Highway Traffic Safety Administration to establish corporate average fuel economy (CAFE) standards. On June 11, 2002, a federal district judge issued a preliminary injunction that prohibits the ARB's Executive Officer from enforcing the 2001 ZEV Amendments with respect to the sale of new motor vehicles in the 2003 or 2004 MYs, pending final resolution of the case. The judge issuing the preliminary injunction found that the plaintiffs were likely to succeed in their preemption claim. He rejected arguments that the optional nature of the AT PZEV provisions eliminated preemption concerns, because he found that disparities in costs among the various compliance options in effect required manufacturers to produce gasoline hybrids. He enjoined enforcement of all of the 2001 ZEV Amendments based on the conclusion that the challenged AT PZEV provisions likely were not severable from the rest of the ZEV program. The ARB appealed issuance of the preliminary injunction to the U.S. Court of Appeals for the Ninth Circuit, which heard oral argument on February 13, 2003. In the interim, the preliminary injunction remained in effect.

The first state court lawsuit. The second case was filed in January 2002 in the Fresno County Superior Court with Isuzu Motors as an additional plaintiff. As amended, the complaint identities seven theories under which the 2001 ZEV amendments are claimed to be partially or wholly invalid. One allegation is that the amendments adding LDT2s to the base for the percentage ZEV requirements was beyond the scope of the original hearing notice and could not adopted without a new notice. There are also claims that the ARB did not comply with the California Environmental Quality Act (CEQA), that the ZEV regulation is inconsistent with the ARB's authorizing statutes, and that the Board failed to make a rational cost-effectiveness determination. On December 19, 2002 the

trial court had denied the automakers' motion for summary judgment and a trial court hearing on the merits was expected after January 2003.

The second state court lawsuit. On December 11, 2002, DaimlerChrysler and GM filed a second lawsuit in Fresno County Superior Court, this time challenging a November 21, 2002 guidance letter transmitted by the ARB's Executive Officer to vehicle manufacturers. The letter responded to inquiries on when 2002 MY NEVs would need to be placed in service in order to qualify for the 2002 MY early introduction multiplier – in case the preliminary injunction was lifted or the issue became relevant in the context of subsequent amendments to the ZEV regulation. The Executive Officer interpreted the regulation as allowing a MY 2002 ZEV to receive the 4.0 multiplier only if it is placed in service by the end of March 2003. Following a December 17 hearing, a temporary restraining order was issued temporarily prohibiting enforcement of the March 31, 2003 deadline as established in the guidance letter.

Technology developments. When the Board amended the regulation in 2001, it did so with the understanding that near-term compliance with the pure ZEV portion of the regulation would be expensive for automakers, but that continued vehicle and technology development would lead to less costly approaches. Since that time, there have been no significant reductions in the cost of battery EVs. Meanwhile, the marketing of battery EVs has been met with only modest success, with only NEVs emerging as a commercial although limited-usage product. These factors, along with the federal lawsuit, have slowed or even halted automaker plans regarding battery EV development.

In addition, projections regarding the pace of commercialization of fuel cells, which were projected to provide a second ZEV technology late in this decade, have become less certain although automakers remain fully committed and continue to invest heavily in the technology. As a result, it appears that under the current regulation manufacturers will need to develop additional battery EV products to bridge the interim years until fuel cells are available in larger quantities in the next decade.

4. The Originally-Proposed 2003 ZEV Amendments Released January 10, 2003

Although the staff believed that federal law does not preempt the challenged AT PZEV provisions and that the federal preliminary injunction should be reversed on appeal, there was no doubt that the injunction has introduced considerable uncertainty regarding the ZEV regulation – uncertainty that would not necessarily be ended by a reversal by the Ninth Circuit Court of Appeal. Removal of this uncertainty was essential for the ZEV program to move ahead. While there were advantages to the scoring provisions for gasoline hybrid AT PZEVs and the efficiency multiplier in the 2001 amendments, the staff developed what it considered to be a satisfactory alternative approach that removed all references in the regulation to fuel economy and addresses the preemption concerns.

The staff also developed additional proposed amendments that were designed to maintain pressure on the commercialization of ZEV technologies while recognizing the current state of the technology and the cost implications related to their development. The original staff proposal released January 10, 2003 included the following elements:

Delaying start of the percentage ZEV requirements until the 2005 MY. The proposed amendments would delay the start of the percentage ZEV requirements two years, until the 2005 MY. Qualifying MY 2004 and earlier ZEVs, AT PZEVs and PZEVs would generate credits or allowances that could be used in future MYs.

Deleting the efficiency multiplier for AT PZEVs and ZEVs, and changing the methods for awarding allowances for AT PZEVs. The staff proposal eliminated the efficiency multiplier for AT PZEVs and ZEVs. The amendments would increase the advanced componentry allowance for a vehicle with a high-pressure or nongaseous hydrogen storage system from 0.1 to 0.2. There would be no change to the 0.1 allowance for a vehicle equipped with a qualifying high-pressure gaseous fuel storage system. The amendments would eliminate the three current methods – the CO_2 reduction method, the efficiency method and the peak power method – that establish sliding scales for awarding allowances to PZEVs with other advanced ZEV componentry, including gasoline hybrids. In their place would be a flat allowance of 0.4 in the 2003-2011 MYs, and 0.35 in the 2012 and subsequent MYs for any PZEV with advanced ZEV componentry that meets either of two threshold criteria: a "peak power ratio" of greater than 13 percent, or a "peak power ratio" of greater than 8 percent with a zero emission drive system maximum power rating of at least 10 kilowatts. These provisions would be accompanied by an express severability clause, and a more general severability clause would also be added to the regulation.

The amendments would also change the way other AT PZEV allowances are determined. The maximum overall cap for PZEVs with low fuel-cycle emissions would be increased from 0.2 to 0.3 and the applicable equation would be revised to increase the allowance by 50 percent. The allowance for zero emission VMT for HEVs and the phase-in multiplier for AT PZEVs with any zero emission vehicle miles traveled would also be increased. The amendments would add a cap on total AT PZEV allowances for any technology type of 3.0 starting in the 2012 MY.

Changing the way credits from ZEVs are calculated and applied. Along with removing the efficiency multiplier for ZEVs, the amendments would make a series of changes to simplify the calculation and encourage sustainable commercialization of ZEVs. They would identify five ZEV "types" that would be the basis for awarding ZEV credits: NEVs, Type 0 (utility low-range ZEVs), Type I (mid-range ZEVs like City electric vehicles), Type II (longer-range ZEVs like full-function battery EVs) and Type III (long range, fast-refueling ZEVs like fuel cell vehicles)[3]. A 2003 and subsequent MY ZEV, other than a

[3] The regulation defines a Type III ZEV as a ZEV having an urban dynamometer driving cycle (UDDS) ZEV range of more than 100 miles and the capability of replacing 95% of its maximum rated energy capacity in 10 minutes or less. Although the regulation indicates that "fuel cell EV" would be the common description for a Type III ZEV at this time, the regulatory provisions consistently refer not to fuel cell ZEVs

NEV, would earn 1 ZEV credit when it is produced and delivered for sale in California. A 2003 and subsequent MY ZEV would earn additional credits based on the earliest model year in which it is placed in service (not earlier than the ZEV's model year). The following table shows the total number of credits the ZEV would earn, including the credit not contingent on placement in service, if it is placed in service in the specified model year or by March 31 after the end of the model year.

Table 1
Original Proposal for ZEV Credits for 2003 and Subsequent MY Vehicles

Tier	*Model Year in Which ZEV is Placed in Service*									
	2003	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012+*
NEV	1.25	0.625	0.625	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Type 0 (Utility)	1.5	1.5	1.5	1.5	1.5	1.5	1	1	1	1
Type 1 (City)	8	8	8	7	7	5	2	2	2	2
Type II	12	12	12	10	10	7	3	3	3	3
Type III	40	40	40	15	15	15	4	4	4	3

Proposed additional amendments affecting the ZEV credit calculations reflected the above changes to the structure of the calculation and experience with the program to date. These proposed changes include modification of the fast refueling definition and elimination of the in-service/warranty credit for MY 2005 and later.

Expanding manufacturers' compliance options prior to the 2012 MY. The amendments would allow a manufacturer to use AT PZEVs to meet three-quarters rather than one-half of its MY 2005-2011 ZEV obligation that could not be met with PZEVs. This would mean that for MYs 2005-2008 only 10 percent of the manufacturer's overall ZEV obligation would have to be met with ZEVs or credits from ZEVs. During the 2009-2011 MYs, an increase in the permitted AT PZEV share would mean that only 1.25 percent of a manufacturer's applicable California passenger car, LDT1 and LDT2 production volume would have to be ZEVs. These amendments were proposed to create a slower ramp up of volumes of pure ZEVs and to encourage an increase in AT PZEV volumes in the early years.

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but to Type III ZEVs. Technologies other than fuel cell vehicles that meet the specified performance criteria would qualify as Type III ZEVs. In this FSOR, the term "fuel cell vehicle" is sometimes used in place of "Type III ZEV," but we emphasize that the pertinent regulatory requirements apply to any Type III ZEVs.

Additionally, staff proposed that ZEVs be removed from the sales volume used to calculate the ZEV requirement. Staff also proposed elimination of the cap on the use of banked NEV credits when used to meet obligations that can be satisfied with allowances from PZEVs or AT PZEVs.

Refining the "placed in service" requirements. The amendments would provide that a 2001-2002 MY ZEV qualifies for the early introduction multiplier of 4.0 only if it is placed in service in California by April 15, 2003. If it was placed in service after that time, it would be subject to the credit provisions applicable to 2003 and subsequent MY ZEVs as described above.

Miscellaneous changes. The energy storage device on a hybrid electric PZEV is currently required to be warranted for 15 years or 150,000 miles, whichever occurs first. The originally proposed amendments would revise the warranty requirement for the energy storage device to 10 years or 150,000 miles. The amendments would also extend the sunset date on the award of transportation system credits from MY 2007 to MY 2011, and remove credits earned by vehicles from the cap on the use of transportation system credits.

Reaffirmation of the phased addition of LDT2s. The original hearing notice indicated that during the comment period the Board would accept comment on whether it should reaffirm the changes in the 2001 ZEV amendments that phase in a requirement that LDT2 vehicles be included in the base for calculating a manufacturer's ZEV obligation. In MY 2007, 17 percent of the manufacturer's California LDT2 production is to be counted. The percentage increases by 17 percent increments through the 2011 MY, with a 100 percent requirement starting in the 2012 MY. The staff proposed that, at the conclusion of the hearing, the Board reaffirm the inclusion of these provisions in the ZEV regulation.

B. MODIFICATIONS TO THE ORIGINAL PROPOSAL

The Board ultimately adopted the proposed regulations with substantial modifications to the original proposal. A number of the modifications reflected changes that were recommended by the staff in the March 5 Supplemental Staff Report, in some cases with additional changes made by the Board.

1. Choice of an Alternative Compliance Path or Compliance With the Percentage ZEV Requirements of the 2001 Amendments

Based on the comments of the various stakeholders, the ARB ultimately concluded that the program requirements for pure ZEVs contained in the original proposal were overly optimistic. If additional modifications were not made, the program credibility will suffer due to unrealistic requirements, particularly in 2012 when a large increase is required but considerable uncertainty exists regarding commercialization and production volumes of ZEVs. The ZEV program's 10-plus year history of regulatory amendments has dramatized the need to address the credibility issue head-on in order to move

beyond preparation for and evaluation of the requirements and into implementation and realization of air quality benefits of the program. Meanwhile, many ZEV proponents expressed concerns that the build-up of significant quantities of banked ZEV credits, primarily due to NEV placements, had created a "blackout" situation in which no new ZEV production would be required for several years. At the same time, some vehicle manufacturers argued that certain potential regulatory responses to the banked credit issue – such as an additional requirement for "fresh" credits from newly-produced ZEVs – would be unfair to manufacturers who in good faith implemented a compliance strategy based on the requirements of the 2001 amendments.

The ARB ultimately adopted a two-path compliance approach under which manufacturers have the option of either complying with the pre-existing percentage ZEV requirements, or following an alternative compliance path. Under the alternative path, a manufacturer is allowed to meet an increasing "floor" requirement for production of Type III ZEVs during four stages – MYs 2005-2008, 2009-2011, 2012-2014, and 2015-2017 – and to meet the rest of its gold requirement with credits from AT PZEVs. Thus a manufacturer that has concluded that a sound business case cannot be made for battery EVs either on a near-term or long-term basis could choose to devote its entire "gold" ZEV efforts to the development and commercialization of Type III fuel cell ZEVs. In conjunction with the two-path compliance approach, the Board in Resolution 03-4 expressed its intent to establish an independent expert review panel to report to the Board on the status of ZEV technologies and the readiness of various technologies for market and consumer acceptance. The first report is to be received by the Board in time for the Board to consider it in determining the appropriate approach on commercialization of pure ZEVs in MYs 2009 and later.

The following sections outline the rationale for this alternative approach and describe its major features.

(a) Rationale for Alternative Approach

The near-term focus of the ZEV program has been on battery EVs. While technically mature and well suited from a performance standpoint for many applications, battery EVs face severe cost challenges. As part of the 2000 ZEV Program Biennial Review, staff assembled a Battery Technology Advisory Panel (the Battery Panel) to review the performance, cost and availability of advanced batteries. The Battery Panel concluded that nickel metal hydride batteries for full function vehicles would cost EV manufacturers between $9,500 and $13,000 in quantities of 10,000 to 20,000 packs per year, and approximately $7,000 to $9,000 at production levels exceeding 100,000 packs per year.

Based on these assessments, in the ISOR for the 2001 amendments staff estimated the near-term incremental cost for battery EVs at roughly $8,000 for a City EV and $17,000 for a full function EV. In the Staff Report for the 2000 ZEV Program Biennial Review, staff estimated that at high production levels the cost of a full-function 4 passenger battery EV minus the battery pack would be equivalent to the full cost of a SULEV with an internal combustion engine. Thus at production levels exceeding 100,000 vehicles

per year, the full incremental cost of the battery EV would be the same as the cost of the battery pack. Staff knows of no reason to change this assumption.

To provide an update on current status of battery technologies and costs, in late 2002 the ARB contracted with Dr. Menahem Anderman – President of Advanced Automotive Batteries and one of the three members of the 2000 Battery Panel – to provide an evaluation of the progress in battery EV technology since the Battery Panel's work in 2000. In order to critically assess automotive battery trends, during April 2001 through March 2003 Dr. Anderman had conducted over 50 site visits to the major technical centers of leading car companies and advanced automotive battery development firms,[4] and participated in six international conferences on the subject. During February 2003, Dr. Anderman conducted a short survey, aimed at gathering specific information and projections, of major battery developers. Six major EV battery developers answered the survey.[5]

Dr. Anderman's findings based on these investigations were presented at the March 27, 2003 hearing and set forth in a report entitled "Brief Assessment of Improvements in EV Battery Technology Since the BTAP June 2000 Report." He concluded that the key conclusions of the Battery Panel's 2000 report on nickel metal hydride batteries still hold true today. He reported improvements in specific energy of between 5 and 15% – mostly related to material utilization and packaging efficiency. As did the Battery Panel, he foresees that, unless there is an unforeseen breakthrough, nickel metal hydride batteries will be able to achieve about 75 Wh/kg at the pack level. He believes a calendar life of 6 to 12 years is probably achievable if the battery is kept below 40ºC for the majority of its life.

With regard to cost, he identified several new developments:

- Production volume for consumer battery cells picked up in 1999 but has been dropping since.
- There is a significant new supply base for both materials and consumer cells in China. The new facilities include Chinese-owned plants as well as joint ventures with foreign, particularly Japanese, manufacturers.
- The new Chinese supply, in conjunction with the reduction in the total demand on the consumer market, has altered the supply/demand balance. There is now excess capacity for cells as well as for several key raw materials – all of which puts downward pressure on market prices.
- Most notably, the high-volume price of spherical nickel hydroxide (a key material) has dropped below $6/kg, a fall of about 30% in 3 years, while the ultra-high-

[4] Site visits were conducted with the following vehicle manufacturers: BMW, DaimlerChrysler, Fiat, Ford, GM, Honda, Nissan, PSA, Renault, Toyota, VW, and Volvo. The battery developers visited included Delphi, JCI, JSB, MBI, PEVE, Saft, Sanyo, Shin-Kobe, Varta, and Yuasa. In addition, in investigating the status of automotive batteries Dr. Anderman also visited ARB, Continental, the European Commission, Hitachi, LIBES, Siemens, USABC, UC Davis, Valeo, and Visteon.

[5] The responding battery manufacturers were Japan Storage Battery (Kyoto, Japan), Johnson Controls (Milwaukee, Wisconsin), Matsushita Battery Industry [Panasonic] (Kosai City, Japan), Saft (Bordeaux, France and Cockeysville, Maryland), and Shin-Kobe Electric Machinery (Saitama, Japan).

volume bare cell pricing of Chinese-made products has dropped below $200 per kilowatt-hour.
- The price of ultra-high-power HEV packs is currently about $750 per kilowatt-hour for volumes on the order of 20,000 to 50,000 packs.

While the Battery Panel's 2000 report did not project these specific developments, Dr. Anderman does not see them as significant enough to change the cost projections for future pricing of nickel metal hydride batteries for battery EVs. He concluded that, "unless a major worldwide change occurs in nickel prices, the lowest price for packs at ultra-high production volume (100,000s packs per year) is still between $250 and $300 per kilowatt-hour, which translates to a minimum of $7,500 for a typical 30-kilowatt-hour EV-battery pack – required for a fully functional midsize EV."

Dr. Anderman also evaluated lithium ion EV batteries. Along with continuing issues of durability and safety under severe abuse, cost remains a major challenge. The Battery Panel had concluded that without major advances in materials and manufacturing technology, the cost of lithium ion batteries is unlikely to drop those of nickel metal hydride even in true mass production. Dr. Anderman concluded that, "Although cost is dropping, we are not aware of any major breakthrough in material selection or processing that can support significantly lower prices than those of NiMH."

In addition, independent of cost issues, recent marketing experience indicates that although there is a base demand from regulated electric utilities and EV early adopters, the sustainable level of demand appears to be small at least in the near term. Staff is aware of recent advances in battery performance, in particular with regard to cycle life, and will continue to track such developments and factor them in to its future consideration of program status. Battery EV development will also be assessed by the Independent Expert Review Panel described below. At present, however, any recent advances do not appear to significantly alter the fundamental cost equation for battery EVs – a near-term incremental cost of an estimated $17,000 for a mid-size full function battery EV with a range of 70-100 miles compared to the cost of an equivalent conventional vehicle (or $16,900 more than a PZEV).

Even if very high production levels exceeding 100,000 battery packs per year could be reached, such that the incremental cost for battery EV components other than the battery pack drops to zero, the incremental per vehicle cost for a full function battery EV would be $7000 to $9000. To put these production levels in perspective, in the 2001 ZEV rulemaking staff estimated that under its base case scenario, the regulation as amended in 2001 would result in about 24,500 full function ZEVs in the 2015 model year and about 33,250 in the 2020 model year. Under these circumstances, it is not surprising that the major automobile manufacturers express an unwillingness to develop or produce additional full function battery EVs.

Fuel cell vehicles are far more costly than battery EVs in their current stage of development, and face additional technical and engineering challenges involving durability, cold weather performance, and other factors. Manufacturers appear to

believe there is a business case for fuel cell development. Staff concurs that the technology shows great promise and fully expects fuel cell development to proceed to commercialization. At present, however, fuel cell ZEVs are clearly not ready for volume production.

Meanwhile, rapid advances in PZEV and AT PZEV development have resulted in widespread availability of extremely clean vehicles. An estimated 140,000 PZEVs are being marketed in the 2003 model year, and two AT PZEV models have been certified are being actively marketed – the MY 2004 Honda Civic hybrid and the MY 2004 Toyota Prius. More will be available in the near future. Volume production of such vehicles will result in air quality improvement and, in the case of AT PZEVs, will also build the manufacturing and supplier base for componentry that will eventually be used on pure ZEVs.

Under these circumstances, the ARB has concluded that the best course of action is to take full advantage of the near-term possibilities afforded by PZEVs and AT PZEVs, and adopt a stepwise approach towards pure ZEV commercialization that takes into account the desire of vehicle manufacturers to devote their entire "gold" vehicle focus to fuel cell ZEVs. At the same time, a variety of incentives are provided for manufacturers who may wish to market battery EVs or keep battery EVs on the roads longer. The following sections describe the major elements of the alternative compliance approach.

(b) Compliance With the Percentage ZEV Requirements of the 2001 Regulation As an Option (§ 1962(b)(2)(A))

The originally proposed amendments to the percentage ZEV requirements for large volume manufacturers in section 1962(b)(2)(A) have been deleted. Thus large volume manufacturers that choose not to pursue the alternative compliance approach discussed below will have the option to achieve compliance essentially under the terms and conditions of the 2001 regulation's percentage requirements. For example, a manufacturer could choose to satisfy its entire ZEV obligation using banked credits, subject to the existing NEV cap limitation in the gold category.

The reason for this modification is to assure that a manufacturer that developed a compliance plan in reliance on the provisions of the ZEV regulation as amended in 2001 has the ability to continue with that compliance plan if the manufacturer chooses to do so. Some manufacturers have made good faith efforts to comply by building, marketing and placing ZEV products. This resulted in their legitimate accrual of ZEV credits, sufficient in some cases to defer the need for additional vehicles for a number of years. Although some have suggested that the resulting "ZEV blackout" should be addressed by devaluing such early credits, in staff's view it is more important in the long run to recognize and preserve the value of the early efforts that were undertaken.

(c) Minimum Floor Level for New Type III ZEV Production in MYs 2005-2017 (§ 1962(b)(2)(B)1.)

The key element of the alternative compliance path is the requirement that manufacturers produce demonstration and ramping numbers of new Type III ZEVs, while allowing the remaining gold obligation to be back-filled with silver vehicles up to the full gold obligation levels set in the 2001 amendments. In addition, up to one-half of the Type III ZEV obligation can be met with credits generated by larger numbers of Type I and II ZEVs and credits from the extending the service life of such vehicles. The first two subsections below cover the Type III ZEV floor levels, followed by a subsection on credits from Type I and II ZEVs.

(i) Minimum Floor Level for Type III ZEVs in MYs 2005-2008 (§ 1962b)(2)(B)1.a.)

In order to use the alternative compliance path during MYs 2005-2008, a large volume manufacturer must produce Type III ZEVs (cumulative total over the 2001 through 2008 model years) sufficient to achieve a minimum floor credit level. The minimum floor requirement, if met by all manufacturers, is expected to result in a cumulative total of roughly 250 Type III ZEVs produced by the large manufacturers over the 2001-2008 model years. This number of Type III ZEVs should be fully sufficient to satisfy the need for small-scale demonstration programs, which are the next logical step in the path to commercialization of fuel cell vehicles. At this level, all manufacturers appear to be able to formulate a viable strategy – either on the base or alternative paths – although the alternative path requirements are higher than some would choose.

To achieve the targeted cumulative total number of Type III ZEVs, for each manufacturer the level is set at 1.09 percent of the manufacturer's average annual sales of PC and LDT1 vehicles over the 5-year period from model years 1997 through 2001. The obligation will be assessed against these past years in order to provide greater certainty as to the number of vehicles to be produced. In order to provide a uniform credit level through the MY 2001-2008 period, the credit level for 2006-2008 Type III ZEVs has been increased from 15 to 40 as described in Section B.4.

(ii) Minimum Floor Level for Type III ZEVs in MYs 2009-2011, 2012-2014, and 2015-2017 (§ 1962(b)(2)(B)1.b.-e.)

The alternative compliance path also includes also minimum floor requirements for the production of Type III ZEVs in MYs 2009-2011, 2012-2014, and 2015-2017. The modified staff proposal contained in the March 5, 2003 Supplemental Staff Report and presented to the Board at the March 2003 hearing did not specify any minimum floor Type III ZEV production level for MYs 2009 and subsequent. Rather than establishing the requirement at this time, staff recommended that it be set in a future rulemaking following the initial technology review by the Independent Expert Review Panel. Staff recognized, however, that the determination as to whether minimum floor levels for MYs

2009 and subsequent should be established at this time was a policy decision that needed to be addressed by the Board.

After considering the extensive public comments and additional staff analysis, at the April 2003 hearing the Board initiated action to establish specific minimum production levels for the MY 2009-2011 and subsequent time periods. The calculation methods are designed to result in 2,500 Type III ZEVs in MYs 2009-2011, 25,000 Type III ZEVs in MYs 2012-2014, and 50,000 Type III ZEVs in MYs 2015-2017 if all large volume manufacturers participate in the alternative compliance path.

The specified volumes are based on the principle that early production for new types of vehicles proceeds in stages in which volumes typically grow from tens to hundreds and then to thousands. This growth pattern has been affirmed in staff discussions with automobile and fuel cell manufacturers. The numbers are also generally consistent with the U.S. Department of Energy targets when those targets are scaled to California rather than national coverage. In its discussion of possible approaches, the Board noted that these target volumes present a realistic goal. The resulting production totals will require manufacturers to mount a substantial research and development program, which is the key factor needed for successful commercialization.

The method used to derive the percentage requirements for the 2009-2011 and subsequent time periods is similar to the method used for the 2001-2008 time period with the following differences: (1) the percentage requirements are assessed against more recent sales periods, (2) the percentage requirements are assessed against the manufacturer's ZEV obligation, rather than against vehicle sales, (3) the calculations are designed to generate larger numbers of vehicles (2,500 in 2009-2011, 25,000 in 2012-2014, and 50,000 in 2015-2018), and (4) rather than specifying a fixed percentage for each time period, the calculation method derives the percentage for each time period that is needed to generate the target number of Type III ZEVs, taking into account actual sales.

For example, the alternative path percentage requirement for 2009-2011 is assessed against the manufacturer's section 1962(b)(1) percentage ZEV requirement for the 2010 model year, based on the "prior year method" described in section 1962(b)(1)(B). Given the operation of the prior year method this means that the requirement for the 2009-2011 period is based on the manufacturer's three-year average sales for 2003-2005. Similarly, the requirement for the 2012-2014 time period is based on 2006-2008 average sales, and would result in 25,000 vehicles; the requirement for 2015-2017 is based on 2009-2011 average sales and would result in 50,000 vehicles.

This approach was chosen for several reasons. First, it results in the desired target number of vehicles. Alternative approaches that use a predefined percentage would result in more or fewer vehicles, depending on actual future sales. Second, this method provides a known, firm target for manufacturers that allows ample lead-time. At the conclusion of sales reporting for the 2005 model year manufacturers will know with certainty their 2009-2011 obligation. This simplifies compliance planning. Third, the

use of more recent sales data allows the requirement to better track any changes in market share, and also allows for the incorporation of LDT2 sales as is the case on the base path. This results in a more equitable distribution of the compliance burden. Finally, assessing the requirement against the ZEV obligation rather than against sales simplifies the calculation – the LDT2 phase-in is "built in" to the calculation and does not need to be added in separately.

(iii) Using Type I and Type II ZEVs to Meet Up to One-Half of the Minimum Floor Levels for Type III ZEVs (§1962(b)(2)(B)1.b.-d.)

A large volume manufacturer is allowed to meet up to one-half of the minimum floor requirements with credits from Type I and Type II ZEVs. This provides an additional incentive for the production of fresh battery EVs while maintaining a core alternative compliance path requirement for production of fuel cell vehicles. Since the intent is to incentivize new Type I and II ZEVs, the battery EVs must have been produced in the 2004 or subsequent model years. In the MY 2005-2008 and 2009-2011 periods, 20 Type I ZEVs, or 10 Type II ZEVs, would equal one Type III ZEV. These credit ratios are designed to reflect relative costs of the battery EV and fuel cell vehicle technologies – with a bias to make battery EV substitution more economically attractive – based on cost data received from Cal ETC. For 2012 and later, 10 Type I ZEVs, or 5 Type II ZEVs equal one Type III ZEV. The ratios for the 2009 and subsequent model years are based on limited cost data, and those ratios may need to be amended in the future when new cost information is available.

In addition, credits earned by extended in-use Type I and Type II ZEVs in MYs 2003-2011 may be used at a 33 to 1 credit ratio towards satisfaction of the one half of the minimum floor requirement that could be met by Type I and Type II ZEVs. This mechanism is designed to encourage re-leasing of existing Type I and II ZEVs. Since subsection (f) has a well-developed mechanism for rewarding extended service of existing ZEVs, under the new modified language a ZEV's qualification depends on its qualification under subsection (f) (the modifications to subsection (f) are discussed in Section II.B.10.) This mechanism is sunsetted after the 2011 model year because the extended service multiplier in subsection (f) does not apply after the 2011 model year.

(iv) Other Provisions Related to the Minimum Floor Level Requirements for Type III ZEV Production (§§ 1962(b)(2)(B)1.f.-i.)

Transportation system credits would not be counted in the floor level calculations, since the target numbers of credits used in the calculations were set on the premise that all floor level credits would come from new Type III ZEVs without accounting for transportation system credits.

A large volume manufacturer is permitted to carry over excess credits from Type III ZEVs in a given period and use the credits towards meeting the minimum floor level in a subsequent period. The value of the carry over credits will be based on the model year in which the credits are used. This approach provides some incentive for a

manufacturer to exceed the floor level in the earlier years, while avoiding a situation in which highly valued early-year credits offset large volumes of Type III ZEVs that would otherwise be required in subsequent periods.

Any manufacturer who elects to be subject to the alternative path for any model year and then fails to meet the minimum floor level requirements for Type III ZEVs by the end of the three or four year period in which the model year falls will be treated as subject to the primary requirements for that three or four year period. This provision is necessary to clearly state the consequences for failing to meet the floor level requirements. Since compliance with those requirements is determined on a multi-year basis, it is appropriate to treat failure to comply on the same multi-year basis.

In order to give clear guidance to manufacturers, the regulation provides that the number of Type III ZEVs a manufacturer needs to produce under the minimum floor requirements will be rounded to the nearest whole number.

The regulation also provides that ZEV credits earned by vehicles produced to satisfy the floor obligation will also count towards compliance with a manufacturer's 10 percent obligation in the year in which the vehicle is produced, since there is no reason for those credits not to be counted towards the percentage ZEV requirements.

(d) Use of AT PZEV Credits in the Gold Category Under the Alternative Compliance Path (§ 1962(b)(2)(B)2.)

A large volume manufacturer using the alternative compliance path and meeting the Type III ZEV minimum floor requirements will be allowed to use AT PZEV credits earned by vehicles (i.e. excluding transportation system credit) in the gold category for purposes of meeting the percentage ZEV requirements.

(e) Election of the Primary or Alternative Requirements for Large Volume Manufacturers (§ 1962(b)(2)(C))

The regulation provides that a large volume manufacturer is treated as being subject to the primary compliance path for MY 2005 unless the manufacturer notifies the Executive Officer before the start of that model year of its election to be subject to the alternative path. Thereafter, the manufacturer will be subject to the same compliance option as the previous model year unless it notifies the Executive Officer of its election to switch compliance options. A manufacturer that has elected to be subject to the primary requirements in one or more model years in one of the three or four year periods may elect to switch to the alternative path before the end of the three or four year period as long as it meets the alternative path requirements for the full period. These provisions are necessary to clearly spell out how elections are to be made, and to assure there is a default option that will apply for each year. Compliance with the full 3 or 4 year minimum production obligation under the alternative path is required to assure that manufacturers choosing the alternative path are aggressively and consistently pursuing the development of fuel cell or other Type III ZEVs.

(f) Independent Expert Review Panel

In adopting Resolution 03-4 at the April 24, 2003 hearing, the Board expressed its intent to establish an independent expert review panel to report to the Board on the status of ZEV technology development. The relevant portion of the Resolution provided as follows:

> BE IT FURTHER RESOLVED that the Board shall appoint an Independent Expert Review Panel, whose members shall not have financial ties to motor vehicle manufacturers, to report to the Board on the status of ZEV technologies and the readiness of various technologies for market and consumer acceptance, after consulting with members of the California Fuel Cell Partnership and other experts in connection with its review; that the Panel Report should be received by the Board in time for the Board to consider it and other information in determining the appropriate regulatory approach on the commercialization of pure ZEVs in the 2009 and subsequent model years; and that it is the intent of the Board that the Panel not make recommendations on regulatory action, and only the Board itself shall decide whether amendments to the regulatory requirements are to be made.
>
> BE IT FURTHER RESOLVED that the Independent Expert Review Panel shall also review and report to the Board on the extent to which the development and production of AT PZEVs have contributed towards commercialization of fuel cell vehicles, whether economies of scale have largely been achieved and technology largely optimized, and the potential that future increases in the number of AT PZEVs produced pursuant to the ZEV regulation as amended in this rulemaking will further contribute to the commercial success of fuel cell ZEVs.

The role and composition of the Independent Expert Review Panel is not specified in the regulation because it does not have regulatory powers. While the panel will provide input to the Board for consideration, its findings would not bind the Board in any way.

2. Increase ZEV Credits for 2006-2008 MY Fuel Cell Vehicles (§1962(d)(5)(B))

The staff originally proposed that MY 2003-2005 Type III vehicles receive 40 ZEV credits, with the credits dropping to 15 in MYs 2006-2008. The credits in these later model years have been increased in order to extend the 40 credit level through 2008. Since the fuel cell vehicle floor provisions under the alternative compliance path start with a cumulative requirement covering MYs 2005-2008, it makes sense for all of the Type III vehicles in this four-year period to generate the same number of ZEV credits.

This represents the only modification made to the credit levels of the original proposal shown in Table 1. There were no modifications made to the five new categories of ZEVs.

3. Allow Certain Early PZEV Placements to Earn AT PZEV Credits (§ 1962(b)(2)(D))

Under the 2001 ZEV amendments, manufacturers were required to demonstrate compliance beginning with the 2003 model year. In light of the federal injunction against enforcement of the 2001 amendments with respect to MY 2003 and 2004 vehicles, the current rulemaking is delaying the onset of required compliance until MY 2005. Because of the lead-time involved in developing vehicles, however, some manufacturers have already made plans that allow them to offer PZEVs during MYs 2003 and 2004. Since these same manufacturers generally would have the ability to take full advantage of the PZEV option in 2005 and subsequent model years using current production in each year, banked PZEV credits would have little value and these manufacturers would accordingly have little incentive under the January 2003 staff proposal to produce PZEVs during MYs 2003 or 2004. Meanwhile, providing the extended warranty needed to certify vehicles as PZEVs imposes additional costs on manufacturers.

In order to capture the potential air quality benefits afforded by additional PZEV production, and to provide early experience with such technologies, an incentive has been added to encourage manufacturers to certify MY 2003 and 2004 vehicles as PZEVs. This has been accomplished by making credits earned by "excess" PZEVs in the MYs 2003 and 2004 available for use in the AT PZEV category in the 2005 and 2006 model years. Credits from MY 2003 and 2004 PZEVs will be "excess" to the extent they exceed the number of credits from PZEVs that would be required to take full advantage of the PZEV option in each year, had the percentage ZEV requirements been applicable. For example, if a manufacturer could use 500 credits under the PZEV option, credits earned in excess of 500 in each year will be available for use in the AT PZEV category in MYs 2005 or 2006.

Since banked AT PZEV credits may be used in the gold category under the alternative compliance path, no further incentives were necessary to encourage early production of AT PZEVs.

4. Modifications to the AT PZEV Provisions

(a) Advanced Componentry Credit for Use of a Qualifying HEV Electric Drive System (§ 1962(c)(4)(B))

The Board has made a number of modifications to the criteria for determining if a HEV earns advanced componentry credit. The specific criteria are set forth in Table 2 below. In brief, the Board has established five categories of HEVs that qualify for credits:

- Type A: Low voltage, low power HEV (< 60 volts, minimum 4 kW motor power)
- Type B: High voltage, low power HEV (≥ 60 volts, ≥ 4 kW - <10kW motor power)
- Type C: Low voltage, medium power, advanced energy storage HEV (< 60 volts, ≥ 10 kW motor power)
- Type D: High voltage, medium power HEV (≥ 60 volts, minimum 10 kW motor power
- Type E: High voltage, high power HEV (≥ 60 volts, minimum 50 kW motor power)

This approach retains the use of a maximum power rating for the electric drive system, but eliminates the use of "peak power ratio" as a criterion for advanced componentry qualification. Instead, the criteria for HEVs to qualify for AT PZEV credits are voltage level and rated peak power, along with traction drive boost, regenerative braking, and idle start/stop. Hybrid vehicles exhibiting these attributes are "ZEV enabling" because they lead directly to performance improvements and more cost-effective electric drive systems for ZEVs.

The modifications are premised on the proposition that HEVs equipped with high-voltage electric drive systems better advance the technology and manufacturing base for ZEVs. In order to meet the high power propulsion demands of light duty ZEVs, high voltage systems will be necessary in order to avoid excessive energy losses at impractical current levels. Therefore high voltage should also be a qualifier for higher AT PZEV advanced componentry credit. The credits for the five types of qualifying HEVs reward ZEV enabling technology, and increasing credit is awarded with increasing applicability to ZEVs.

Type A Low Voltage, Low Power HEVs. Type A HEVs are identified in Table 2 as having system voltage less than 60 volts and a drive system peak output of at least 4 kilowatts. Type A HEVs will not receive an additional advanced componentry credit, but the base 0.2 PZEV credit earned by such vehicles will be available for use in the AT PZEV category through MY 2008. These vehicles advance electric drive technology to the extent that they might be applicable in selected low power ZEV applications, and they help develop consumer recognition of HEV technology. These systems are expected to become commonplace in standard automobiles and reach technical maturity much more rapidly than the more challenging high-voltage systems. For this reason, credit earned by low voltage systems will not be eligible for use in the AT PZEV category after MY 2008.

Type B High Voltage, Low Power HEVs. HEVs in this category have higher voltages than Type A HEVs, and accordingly will earn an additional AT PZEV allowance of 0.2 in MYs 2008 and earlier. Treatment of Type B HEVs as AT PZEVs is sunset after the 2008 model year because of their relatively low power characteristics.

Type C: Low Voltage, Medium Power, Advanced Energy Storage HEVs. The Type C category provides additional allowances for certain hybrids that provide substantial drive system peak output power (greater than 10 kW), since these systems are also expected to act as significant "stepping stones" to future electric drive vehicles even though they do not use high-voltage systems. During the 2011 and earlier model years, Type C HEVs will earn an additional AT PZEV allowance of 0.2 – half the additional allowance for Type D HEVs. In order to assure that these vehicles have significant ZEV-enabling traction drive features, there is an added requirement that Type C HEVs be equipped with an advanced traction energy storage system – such as nickel metal-hydride batteries, ultracapacitors, or other similar systems – with a design lifetime of at least 10 years. The Type C HEV credit sunsets after 2011 since the benefits of encouraging this intermediate class of HEVs diminishes with time.

Type D: High Voltage, Medium Power HEVs. High Voltage HEVs are identified in Table 2 as having system voltage greater than 60 volts and drive system peak output of at least 10 kW. An example of this class of hybrid is the MY 2004 Honda Civic HEV. Type D HEVs will qualify for an advanced ZEV componentry credit of 0.4 for MYs 2003 through 2011. The Board anticipates that in the 2012 and later timeframe, high-voltage 10+ kW systems may also become commonplace, and their benefit towards the promotion of ZEVs will diminish as volumes grow. The advanced componentry credit for these systems will accordingly be reduced in stages, first to 0.35 in MYs 2012-2014, and then to 0.25 in the 2015 and subsequent MYs.

Type E: High Voltage, High Power HEVs. High Voltage, High Power HEVs are identified in Table 2 as having system voltage greater than 60 volts and a drive system peak output of at least 50 kW. Examples of Type E hybrids include the MY 2004 Toyota Prius and the upcoming Lexus RX400 and Ford Escape HEVs. Type E HEVs will qualify for an advanced componentry credit of 0.5. At this motor size, although the ratio of motor power to total drive system power may be quite low for selected vehicles with large engines, some HEV motors may have sufficiently high power ratings to meet or exceed the power requirements for small ZEVs.

The HEV severability provisions in section 1962(c)(4)(B)7. have been modified to reflect the modifications in the rating system for HEVs.

Table 2
Hybrid Electric Vehicle Advanced Componentry Requirements and Credit

Characteristics	***Type A***	***Type B***	***Type C***	***Type D***	***Type E***
Electric Drive System Peak Power Output	>= 4 kW	>= 4 kW <10 kW	>= 10 kW	>= 10 kW	>= 50 kW
Traction Drive System Voltage	<60 Volts	>= 60 Volts	< 60 Volts	>= 60 Volts	>= 60 volts
Traction Drive Boost	Yes	Yes	Yes	Yes	Yes
Regenerative Braking	Yes	Yes	Yes	Yes	Yes
Idle Start/Stop	Yes	Yes	Yes	Yes	Yes
10 year/ 150k mile Battery Warranty	Yes	Yes	Yes	Yes	Yes
Advanced traction energy storage system w/ design life of at least 10 yrs.	N/A	N/A	Yes	N/A	N/A
PZEV Status	AT PZEV (2008 MY or earlier only)	AT PZEV (2008 MY or earlier only)	AT PZEV (2011 MY or earlier only)	AT PZEV	AT PZEV
Base Credit	0.2	0.2	0.2	0.2	0.2
Maximum Advanced Componentry Credit					
MY 2003-2011	0.0	0.2	0.2	0.4	0.5
MY 2012-2014	0.0	0.0	0.0	0.35	0.45
MY 2015+	0.0	0.0	0.0	0.25	0.35
Total Credit	0.2	0.4	0.4	0.6 to 0.45	0.7 to 0.55

(b) Hybrid Electric Vehicle Energy Storage Device Warranty Requirement (§ 1962(c)(2)(D))

HEVs certified as AT PZEVs would be subject to the PZEV extended warranty requirement. Under the original proposal, HEV batteries and/or capacitors that provide traction power and absorb regenerative braking energy would then be subject to the HEV energy storage 10 year, 150,000 mile warranty requirement.

In the January 10, 2003 staff proposal, the regulatory language used for the proposed modifications to the battery warranty was ambiguous. It was not intended for the on-board diagnostic (OBD) elements of the energy storage system to be exempted from the extended warranty provisions. The Board has clarified the regulatory text so that energy storage OBD monitoring systems are outside of the warranty coverage limitations and must continue to operate as required by OBD regulations. References

to hydraulic or pneumatic systems have also been eliminated, because evidence has not yet been provided that shows these systems can move beyond hybrid-augmentation of conventional vehicles to become the sole power source for practical ZEVs. The objective of the AT PZEV provisions is not to encourage all hybrids, but rather just those that incorporate technologies that may someday provide full-time propulsion for ZEVs.

An additional requirement for Type C HEVs is that their traction energy storage devices must have a design lifetime of at least 10 years. While all HEVs must have full-cost battery warranties of at least 10 years or 150,000 miles, whichever occurs first, a manufacturer could meet this requirement by using batteries having a shorter life and replacing the batteries under warranty as necessary. The Type C requirement of a design life of at least 10 years was added because the objective of the AT PZEV provisions is to encourage technologies that are more likely to be desirable for application in Type II or II ZEVs, including longer-life batteries.

(c) Limit on Maximum Zero-Emission VMT Credit Under an Alternative Procedure (§ 1962(c)(3)(B))

As was the case with prior versions of the regulation, the original proposal allowed additional credit for vehicles – such as grid connect HEVs – that operate part of the time in zero emission mode. The credit earned is based on the zero emission range of the vehicle. The regulatory language authorizes the Executive Officer to approve an alternative procedure for determining the zero-emission VMT potential of the vehicle as a percent of total VMT. An example is provided under which a vehicle that has zero emissions of one but not all pollutants (e.g. a reformer fuel cell vehicle or a hydrogen ICE vehicle) can also earn credit up to one-half that of a vehicle with zero emissions of all regulated pollutants. Because vehicles covered by this example are likely to reach the maximum range specified in the regulation, the mechanism has been simplified by removing the reference to ZEV range and incorporating a maximum credit cap of 1.5 for the example.

(d) AT PZEVs Qualifying for Both Zero Emission Range and Advanced Componentry Credit (§ 1962(c)(4))

The Board has modified section 1962(c)(4) so that an AT PZEV qualifying for both the zero emission VMT credit and the advanced ZEV componentry credit will be allowed to make use of both credits. The combined use of both features is of further benefit and should therefore be rewarded. This will allow, for example, a hydrogen ICE vehicle that is also equipped with a high voltage hybrid electric drive system, or an Indirect Methanol FCV, to be rewarded for both zero emission VMT and advanced componentry features. Table 3 lists example credit values for a variety of AT PZEVs to illustrate the application of this modification.

(e) Use of High Pressure Gaseous Fuel or Hydrogen Storage System (§ 1962(c)(4)(A))

In the January 10, 2003 proposal the regulatory language regarding hydrogen storage was unclear. Staff did not intend that hydrogen fueled high-pressure gaseous vehicles receive both the 0.1 credit for gaseous storage and the 0.2 credit for exclusive fueling on hydrogen. The Board has therefore modified this language to indicate that these are alternative, not additive, credits. However, the Board recognizes the considerable technical challenges associated with on-vehicle storage of gaseous and hydrogen fuels and has accordingly increased the advanced componentry credit for these high-pressure storage systems be increased from 0.1 to 0.2 for CNG and from 0.2 to 0.3 for hydrogen.

The Board has also included a further modification that allows dual fuel CNG-hydrogen vehicles to earn the higher 0.3 hydrogen storage advanced componentry credit if these vehicles are capable of operating exclusively on 100 percent hydrogen. The preexisting regulatory language unnecessarily restricted this credit to vehicles fueled exclusively by hydrogen. This change will reward vehicles that are equipped with hydrogen-capable storage systems that advance the technology and manufacturing capability for hydrogen systems whether or not they are fueled on hydrogen 100 percent of the time.

(f) Application of Early Introduction Multiplier and Zero Emission Range Multiplier (§ 1962(c)(7))

The Board has made a modification making it clear that the early introduction multiplier and the zero emission range multiplier are not to be combined. The zero emission range multiplier was a modified phase-in multiplier and was intended as an alternative to the standard PZEV introduction phase-in multiplier. These multipliers were introduced in order to accelerate the development and deployment of PZEVs and to recognize that a subset of AT PZEVs, those earning zero emission range credit, would not be ready for market introduction for several more years. The phase-in multiplier for PZEVs that earn a zero emission VMT credit was developed as a substitute for the default PZEV phase-in multiplier, so the regulatory language has been clarified to expressly allow PZEVs to make use of only one multiplier instead of both.

(g) Cap On the Value of an AT PZEV Allowance Based on the Credit Value of a Type III ZEV (§ 1962(c)(6)(B)2.)

Another modification adds a provision limiting the combined credit for any AT PZEV – including plug-in hybrids that earn a zero emission VMT allowance – to no more than that earned by a Type III PZEV in the same model year. This results in a credit cap of 4 in MYs 2009-2011. The regulation provides sufficient incentives for AT PZEVs, and in particular plug-in HEVs, without awarding them more credit than Type III ZEVs. The staff expects that MY 2009-2011 plug-in hybrids, if produced, will be certified with a modest range capability that allows them to still take advantage of the phase-in multiplier without being limited by the cap based on credits earned by Type III ZEVs.

(h) Combined AT PZEV Credit Examples

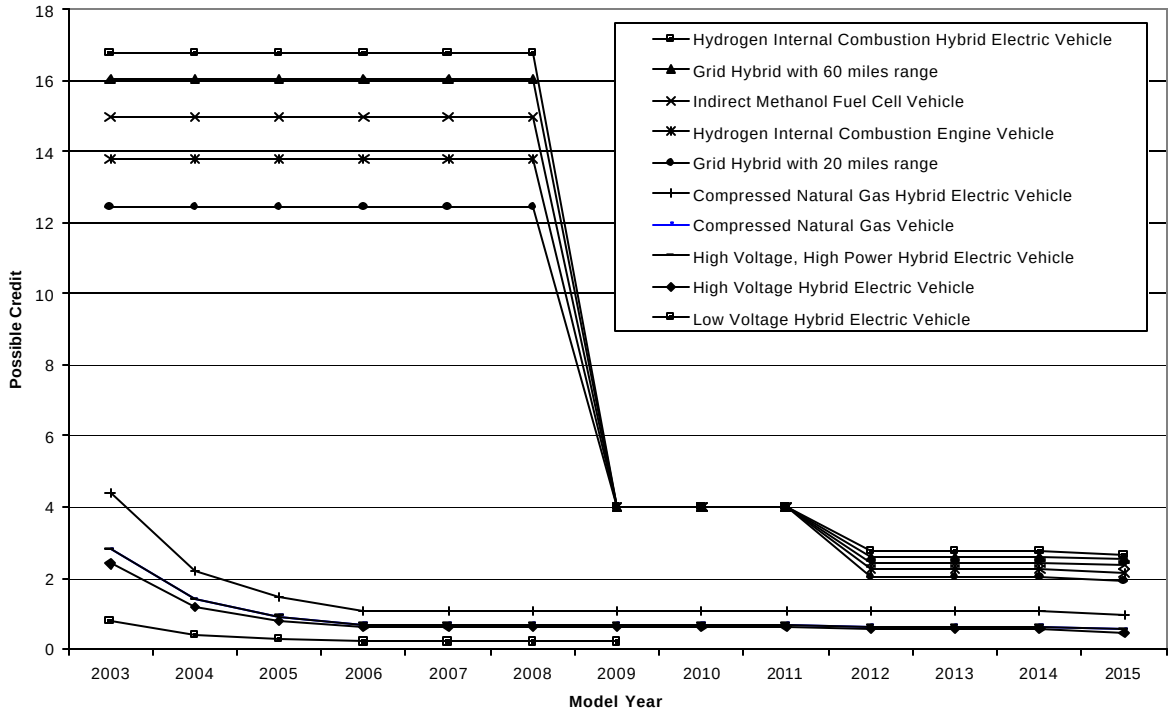
The following table provides examples of credits for a variety of AT PZEV types with the modifications to the original proposal. These examples are for illustration purposes only and are, in some cases, dependent on a successful application to the Executive Officer for credits on particular vehicle configurations. It is entirely possible that different manufacturers' vehicles of the same general type may earn different AT PZEV credit.

Table 3
MY 2005-2011 AT PZEV Credit Determinations
(without multipliers)

	Zero Emission Range	Base Credit	Zero Emission Range Credit	Zero Emission Range Credit	Advanced Componentry Credit		Low Fuel Cycle Emission Credit	Total Credit
	Miles		Zero Emissions for single pollutant	Zero Emissions for all pollutants	Tanks	High Voltage		Without Early Intro Multipliers
Type A Low Voltage, Low Power HEV	0	0.2				0		0.2 Thru '08
Type B High Voltage, Low Power HEV	0	0.2				0.2		0.4 Thru '08
Type C Low Voltage, Medium Power HEV	0	0.2				0.2		0.4
Type D High Voltage, Medium Power HEV	0	0.2				0.4		0.6
Type E High Voltage, High Power HEV	0	0.2				0.5		0.7
Compressed Natural Gas Vehicle	0	0.2			0.2		0.3	0.7
Compressed Natural Gas Hybrid Electric Vehicle (10 kW)	0	0.2			0.2	0.4	0.3	1.1
Hydrogen Internal Combustion Engine Vehicle	0	0.2	1.5		0.3		0.3	2.3
Indirect Methanol Fuel Cell Vehicle	0	0.2	1.5			0.5	0.3	2.5
Grid Hybrid with 20 miles electric Range	20	0.2		1.25		0.5	0.12	2.1
Grid Hybrid with 30 miles electric Range	30	0.2		1.40		0.5	0.15	2.3
Grid Hybrid with 60 miles electric Range	60	0.2		1.82		0.5	0.15	2.7
Hydrogen Internal Combustion Engine Hybrid Electric Vehicle 10 kW	0	0.2	1.5		0.3	0.4	0.3	2.7
Compressed Natural Gas Hybrid Electric Vehicle with 20 Miles Electric Range	20	0.2		1.25	0.2	0.5	0.3	2.5

Figure 1 below shows the credit levels for selected vehicle types over time, taking into account the applicable early introduction multipliers.

Figure 1
AT PZEV Credit



5. Retain the NEV Cap in the Silver Category, But Delay the Cap Until MY 2009 (§ 1962(g)(6))

The 2001 ZEV amendments established a cap on the use of credits banked from MY 2001-2005 NEVs. Beginning in MY 2006, a manufacturer could satisfy no more than 75 percent of any program category (gold, silver, or bronze) using banked NEV credits. The maximum allowable use of banked NEV credits decreased to 50 percent in any program category for MYs 2007 and later.

The original proposal removed the NEV cap from the silver and bronze categories. The rationale for this change was to provide greater lead-time and additional flexibility for manufacturers to take advantage of the AT PZEV and PZEV options. The cap would have been retained in the gold category to ensure that manufacturers would need to meet some minimum portion of the gold category using credits from vehicles other than NEVs.

Under the finally adopted amendments, the NEV cap in the silver category is being retained, but imposition of this silver category cap has been delayed from MY 2006 to MY 2009. Thus a manufacturer will be permitted to satisfy no more than 75 percent of the AT PZEV category using banked NEV credits in the 2009 model year, with the percentage decreasing to 50 percent in the 2010 and subsequent model years. This modification is designed to ensure some minimum level of AT PZEV production in MYs 2009 and later without regard to the availability of NEV credits, while providing lead time

and flexibility in the years prior to 2009 for manufacturers that may not have sufficient AT PZEV products available in that timeframe.

As a result of this change, manufacturers choosing the alternative compliance path will not be subject to any NEV cap prior to the 2009 model year. Through the 2008 model year such a manufacturer may meet its gold obligation using any combination of new gold vehicles, banked gold credits, new silver vehicles, or banked silver credits. The cap on the use of banked NEV credits in the silver category would take effect in 2009 and subsequent model years.

Another modification to section 1962(g)(6) makes clear that credits may be acquired from any party and not just a manufacturer; it is not the Board's intent to preclude a party that is not a manufacturer from acquiring credits and then marketing them.

6. Type III ZEVs Placed in a Section 177 ZEV State Applied Towards Compliance in California (§ 1962(d)(5)(D))

Section 177 of the federal Clean Air Act allows other states to adopt California's motor vehicle emission standards. New York, Massachusetts and Vermont have adopted ZEV requirements based on the California program, and their officials have indicated their intent to continue to do so. Auto manufacturers have expressed concern that the ZEV program obligations in California are multiplied across other states that have adopted California's ZEV program. This "travel" issue is of particular concern when considering requirements for the production of fuel cell vehicles, as the nearer-term volumes necessary to comply are challenging under the California program by itself. The value of additional fuel cell vehicles required under the ZEV programs in section 177 states is limited during the period those vehicles are being introduced on a demonstration basis. If the MY 2005-2008 alternative compliance path cumulative floor level of 250 Type III ZEVs is applied to all states administering the ZEV program, the total number of Type III ZEVs increases by 1.7 times to 425 fuel cell vehicles.

For these reasons, section 1962(d)(5)(D) has been added to provide that Type III ZEVs placed in any state that has adopted California's ZEV program be allowed to count towards California's ZEV requirement, including the requirements for a minimum floor for production of Type III ZEVs under the alternative compliance path through MY 2011. Similarly, under identical programs adopted by Section 177 states, Type III ZEVs placed in California would have to count towards the ZEV requirement in those other states. The effect of this provision is that during the MY 2005-2008 and MY 2009-2011 periods in which the target numbers of alternative path Type III ZEVs are 250 and 2500 respectively, those numbers would essentially apply on a combined basis in California and all Section 177 states administering a California ZEV program. In fact, those target numbers were chosen with the expectation that they would reflect nationwide volumes. The mechanism would no longer apply when the target level of fuel cell vehicles is ramped up to 25,000 in the MY 2012-2014 time period because at that point the incremental cost of fuel cell vehicles is expected to decline significantly, and the

requirement for increased production volume would help rather than hinder progress towards commercialization.

The Board appreciates the forward-looking and cooperative approach of the New York and Massachusetts officials who have supported this approach as long as it is sunsetted after MY 2011.

7. "Placed In Service" Requirement (§§ 1962(d)(3)(A) and 1962(d)(5)(B))

As discussed above, in the second 2002 state court lawsuit involving the ZEV program, a temporary restraining order was issued December 24, 2003 enjoining the ARB from implementing a November 21, 2002 advisory letter indicating that early introduction multiplier of 4 for a MY 2002 ZEV would only be available for vehicles placed by March 31, 2003. The original proposal included a "placed by" date of April 15, 2003.

The final 2003 ZEV amendments include a modification providing that a MY 2001-2002 ZEV qualifies for the early introduction multiplier of 4.0 if the vehicle is placed in service by September 30, 2003. In the 2003 and subsequent model years, a ZEV will receive the ZEV credits applicable to its model year if it is placed in service in California by June 30 after the end of its model year. This is consistent with the Agreement of Counsel in the ZEV litigation, and will result in dismissal of the pending lawsuit challenging application of the November 2002 advisory. The approach is appropriate in light of the challenges faced in placing ZEVs and the expectations of manufacturers regarding the application of the regulation.

8. Specialty Vehicles (§§ 1962(d)(5)(A) and 1962(i)(5))

Under the 2001 amendments, a "specialty electric vehicle" was defined as an EV that is designed for a commercial or government fleet application and that has the same battery pack and chassis as an existing EV from which it was modified. In determining range multipliers, a specialty EV could with Executive Officer approval be tested at the parameters used to determine the ZEV multipliers for the EV from which it was derived.

In order to better address specialty vehicles that may not be identical to existing ZEVs, a modification allows the manufacturer of a specialty vehicle that is optimized for a particular function which conflicts with optimization for maximum vehicle range to request that the Executive Officer promote the vehicle to the next highest ZEV Tier (e.g. Type I or II). The basis for approval of such a request will be the Executive Officer's determination that the specialty vehicle has ZEV componentry equivalent to that utilized by ZEVs in the next tier and would meet the requirements for the next tier if optimized for maximum range. For example, a medium-duty urban delivery van may be equipped with a battery pack that has higher energy storage capacity than other Type II battery electric vehicles, but may not achieve the range minimum that a Type II passenger car or light-duty truck would achieve. Given the componentry equivalence to ZEVs in the next tier, it is appropriate for the specialty vehicle to be elevated to that tier. In addition,

the definition was revised so that ZEVs other than EVs can be treated as "specialty" ZEVs.

9. Credit Multiplier for MY 2004-2011 Type I and II ZEVs That Are Sold or Are Leased With an Option to Re-Lease or Purchase (§ 1962(d)(5)(C))

To provide an incentive for battery EVs to be on the road longer, a modification provides a manufacturer with a 1.25 credit multiplier for Type I and II ZEVs that either are sold to a motorist or are leased for three or more years to a motorist who is given the option to purchase or re-lease the vehicle for two years or more at the end of the first lease term. Some battery EV drivers who have been delighted with the performance of their cars have expressed frustration over their inability to obtain extensions of initial three-year leases.

10. Revisions to the Extended-Service Multiplier (§ 1962(f))

Under the original staff proposal, a MY 2001-2004 ZEV whose zero-emission energy storage or conversion system is under an original warranty from the manufacturer beyond three years of service and is registered for operation on public roads in California earned additional credit for each year of continued operation through the 2011 model year. The yearly credit was 0.1 times the ZEV credit the vehicle would earn if leased or sold in that year, beginning in the fourth year; it was reduced by half for the 2008-2011 model years. A PZEV with a zero-emission range of 10 miles or more received the same treatment, and there was no credit for NEVs.

The final version of this provision reflects a number of modifications. First, the mechanism will apply to 1997-2003 MY vehicles. A number of EV drivers and supporters urged during the first 15-day comment period that the mechanism apply to pre-2001 MY ZEVs, so that it can be used for GM EV1s, Honda EV Plusses, Chrysler EPICs, and more Toyota, Ford and Nissan EVs, in order to encourage vehicle re-leases and keep a visible presence of battery EVs on the road.

Second, in order to further encourage lease extensions, the requirement for an extended battery warranty was eliminated. Manufacturers are reluctant to commit to having to purchase a replacement battery pack while customers may be fully willing to lease the vehicle without an extended warranty as long as it meets the customers' needs.

Third, the modifications eliminated applicability to 2004 MY vehicles, because these vehicles qualify for the new section 1962(d)(5)(C) multiplier for Type I and II ZEVs that are either sold to a motorist or leased for three years or more with an option to release for two years or more. It is inappropriate to allow two different extended service incentive mechanisms to both apply for a single overlapping model year.

Fourth, in order to further incentivize re-leases, the credit was doubled from 0.1 times to 0.2 times for additional years of service starting April 24, 2003 or later, and the step-

down to 0.05 starting in MY 2008 was eliminated. Using the April 24, 2003 Resolution 03-4 date as the dividing line between the 0.1 and 0.2 multipliers reflects the Board's intent that the increase in the multiplier is intended to provide further incentives for future re-leases of ZEVs that have already been on the road.

Finally, the last two sentences in of section 1962(f) were deleted because all of the referenced vehicles released prior to January 25, 2001 are covered by the new language regarding vehicles re-leased prior to April 24, 2003.

11. Advanced Technology Demonstration Vehicle Credits (§ 1962(g)(4))

Demonstration vehicles by their nature are moved from location to location between states and countries. A modification provides that to qualify for these credits, the application to the Executive Officer must demonstrate that an advanced technology demonstration vehicle will be in California at least 50 percent of the time during its first year of placement. This is appropriate to assure that California receives a benefit from the demonstration program.

Under another modification, NEVs are not eligible for advanced technology demonstration program credits. The intent of the demonstration vehicle provision is to allow manufacturers to earn credit for pre-production vehicles that have not been certified by the ARB for sale in California. NEVs are an established product and a number of NEV models have been certified. Thus, there is no need for NEVs to have demonstration vehicle status. Staff had never contemplated that the demonstration vehicle provision would apply to NEVs, and the modification makes this clear.

12. Reporting Requirements (§ D.3. of the ZEV Standards and Test Procedures)

The Board has added a reporting provision to assure that the status of each manufacturer's compliance with the ZEV requirements in each year can be verified. Each manufacturer will be required to submit a report at least annually, by May 1 of the calendar year following the close of the model year, to the Executive Officer. The report will include necessary delivery and placement data of all vehicles generating ZEV credits or allowances, and all transfers and acquisitions of ZEV credits.

13. Other Miscellaneous Clarifications

For clarification purposes other miscellaneous proposed modifications include:

- Removal of inadvertent remaining references to the high efficiency multiplier. Section 1962(c)(6)(A) and (i)(1)
- Optional credit multiplier based on vehicle range or battery specific energy for model-year 1999 ZEVs. Section 1962 (d)(2)
- Added definitions for "regenerative braking" and "Type 0, I, II, III ZEV" in Section 1962 (i)

C. PROJECTED PRODUCTION VOLUMES OF ZEVS, AT PZEVS, AND PZEVS RESULTING FROM THE ADOPTED AMENDMENTS

1. Introduction

Given the significant differences between the initial staff proposal and the adopted amendments, this FSOR provides revised staff projections of the 2005 and subsequent model year production volumes of ZEVs, AT PZEVs and PZEVs resulting from the final amendments.

Any discussion of vehicle production under the ZEV program must begin with a statement of the uncertainties involved. The regulation provides manufacturers with considerable flexibility. In addition, each manufacturer is in a unique situation. Some have small numbers of banked credits (credits earned from vehicle placements prior to the effective date of the regulation) while others have credits sufficient for a number of years. Some manufacturers have both NEV and non-NEV credits (which are treated differently under the regulation) while others do not. In addition, manufacturers differ in the status of fuel cell development, the availability of PZEV or AT PZEV products in the near term, and the technologies to be emphasized in their corporate strategy. All of these factors affect each manufacturer's compliance status and the compliance pathways they will pursue. Due to these factors, it is impossible to predict with accuracy the number of vehicles in each category that will actually be produced.

To provide a context for the evaluation of program alternatives, staff has developed a "base case" estimate of the number of vehicles that manufacturers will produce. The base case is not a prediction of actual production, but rather a scenario based on a consistent set of assumptions that can be used to track the effect of various program changes. It is particularly noteworthy that the base case estimate methodology does not take into account the effect of banked credits.

The following sections discuss ZEV, AT PZEV and PZEV production in turn. The scenarios presented illustrate plausible outcomes but should not be viewed as firm estimates. Table 4 at the end of Section II.C. provides year-by-year vehicle totals for each vehicle category.

2. Projected Base-Case Production of ZEVs

The base-case scenario for pure ZEV production assumes that all manufacturers choose the alternative path. If so, the industry-wide totals under adopted 2003 amendments are 250 fuel cell vehicles for MYs 2001 through 2008, 2,500 fuel cell vehicles for MYs 2009 through 2011, 25,000 fuel cell vehicles for MYs 2012 through 2014, and 50,000 fuel cell vehicles for MYs 2015 through 2017.

Note, however, that some manufacturers have accumulated banked credits sufficient to ensure compliance on the base path through 2008. Thus it is unlikely that all

manufacturers will choose the alternative path, at least in the early years. This would result in fewer fuel cell vehicles than the numbers listed above, to the extent that manufacturers on the base path produce fewer fuel cell vehicles than would have been required on the alternative path. On the other hand, the regulation also allows manufacturers on the alternative path to substitute larger numbers of battery EVs for a portion of the required fuel cell production. If pursued, this option would increase the number of ZEVs produced.

3. Projected Base-Case Production of AT PZEVs

The likely number of AT PZEVs also is highly uncertain. There are several different types of AT PZEVs that manufacturers could build, each of which earns a different amount of ZEV credit. Manufacturers also may choose to build additional AT PZEVs to offset a portion of their ZEV obligations.

The base-case projection for AT PZEVs assumes the following:

- Manufacturers build AT PZEVs with characteristics similar to the 2003 Prius or Civic hybrids.
- Manufacturers do not use banked credits to offset any AT PZEV production.
- Manufacturers all choose the alternative path, and take full advantage of the option to use AT PZEVs to satisfy the remaining pure ZEV obligation.
- In the early years, not all manufacturers are able to take full advantage of the AT PZEV option.

Using these assumptions, manufacturer AT PZEV production would grow from roughly 40,000 in MY 2005 to 120,000 in MY 2010 and 200,000 in MY 2015 and beyond.

4. Projected Base-Case Production of PZEVs

A large manufacturer is allowed to meet 6 percent of its ZEV obligation using PZEVs. In addition, an intermediate manufacturer may meet its entire ZEV obligation in this manner. Thus the staff estimate of PZEV production includes both large and intermediate manufacturers.

In staff's view, the estimates of PZEV production are more certain than the estimates for ZEVs or AT PZEVs. The PZEV portion of the regulation has fewer variables, and it is clear already that manufacturers will have the technical capability to take full advantage of the PZEV option. In fact, PZEV production is already well underway. Numerous models have been certified, and staff expects that MY 2003 sales of PZEVs in California will total about 140,000 vehicles. These vehicles are already making a significant contribution to California's air quality.

Assuming that large and intermediate manufacturers take full advantage of the PZEV option, PZEV sales will grow from about 275,000 in MY 2005 to 625,000 in MY 2010 and more than 800,000 in MYs 2018 and beyond.

5. Combined Production Scenarios

Table 4 below shows the combined production of ZEV program vehicles (ZEVs, AT PZEVs, and PZEVs) that would result from the scenarios described above. As the table shows, the majority of ZEV program vehicle production will be PZEVs, with AT PZEVs and ZEVs playing an increasingly important role in later years.

Table 4
Combined Production Scenarios

Model Year	Number of New Vehicles, by Technology Type		
	ZEV	AT PZEV	PZEV
2005	63	42852	274601
2006	63	64197	410237
2007	63	72728	460835
2008	63	81259	511433
2009	833	111890	575954
2010	833	122553	627773
2011	833	133217	679592
2012	8333	148528	742756
2013	8333	148528	742756
2014	8333	148528	742756
2015	16667	205009	777640
2016	16667	205009	777640
2017	16667	205009	777640
2018	29636	197575	812524
2019	29636	197575	812524
2020	29636	197575	812524

D. MANUFACTURER COSTS AND SAVINGS RESULTING FROM THE ADOPTED AMENDMENTS

In the January 10, 2003 ISOR, staff compared the cost to manufacturers under the proposed amendments to the cost with no ZEV program, and also to the cost under the ZEV regulation as amended in 2001. Given the significant differences between the originally proposed amendments and the adopted amendments, this FSOR presents updated cost estimates.

The cost estimates assume that manufacturers will use banked credits to the maximum extent possible to postpone ZEV production. Under the regulation as amended in 2001, it appeared that manufacturers might not need to produce any ZEVs until the 2009 model year. To avoid such a “blackout”, the adopted amendments introduce the concept of the alternative compliance path, under which manufacturers that produce minimum threshold quantities of ZEVs in defined time periods are able to backfill the remainder of their ZEV obligation with AT PZEVs. It is not clear how many manufacturers will choose the alternative path, nor is it clear how manufacturers

pursuing the alternative path will make use of any banked credits. In light of this uncertainty, the staff has estimated manufacturer compliance costs for the amended regulation under several different scenarios. All costs reported below are combined totals for the 2005 through 2011 model years.

Under the first scenario, all manufacturers pursue the base path and make maximum use of banked credits to offset the gold portion of the requirement. The 2003 base path is similar in many ways to the regulation as amended in 2001, and results in estimated compliance costs of $815 million to $4,099 million. This represents an estimated savings of $16 million to $1,517 million as compared to the 2001 regulation, primarily due to the increased credit values earned by ZEVs under the 2003 amendments which result in fewer vehicles being required. The wide range for this and the subsequent cost estimates is indicative of the large number of variables involved.

Under the second scenario, all manufacturers pursue the alternative path and use banked credits to offset the entire remainder of the gold and silver requirement. This approach results in estimated compliance costs of $523 million to $902 million compared to having no ZEV program. Savings versus the regulation as amended in 2001 are estimated at $608 million to $4,714 million.

Finally, under the third scenario all manufacturers pursue the alternative path and use banked credits to offset one half of the combined gold and silver requirement. This approach results in estimated compliance costs of $550 million to $929 million compared to no ZEV program, slightly higher than the scenario discussed above. The savings as compared to the 2001 regulation are correspondingly slightly lower at $580 million to $4,687 million.

Thus in all cases reviewed the final adopted amendments provide savings for manufacturers as compared to the preexisting regulation.

E. COST-EFFECTIVENESS OF THE AMENDED REGULATION

1. Introduction

Determining the cost-effectiveness of the ZEV program has always been more difficult and uncertain than for other regulatory measures due to the far-reaching nature of the program. Predicting the future cost of technologies that are still in the demonstration stage is difficult at best. In addition, the ZEV program combines two distinct objectives – first, achieving emission reductions today through expanded introduction of commercially available near-zero emission technology, and second, accelerating the development of pure ZEV technologies that have the potential to provide significant air quality benefits over the long term, but have minimal immediate air quality impact given their pre-commercial status and limited production.

Cost-effectiveness is a measure of the cost incurred to achieve a specific outcome, as compared to other ways to reach that same end. Thus it is appropriate to separately consider the two distinct objectives outlined above.

2. Near-Term Emission Reductions

The first objective of the ZEV program – achieving emission reductions today – involves the PZEV and AT PZEV options included within the program. These options encourage the near-term mass-market production of commercially available technologies.

Table 5 below shows the lifetime emission reductions achieved by a PZEV and HEV PZEV as compared to a conventional SULEV meeting the 0.5 grams per test evaporative emission standard. These values are taken from the FSOR for the 2001 ZEV rulemaking and are based on information prepared by staff and used by Toyota in its comments on the 2001 staff proposal.

Table 5
Lifetime Emission Benefits

Vehicle Type	NMOG (g/mile)	NOx (g/mile)	150,000 mile ROG + NOX (pounds)	Benefit vs. SULEV/0.5 evap (pounds)
SULEV/0.5 evap	0.0703	0.0266	32.02	0.00
PZEV	0.0577	0.0256	27.52	4.50
PZEV HEV	0.0477	0.0251	24.05	7.97

Table 6 below shows the cost-per-ton of emissions reduced for each technology, given the incremental cost per vehicle assumed for Stage I, Stage II, Stage III, and 2012 and beyond. Incremental costs are taken from Table 5.1 of the ISOR.

Table 6
Dollars per Ton of Emission Reduction

	Stage I	Stage II	Stage III	2012+
Vehicle Type				
AT PZEV				
Incremental Cost	$2,300	$500	$200	-$300
Dollars per Ton	$577,164	$125,471	$50,188	-$75,282
PZEV				
Incremental Cost	$100	$100	$100	$100
Dollars per Ton	$44,444	$44,444	$44,444	$44,444

3. Long-term Emission Reductions

The second objective of the program is to accelerate the development of pure ZEV technology to achieve significant future air quality benefits. This is accomplished by the "gold" or pure ZEV obligation within the program.

In proposing amendments to the regulation in 2001, ARB staff provided data to the Board that showed that in the early years of the ZEV program the dollars spent per ton of pollutant reduced would be much higher than for any other ARB regulatory measure. The Board, however, voted unanimously to maintain the program because of its belief that the ZEV program needs to be viewed and considered on a long-term basis. Simply put, the Board has expressed confidence in the technical capability of industry to reduce cost such that the long-term costs of ZEVs will be comparable to conventional vehicles.

Table 7 below shows the lifetime emission reductions achieved by ZEVs as compared to a conventional SULEV meeting the 0.5 grams per test evaporative emission standard. As was the case with the PZEV and AT PZEV estimates given above, these values are taken from the 2001 FSOR and are based on information prepared by staff and used by Toyota in its comments on the 2001 staff proposal.

Table 7
Lifetime Emission Benefits

Vehicle Type	NMOG (g/mile)	NOx (g/mile)	150,000 mile ROG + NOX (pounds)	Benefit vs. SULEV/0.5 evap (pounds)
SULEV/0.5 evap	0.0703	0.0266	32.02	0.00
ZEV (BEV)	0.002	0.0003	0.76	31.26

Table 8 below shows the cost-per-ton of emissions reduced for a hydrogen fuel cell vehicle, given the incremental cost per vehicle assumed for Stage I, Stage II, Stage III, and 2012 and beyond. Incremental costs are taken from Table 5.1 in the ISOR.

Table 8
Dollars per Ton of Emission Reduction

	Stage I	Stage II	Stage III	2012+
Vehicle Type				
ZEV (fuel cell)				
Incremental Cost	$1,000,000	$300,000	$120,000	$10,000
Dollars per Ton	$63,979,527	$19,193,858	$7,677,543	$639,795

Clearly the dollars per ton estimates given above greatly exceed those for other air pollution control measures. They must, however, be viewed in the context of the objective that the Board is trying to achieve. The purpose of the pure ZEV obligation within the ZEV program is to maintain significant pressure on manufacturers to continue

ZEV technology development. We know of no other mechanism that can accomplish this objective in a more economical fashion.

In addition, we expect that the long-term cost of ZEV technology will decline beyond the cost estimates shown here. The ARB's confidence in the ability of engineering and manufacturing improvements to reduce cost is rooted in the history of vehicular air pollution control programs. Not only were the PZEV and AT PZEV technologies not commercially available when the Board first adopted the ZEV program in 1990, they were not even envisioned or thought possible. Now they are mass-market products with low incremental costs, spurred on by the pressure provided by the ZEV mandate.

The ARB expects the same progress to occur with the next generation of technology, such as fuel cell vehicles. The Board's long-term vision is that zero emission vehicles will be cost effective when compared to conventional vehicles. The notion that such vehicles will one day be cost competitive is supported by the tremendous investments being made by all of the automakers. Automakers have invested several billion dollars to date in developing fuel cell technology and have publicly stated plans to continue heavy investment in the next decade. We believe it is unlikely that this level of investment would exist or continue without a belief on the part of the vehicle manufacturers that there is a long-term business case to be made for the profitable mass production of fuel cell vehicles.

F. AGREEMENT TO RESOLVE THE LITIGATION CHALLENGING THE ZEV REGULATION AS AMENDED IN 2001

On August 12, 2003, the ARB, DaimlerChrysler Corporation, Isuzu Motors Limited, GM, and several motor vehicle dealers jointly announced an agreement bringing an end to the three lawsuits challenging the ZEV regulation as amended in 2001. The August 12 agreement was among the attorneys for all of the parties to the lawsuits, since additional time was needed to obtain final agreement and signatures of the numerous principals. The last of the parties signed on December 19, 2003, at which time the agreement of the parties took effect.

The agreement covers all the state and federal litigation, at both the trial and appellate court levels. It calls for DaimlerChrysler, GM and the other plaintiffs to dismiss their lawsuits, and for the ARB to dismiss its appeal of the preliminary injunction in the federal case, after the 2003 ZEV amendments are filed with the California Secretary of State in a form that fulfills the intent of Board's April 24, 2003 Resolution 03-4.

In the August 12, 2003 joint announcement, ARB Chairman Alan Lloyd stated, "ARB views this agreement as another successful step in the Board's implementation of a mobile source emission reduction program that will help ensure California citizens of continued improvements in California's air quality. It will free resources at ARB and within the industry to work on advanced technologies, such as fuel cell vehicles, to help us achieve California's goal of a zero emission vehicle fleet in California."

"General Motors believes the best way to address the environmental and energy issues facing California, our nation, and the world is through voluntary, market-based applications of innovative technologies," stated Beth Lowery, GM Vice President of Environment and Energy. "Although GM does not agree with the concept of mandated approaches to automotive technology advancement, GM believes the proposed 2003 ZEV regulation provides the flexibility we need to move beyond the litigation. As always we will continue to seek opportunities to work collaboratively with ARB, our industry partners, and other stakeholders, and to advance new automotive technologies, such as hybrids and fuel cell vehicles, and the necessary incentives and infrastructure to support those technologies."

"As legal action is never our preferred approach, DaimlerChrysler is pleased we were able to work with ARB and the other plaintiffs to resolve the litigation," said Bernard Robertson, DaimlerChrysler Senior Vice President for Engineering Technologies and Regulatory Affairs. "While we don't believe mandates are appropriate in the consumer-driven marketplace, DaimlerChrysler is committed to work with ARB and other interested parties to ensure that all technologies that can benefit the air quality in the State of California are recognized and permitted in any future regulations."

III. SUMMARY OF PUBLIC COMMENTS AND AGENCY RESPONSES

The ARB received numerous written and oral comments, in connection with the March 27-28, 2003 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 an 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. COMMENTS PRESENTED PRIOR TO, OR AT THE MARCH 27-28, 2003 HEARING

1. General Opposition to the Proposed Amendments

(a) Support for the Preexisting ZEV Requirements and Opposition to the Staff Proposal

1. Comment: Do not postpone or weaken the ZEV mandate, reject the ARB proposal. The program has been successful in moving towards cleaner technologies.

Stick to the ZEV mandate, it works and has put EV drivers on the road despite auto company hostility and reluctance.

The battery EV uses no gas, and has been produced over the objections and opposition of the oil industry and the automakers. Without the ZEV mandate, there won't be any

more cars like this. I hope you will continue to allow me to purchase a zero emission vehicle.

The ZEV program has been a stunning success in moving automakers forward to create improved clean air technologies. In addition to the battery EV employed by many fleets, super-ultra low emission vehicles and hybrid electric vehicles are direct by-products of striving for zero emissions. We ask that you maintain a focus on encouraging those technologies that move us closer to a zero-emission future.

There is no reason to wait. Our children deserve our most vigorous efforts to clean our air. We urge you to move forward, preserving and strengthening the ZEV program.

(Suppes, Friedman, Beasley-Cockroft, Cushing, Landers, Shea, The Beacon House, France, Chen, Rassweiler, Martin, Gilmer, Von Bargen, Monsalve, Cassidy, Raybon, Jessop, Langley, Willis, Nicely, Larson, Freel, Saunders, O'Connell, L'Amoureux, Spitzer, Thurber, Jenks, Cagna, Reuben, Nicholes, Medina, Bamrick, Dickeson, Seldon, Haller, Sponer, Field, Dammuller, Alosi, Tauer, Leach, Vaughn-Perling, Johnson, Hildner, Curtin, Ross, Kihn, Tolbert, Scott, Building Industry Association of Central California, Mayfield, Banion, Stevens, Hallinan, Thomas, Schmelzer, Tribbey, Pease, Godshall, Olson, Pirondini, Stanislaus County Hispanic Chamber of Commerce, Dennis, Scharlack, Yang, City of Redlands, City of Sunnyvale, Global Vehicle Service, Building Industry Association of the San Joaquin Valley, JACCC, City of Ceres, Erb, Stanislaus County, AFSCME, Cardoza, Tree Muskateers, City of Atwater, City of Sacramento, Latino Political Action Committee, Fay, City of Sonora, City of Santa Cruz, Hyde, Rivers, Seligman, City of Palo Alto, City of Oakland, City of Los Banos, Landshark Farms, Artesia Chamber of Commerce, ADRO Environmental, Nadel, Krupp, Lakewood Chamber of Commerce, Stanislaus County Office of Education, Latino Community Roundtable, BAAQMD Board of Directors, Stanislaus County Health Services Agency, Feel Good Cars, Building Industry Association of Kern County, The Diocese of Los Angeles, Medina, CyberTran, California Nurses Association, Adelman, Solano Asthma Coalition, Laborer's International Union of North America, City of Hayward, City of Riverside, Communities for a Better Environment, City of Monterey Park, Thurber, WCLO, County of Fresno, Community Health Works, City of Oakdale, City of Merced, American Academy of Pediatrics, Blose, San Joaquin APCD, Rogers, Hofer, Khalsa, Emmett, Smith, City of Kerman, TransAction Companies, Ltd., City of Kingsburg, Steinberg, Merced-Mariosa Central Labor Council, Kallman, City of Berkeley, Trudel, Oldtimers Housing Development Corporation, Chase, Harris, Merced County, Operation Clean Air, Gach, Alford, Public Health Institute, Grover, Bleich, Montgomery, Berlin, form letter from 27 individuals, City of Santa Monica, City of Riverbank, City of San Jose, Merced County Department of Health, Cykana, Chambers, Dall, Taylor, Whitehead, White, Freund, Looper, McMenomy, Rowan, McRae, Wayburn, Munoz, Dieden Co. Fresno County Office of Education, CHEC, Robinson, City of Stockton, TransAction Companies, Evans, Reis, Hays, Clean Air Now, Trinh, Brandenburg, Star, City of Montclair, City of Merced, Freed, Denison, City of Newman, Consumers Coalition of California, Alford, Zerrudo, Sustainable Mill Valley, Griffith, Visalia Chamber of Commerce, Davis, Lomita Chamber of Commerce, Centro CHA, City of Lancaster,

City of Firebaugh, Human Services Association, Carrillo & Associates, CHARO, Sierra Club Marin Group, McConnell, Dixon, CVAG, Parcher, McDonnell, Building Industry Association of Tulare/Kings Counties, Hanford Chamber of Commerce, Nass, Halgrin, Snyder, Merced/Mariposa County Asthma Coalition, City of Thousand Oaks, Asian Business Association, Oldtimers Foundation, Western United Dairymen, County of Santa Barbara, Marin County, SCAQMD, The Los Angeles Interfaith Environmental Council, Tulare Kings Hispanic Chamber of Commerce, Hannigan, Novy, Singleton, R. Heymann, Wright, Litton, Kiff, P. Heymann, Watts, City of Petaluma, WCLO, City of Fresno, Tulare Chamber of Commerce, United Cambodian Community, Earth Resource Foundation, Berten, Ronquillo, Zinner, Southern California Ecumenical Council, San Fernando Valley Branch-NAACP, The Workman's Circle, Eco-Home Network, Greater Sacramento Regional Clean Air Coalition, AFL-CIO-Local 11, California Communities Against Toxics, City of San Fernando, Hartwell Corporation, Rosemead Chamber of Commerce, Peskin, City of Ontario, PCL, Dias, Karlen, City of West Hollywood, Marshall, Erpenbeck, Cox, Earth Resource Foundation, Johnston, Cimino, Louis-Dreyfus, Hartman, Reid, Martinez, CMA, Marin Audubon Society, Matthews County of Mendocino, Crabtree,African Village Weekend, City of Long Beach, City of Bakersfield)

Agency Response: The proposed amendments were prompted by industry litigation over elements related to efficiency within the regulation. While developing proposed modifications to address this issue, the ARB realized that additional modifications were necessary for a variety of reasons. First of all, the ARB concluded that the number of ZEVs required under the 2001 regulation was problematic given the current status of possible ZEV technologies. Battery vehicles, while technically mature and well suited from a performance standpoint for many applications, face severe cost challenges. As part of the 2000 ZEV Program Biennial Review, the ARB assembled a Battery Technology Advisory Panel (Panel) to review the performance, cost and availability of advanced batteries. The Panel concluded that nickel metal hydride batteries for full function vehicles would cost EV manufacturers between $9,500 and $13,000 in quantities of 10,000 to 20,000 packs per year, and approximately $7,000 to $9,000 at production levels exceeding 100,000 packs per year. Based on these assessments, in the Initial Statement of Reasons for the 2001 amendments the ARB estimated the near-term incremental cost for battery EVs at roughly $8,000 for a City EV and $17,000 for a full function EV.

To provide an update on current status, in late 2002 the ARB contracted with a battery expert and member of the 2000 Battery Technology Advisory Panel to provide an evaluation of the progress in battery EV technology since the Panel's work in 2000. The contractor relied in large part on information collected over the last two years during the preparation of his report entitled The 2002 Advanced Automotive Battery Industry Report – A Critical New Assessment of Automotive Battery Trends. The conclusions of the evaluation showed that the cost and performance characteristics of advanced batteries have not meaningfully changed since the 2000 report and as a result the key findings of the Panel's report still hold true today.

In addition, independent of cost issues, recent marketing experience indicates that although there is a base demand from regulated electric utilities and EV early adopters, the sustainable level of demand for battery EVs appears to be small at least in the near term. The ARB is aware of recent advances in battery performance, in particular with regard to cycle life, and will continue to track such developments and factor them in to its future consideration of program status. Battery EV development will also be assessed by the Independent Expert Review Panel called for by the ARB in its 2003 modifications. At present, however, any recent advances do not appear to significantly alter the fundamental cost equation.

Fuel cell vehicles are even more costly than battery EVs in their current stage of development, and face additional technical and engineering challenges involving durability, cold weather performance, and other factors. Manufacturers appear to believe there is a business case for fuel cell development. The ARB concurs that the technology shows great promise and fully expects fuel cell development to proceed to commercialization. At present, however, the technology is not ready for volume production. Thus, additional development is needed before any pure ZEV technology will be ready for mass deployment.

Meanwhile, rapid advances in PZEV and AT PZEV development have resulted in widespread availability of extremely clean vehicles. A number of models have been certified to date and more will be available in the near future. Volume production of such vehicles will result in air quality improvement and, in the case of AT PZEVs, will also build the manufacturing and supplier base for componentry that will eventually be used on pure ZEVs.

Under these circumstances, the ARB believes that the best course of action is to take full advantage of the near-term possibilities afforded by PZEVs and AT PZEVs, and adopt a stepwise approach towards pure ZEV commercialization that takes into account progress over time. The alternative compliance method put forth in the 2003 amendments is intended to maximize the air quality benefits afforded by extremely clean vehicles available in showrooms today, and use an Independent Expert Review Panel to help the ARB keep the pure ZEV requirement aligned with the status of technology development. The ARB remains committed to the pursuit of ZEV commercialization for the simple reason that ZEVs will ultimately be necessary to meet health based air quality goals in the future.

2. Comment: We urge the ARB to not adopt regulatory changes that go beyond adjustments to address issues that were raised in the automaker lawsuit, unless they strengthen, not weaken, the program. (California ZEV Alliance, McCartney, Vashisht, Bloom, Hannigan)

Agency Response: The ARB believes that additional changes, beyond those needed to address litigation issues, were needed to take into account the pace of technology development. See the response to Comment 1 and Section II.B.1..

3. Comment: Based on our commitment to alternative fuel technologies, I urge you to reject the proposed amendments that are under consideration. Continuity and certainty in the ZEV program are vitally important, and speaks volumes to industry about the unwavering commitment and vision of ARB to air quality, and the role of ZEV in that process. (City of San Jose)

As the time draws near for a decision on addressing electric vehicle quotas for automakers, I would hope that strong consideration be given to ensuring a continued wide range of EV model availability be maintained for public fleet use. (City of Newport Beach)

We ask that you support the standards for ZEVs as adopted in 2001. (City of Kernan, Schmelzer)

Vote against any changes to the ZEV regulation that would weaken the program, and its benefit to air quality and economic development. Changing the regulation will have a negative impact on the health of citizens in the City of Fresno. (Henry T. Perea, City Councilman from the City of Fresno)

I urge the ARB to sustain the ZEV Program that the ARB set in 2001. And if that is not possible, then I suggest that some compromise proposals that have been presented be seriously considered. Air pollution is so serious in Stanislaus County that zero emission, not partial emission requirements will be the only way to significantly improve the air quality. (Reagan Wilson, Chief Executive Officer, Stanislaus County)

Agency Response: Many local governments have been strong supporters of the ZEV program and have shown great leadership in incorporating ZEVs into their fleets and supporting the installation of ZEV infrastructure in their jurisdictions. The above commenters urge that the ARB continue to mandate the production of battery EVs so that such vehicles will continue to be available for use in local projects.

The ARB acknowledges the efforts that local governments have made. Such local initiatives have helped to demonstrate the utility of battery EVs in meeting a variety of fleet needs, and have achieved local air quality benefits. It is important to recognize, however, that the manufacturers have heavily subsidized the vehicles employed in these demonstrations and significant cost barriers remain. As is outlined in the response to Comment 1 above, the ARB therefore has concluded that no pure ZEV technology is ready for mass deployment at this time. Under these circumstances, requiring manufacturers to place large numbers of today's battery electric or fuel cell vehicles would impose large costs but would not accelerate progress towards commercialization. Therefore, the ARB believes that it was necessary to modify the requirements.

The 2003 amendments do provide incentives to keep existing battery electric vehicles on the road. Such incentives include allowing new or re-leased battery electric vehicles to count towards a manufacturer's alternative path requirement, providing enhanced

credit if consumers are given the opportunity to purchase or re-lease the vehicle, and removing the requirement that manufacturers provide a battery warranty on re-leased vehicles. These incentives will help encourage continued availability of vehicles to the extent possible. See also the response to Comment 78.

4. Comment: I support the noble work and leadership that the ARB has shown throughout its existence. I only hope that you maintain the authority to again invoke these mandates when the technology is available for the good of the people of California and the world. (PowerDisc)

Agency Response: The ZEV program is still in place and the ARB retains full authority to set its specific requirements as appropriate given the state of technology. The ARB has already committed to establishing an Independent Expert Review Panel to assess the state of technology and provide background information that will assist the ARB in assessing regulatory requirements for the long term.

5. Comment: The original mandate can be implemented. Don't wait for the fuel cell to get cars that are virtually clean – work with hydrogen and technologies we have today. I suggest going back to the legislature and redefining a ZEV as being a car that is virtually free of pollution in the whole fuel cycle. (David Freeman, California Power Authority)

Agency Response: In defining the certification category "ZEV," the ARB has remained firm in the belief that a ZEV should not emit pollutants, at any level. Both electric and fuel cell vehicles promoted in the regulation provide opportunities for zero emissions in the whole fuel cycle. Additionally, more credits are awarded to PZEV and AT PZEVs with improved fuel cycle emissions. In regards to implementation of the original mandate, see the response to Comment 1 and Section II.B.1..

6. Comment: As the complexity of the measure grows so does the probability of a lawsuit. The success of the battery electric program is not just the numbers on the road, which are small, but that it's a catalyst for driving all kinds of automotive development and progress that will stop if the program is gutted. Stick with a flexible results driven mandate. Have a policy that favors existing technology that already works. Encourage one manufacturer or set it up so that one manufacturer could meet the mandate for all of them if they cooperated as they have in the fuel cell process. (Lisa Rosen, EV Driver)

Agency Response: See the responses to Comments 1 and 30.

7. Comment: We recommend that the ARB step back and not try to select the winning zero emission technology. This is a decision that is best determined by the marketplace. Hybrids that meet the SULEV standard are impressive and along with plug-in hybrids should be encouraged. (John Boesel, President, CALSTART)

I strongly urge the ARB to maintain a clear and strong pathway toward the development and commercialization of true zero emission technologies and incentives for near-zero emission advanced technologies, such as hybrid vehicles. (Lieber, Kabcenell)

The ARB must maintain the ZEV program. The improvements and incentives for battery dominant and plug-in hybrid EVs will encourage technology development in and maintain current EV infrastructure. (Thomas Bradley, EPRI)

Agency Response: The amendments adopted by the ARB are consistent with these recommendations. The amended program allows manufacturers to pursue their preferred zero emission technology, and it also provides strong incentives for production of hybrid electric vehicles and plug-in hybrid electric vehicles. The credit structure for various technology types appropriately recognizes their relative contribution to clean air or their contribution toward successful commercialization of pure ZEVs through specific technology demonstration.

(b) Opposition to the Staff Proposal and Support for Stronger ZEV Requirements

8. Comment: I encourage you to reject the approach proposed by the staff and adopt a plan that puts real ZEVs into the marketplace, not just into small demonstration programs. Start with the January staff proposal but eliminate all the different categories of ZEVs based on range, refueling time, and speed capability. All these categories are just an invitation for another lawsuit. Have just one kind of ZEV – the only requirement is that it be certified as a full function motor vehicle to FMVSS standards. Adopt any number of ZEV credits per vehicle as you think appropriate to result in a rational phase-in of the number of vehicles. (Brooks)

Agency Response: The 2003 amendments include program requirements that represent a rational phase-in of the number of vehicles. Larger quantities of vehicles in the early years are not appropriate given the current status of technology.

The ARB in the past has considered simplifying the credit structure but has been concerned that awarding all vehicles the same credit would encourage manufacturers to produce low performance vehicles that would not be attractive to consumers. The least cost way to satisfy a “one-ZEV one-credit” requirement would be to build vehicles with the minimum capabilities needed to meet the threshold. There would be no incentive to add additional performance capability. Also see the response to Comment 7 regarding credit structure.

9. Comment: We urge the Board to strengthen the established ZEV production requirements. California should be the state to show transportation energy leadership by moving beyond fossil fuel-dependent detours such as the CARB Staff Report recommendations to a future of electric, hydrogen, and the cleaner, more healthful and increasing economic benefits of the new energy alternatives. (SGMRC)

Please reject the staff proposal. The ZEV program should be strengthened. Close the loophole in the credit system, increase the number of mandated vehicles, and tell the out-of-state and foreign manufacturers that California will not allow our citizens to bear the cost of their lack of cooperation and delay. (California Transportation Commission)

Please strengthen and/or simplify the ZEV mandate. (Morrow, Snodgrass, Becker, Seldon, Krauter, Williamson, Schuh, Panush, Haller, Leach, Hinman, Knepher, Dennison, Veloso-Pueblos, Waller, Cooper, Sanders, Spears. Christodora, Johnson, Bryson, Hickson, Stalker, Laborers' International Union of North America, Sanders, Wang, UFCW Local 1442, Fay, AAFA, Public Allies Los Angeles, Steinheimer, Josephson, Koloski, Calvo, California Black Chamber of Commerce, City of Healdsburg, Ovando, CALSTART, League of Women Voters)

We believe that the ZEV regulation needs to be strengthened in the following areas:

- Continue the requirement for battery EVs
- Require more advanced technology fuel cell vehicles
- Eliminate credit for vehicles placed in other states (Cathedral City)

Agency Response: As noted in the response to Comment 1 above, the ARB believes that it was necessary to modify the regulation to take into account technology status and market trends. Making the requirements even more challenging than the 2001 regulation would exacerbate the difficulties that the amendments are intended to address.

10. Comment: Rather than abandoning the existing ZEV program, the Chamber proposes that CARB maintain the 2 percent requirement, but give automakers additional flexibility during a transitional period by requiring small, but increasing numbers of vehicles every year, beginning in 2005. (Cerritos Chamber of Commerce)

To truly achieve a "significant and growing number of zero-emission vehicles on California roads," the gold requirement should be held to no less than 2 percent through 2011. (ElectriCab)

CARB should insist that automakers continue to make new ZEVs available to meet demand for these vehicles by consumers and fleets, with the number of new ZEVs increasing each year as to achieve cost reductions from volume production. (Gutierrez, Rodriguez)

We propose that small numbers of ZEVs be required beginning in 2005 and steadily increase through 2014, where it returns to the numbers required in the 2001 ZEV regulations. (Cal ETC)

Agency Response: These comments focus on the appropriate level of vehicle production during the early years of the program. This has been one of the most contentious issues throughout the recent rulemaking. Under the final amendments, manufacturers are given two options. They can comply under the basic terms and

conditions of the regulations as amended in 2001, or they can follow an alternative path that allows gold compliance using smaller numbers of fuel cell vehicles (with the option to offset a portion of the requirement with new or re-leased battery electric vehicles). The alternative compliance path was put in place to encourage “fresh” vehicle production, and to make it possible for manufacturers to comply through aggressive pursuit of fuel cell commercialization. With regard to battery EVs, we concluded that even at substantially increased production levels full function EVs would not be cost competitive with conventional vehicles, and that there does not appear to be a viable path that will result in commercialization for general markets. Therefore, we are reluctant to require larger battery EV production levels in the near term, as are recommended by the commenters. Such requirements would impose significant costs but would not accelerate progress towards commercialization.

11. Comment: Please give the auto industry incentives and flexibility in meeting ZEV standards, not excuses for not meeting them. (Zack)

Agency Response: The 2003 amendments provide strong incentives for technology improvement, and provide manufacturers with considerable flexibility. The ARB has concluded that the production levels called for in the newly amended program are appropriate given the current status of technology.

12. Comment: I would like to see that any changes to the ZEV program not reduce the net impact of such requirements. If electric vehicles are no longer mandated, then I would like to see an equivalent – or better – requirement be put in place that includes hybrids, hydrogen fuel cells, or other technologies that will be immediately effective in the marketplace. (Owens)

Agency Response: The 2003 amendments are consistent with this recommendation. They emphasize production of near-term technologies such as PZEVs and ATPZEVs that are in showrooms today and will result in significant near-term air quality benefits. They also encourage the development of hydrogen fuel cell technology for the long term.

13. Comment: I strongly oppose the staff’s recommendations. Fuel cells won't happen because they are too expensive. ZEVs are market ready. There's demand for at least 1,000 ZEVs per year – I propose at least 1,000 vehicles per year of production, approximately, of placement credits through 2006-2010 timeframe. (William Korthoff, EV Driver)

Agency Response: The ARB realizes that fuel cell vehicles are even more costly than battery EVs in their current stage of development, and face additional technical and engineering challenges involving durability, cold weather performance, and other factors. It is important to recognize, however, that manufacturers appear to believe there is a business case for fuel cell development and are investing significant resources in research, development and demonstration programs. Thus, the ARB

concurs that the technology shows great promise and fully expects fuel cell development to proceed to commercialization.

Battery EVs, while technically mature and well suited from a performance standpoint for many applications, face severe cost challenges. Manufacturers have heavily subsidized the vehicles placed to date. Requiring production at the 1,000 vehicle per year level recommended by the commenter would impose significant costs but would not accelerate progress towards commercialization.

Under these circumstances, the ARB believes that the best course of action is to take full advantage of the near-term possibilities afforded by PZEVs and AT PZEVs, and adopt a stepwise approach towards ZEV commercialization that takes into account progress over time. Also, see the response to Comment 1 and Section II.B.1..

14. Comment: The base requirements in the March 5, 2003 staff proposal need to reflect the actual provisions of the regulations adopted in 2001, after correcting for legal issues. These requirements should be revised to:

1) not allow "bronze" vehicles placed in 2003 and 2004 to receive credits in the silver category
2) retain the NEV cap in the silver category
3) not change the minimum performance requirements for hybrid electric vehicles
4) return to the less generous credit levels in the 2001 regulations for all vehicle types
5) not allow exclusion of ZEVs in determining an automaker's future ZEV requirements
6) return to the battery warranty requirements for hybrid vehicles in the 2001 regulations (Cal ETC)

Agency Response: The commenter argues that the base path should be identical to the 2001 version of the regulation, and thus should not incorporate various additional changes adopted as part of the 2003 amendments. The ARB's rationale for the specific changes referenced by the commenter is as follows:

1) Certain bronze vehicles placed in MYs 2003 and 2004 (those in excess of what would have been the manufacturers' 6 percent production level in those years) are allowed to receive credits in the silver category to encourage volume production of PZEVs prior to the MY 2005 start date of the modified regulation. Due to the fact that the original start date for the regulation was MY 2003, many manufacturers had the hardware capability to introduce PZEVs in that timeframe but they might not have offered the 150,000-mile warranty. PZEVs offer significant air quality benefit so we believe it is worthwhile to encourage maximum early placement.

2) The amendments delay the imposition of the NEV cap in the silver category. This was done in order to provide manufacturers with additional flexibility, particularly with regard to their ability to take full advantage of the AT PZEV category in the early years. This added flexibility will remove the need for some manufacturers to come up with an additional ZEV product just to meet a short-term credit shortfall.

3) The amendments allow certain additional types of hybrid electric vehicles to earn AT PZEV credit in the early years. This was done in order to provide additional flexibility and to recognize the benefits to future pure ZEV technology that result from the volume production of low-power and/or low-voltage hybrids. These provisions sunset in the 2009 and 2012 model years.
4) The vehicle credit levels for Type III ZEVs (fuel cells) have been increased to recognize the status of technology development. The credit levels for Type I and Type II ZEVs (battery EVs) were then increased correspondingly in order to maintain a level playing field across the various technology types.
5) The amendments exclude ZEVs from the sales total used to determine an automaker's future ZEV requirements. This was done to avoid "penalizing" manufacturers for producing ZEVs, particularly in future years as the percentage requirement increases. In the extreme case, production of 100 NEVs at 0.15 credit per vehicle in model year 2018 would earn 15 ZEV credits, but would create a manufacturer obligation of 16 ZEV credits. Thus the manufacturer would actually be worse off after the production of the NEVs.
6) The battery warranty requirement for hybrid vehicles in the preexisting regulation was 15 years/150,000 miles, consistent with the general PZEV warranty provisions. The amendments reduce the battery warranty requirement to 10 years/150,000 miles. This was done to recognize the current state of battery technology. The ARB is concerned that if the original warranty requirement is retained, manufacturers would avoid certifying hybrid electric vehicles as PZEVs. This would eliminate possible air quality benefits, and would also greatly increase the manufacturer compliance burden in the early years.

15. Comment: The ZEV regulation needs to require more advanced technology fuel cells. (CVAG)

Agency Response: Fuel cell vehicles still present technical challenges in integrating all essential components into a complete system that provides acceptable weight, volume and operating characteristics, and the most daunting challenge is to significantly reduce cost. Widespread introduction of the technology will be possible only when the technology can be produced and sold at a price comparable to that of today's conventional vehicles. Although prototypes are being placed in research programs, considerable time is still needed for engineering development and for achieving the necessary cost reductions. Projections regarding the pace of commercialization of fuel cells, which were expected to provide a second ZEV technology late in this decade, have become less certain, although automakers remain fully committed and continue to invest heavily in the technology. Based on the most recent information and announcements regarding technology development, the ARB believes that a true commercial introduction will not occur before MY 2011. Therefore, the ARB has included a slow ramp-up of vehicles in MYs 2005-2008 with this number increasing through MY 2017.

(c) Support for a Delay in Adopting Amendments

16. Comment: Please direct the staff to throw out the surrender documents now before you and to undertake a six month comprehensive review of all the mandate provisions with the goal of providing simple, stable, and legally robust standards requiring the continuing, competitive, volume production of ZEVs for sale in California. (Hannigan)

Agency Response: It is not necessary to extend the review period or postpone action. Staff studied the need for change in the regulation prior to the December 2002 workshop. The ARB has sought to take timely action to address legal issues and return certainty to the regulatory program so that it can be restarted with the 2005 model year. The ARB has conducted two hearings, and addressed comments received during these hearings and in response to the two 15-day notice packages.

With regard to California's commitment to zero- and near zero-emission vehicles, see the response to Comment 1 and Section II.B.1..

17. Comment: We respectfully request that you postpone action on this proposal. We also request that the ARB distribute information concerning the ZEV program including information that led to the staff recommendation so that the public will be more informed and better able to assess the significance of this proposed policy change. (City of Santa Barbara)

Agency Response: See the response to Comment 16 regarding the request to postpone action. With regard to the distribution of information, ARB staff mailed out workshop and Board hearing materials to interested parties. In addition, staff also sent electronic notices to all those on the ZEV and ARB Board Hearing Notice list servers that the material was available on the ARB website. Judging from the number of comment letters received from stakeholders and individuals, the public was well informed of the changes being proposed.

(d) Opposition to ZEV Mandates

18. Comment: Volkswagen continues to be firmly opposed to a mandate regulatory approach. We recommend that CARB adjusts the NMOG curve to achieve the same air quality benefits attributed to the ZEV mandate and allow automakers to decide on the technology required to comply with the NMOG curve through performance based emission standards. (VW)

As stated in the January 10, 2003 Initial Statement of Reasons, battery EV technology "may prove attractive for certain limited applications, but does not at this point appear to hold promise for widespread commercial introduction." GM agrees with this assessment, and for that reason does not believe that continuation of the mandate would be productive. (GM)

We suggest that the Board instruct the ARB to develop performance-based criteria for 2009 and subsequent years. (Nissan)

Agency Response: From a policy standpoint, the ARB has clearly articulated the need to maintain a core zero-emission requirement to provide an incentive for further development. The tremendous progress that has been seen to date can at least in part be attributed to the existence of the ZEV requirement, and the ARB believes that maintaining this requirement will accelerate the pace at which true zero technologies are commercialized. At the same time, given the wide-open nature of ongoing technical advances, the amendments provide increased flexibility for automakers to pursue specific strategies that in their view offer long-term promise.

The ZEV program as modified and adopted by the ARB establishes performance-based emission standards for several categories of vehicles (PZEV, AT PZEV and ZEV). Within that framework, production requirements are only set for the ZEV portion of the regulation. The amendments establish an alternative compliance path to provide additional flexibility for manufacturers to meet the regulation with technologies that suit their strengths. Even within the two percent ZEV requirement, flexibility exists through the credit calculation process allowing manufacturers to build different types of vehicles depending on their particular ability and market interests.

19. Comment: I'm writing to say it is not the government's job to tell businesses what they should sell. I urge you to remove this restriction and let the market regulate itself. (Webb)

Agency Response: As noted in the response to Comment 18, the ZEV program does allow substantial flexibility for automakers to produce vehicles that best suit their strengths. The ARB has been directed by the legislature to develop regulations that reduce criteria pollutants from automobiles. Without such regulations, the State cannot meet state and federal health-based air quality standards.

2. Environmental and Cost Issues

(a) Environmental Impacts of the Proposed Amendments

20. Comment: A number of commenters asserted that the staff's proposed amendments will impair air quality due to reductions in the number of "gold" category ZEVs required in the early years of the program. These included the following:

The proposed changes to the regulations that reduce the obligation of automakers to produce ZEVs, or changes allowing automakers to use early introduction credits to meet the proposed reduced requirements, is unhealthy and unsafe for California residents. (Heather Fargo, Mayor of Sacramento)

Without an aggressive ZEV program, many California communities simply cannot and will not achieve health-based federal clean air standards, and that for the ARB to roll

back the ZEV program could be catastrophic for the health of many California citizens. (Communities for a Better Environment and the City of Santa Monica)

The San Joaquin Valley is facing draconian federal sanctions because it cannot meet federal clean air standards, and a relaxation of zero-emission vehicle requirements . . . could be disastrous for the San Joaquin Valley. (Building Industry Association of the San Joaquin Valley)

Agency Response: In the March 5, 2003 Supplemental Staff Report, staff estimated the 2010 and 2020 emissions impact in the South Coast Air Basin of the March 5, 2003 modified staff proposal, as compared to the current regulation and the "no-ZEV program" alternative. These estimates for reactive organic gases (ROG), oxides of nitrogen (NOx) and carbon monoxide (CO) are as follows:

Table 9

Summertime Direct Emissions, South Coast Air Basin in 2010
(Tons per day)

	ROG	NOx	CO
2001 Amendments	155.15	143.28	1571.28
Proposed January 2003 Amendments	155.14	143.26	1571.23
Proposed March 2003 Amendments	155.12	143.22	1571.05
No ZEV Program	155.50	144.24	1574.80

Table 10

Summertime Direct Emissions, South Coast Air Basin in 2020
(Tons per day)

	ROG	NOx	CO
2001 Amendments	87.62	65.75	791.04
Proposed January 2003 Amendments	87.81	65.74	791.07
Proposed March 2003 Amendments	87.58	65.58	787.50
No ZEV Program	90.86	67.81	807.38

These emissions reductions are attributable to the increased numbers of "silver" AT PZEVs that a manufacturer would have to produce in order to meet the ZEV requirements with reduced numbers of gold ZEVs. An example of the possible increase in AT PZEVs under one set of assumptions is shown on page 25 of the March 5, 2003 Supplemental Staff Report.

None of the commenters asserting that the 2003 amendments will increase emissions because of the reduced production of ZEVs have disputed the emissions analysis in the Supplemental Staff Report. The modifications to the supplemental proposal that are reflected in the final amendments will not appreciably change the March 2003 emissions

analysis. We accordingly conclude that the 2003 ZEV amendments reflected in the Final Regulation Order will not result in adverse emissions impacts attributable to the anticipated reduced production of ZEVs resulting from the amendments.

21. Comment: A two-year delay in ZEV regulation requirements is too long. We do not have the luxury to pick from a menu of emission reduction strategies. All feasible options must be implemented as early as possible to achieve state and federal ambient air quality standards. (South Coast Air Quality Management District)

Agency Response: The preliminary injunction issued by the federal district court judge in the *Central Valley Chrysler-Plymouth* case prohibits the ARB's Executive Officer from enforcing the 2001 ZEV Amendments with respect to the sale of new motor vehicles in MYs 2003 and 2004. Since the 2003 model year will be close to completion when the final 2003 ZEV amendments are adopted and the 2004 model year will be well underway, it is not appropriate to have the amended ZEV requirements start before the 2005 model year. This will not result in an adverse emissions impact because the preexisting ZEV requirements cannot be enforced for the 2003 and 2004 model years due to the preliminary injunction.

In any event we note that the amendments provide incentives for early PZEV production in MYs 2003 and 2004 model years by allowing such vehicles to be used as AT PZEVs in MYs 2005 and 2006. It is expected that this incentive will encourage the production of as many as 140,000 PZEVs per year.

22. Comment: In the 2001 ZEV rulemaking, GM submitted extensive comments asserting that the ZEV regulation reflecting the proposed 2001 amendments would ultimately increase rather than decrease emissions. GM claimed that this would happen because assumed increases in the prices of new California cars and light trucks resulting from the ZEV regulation would depress sales of new vehicles, to the extent that emission increases from the greater number of higher-emitting older vehicles on the road due to reduced "fleet turnover" will more than offset the emission decreases attributable to the presence of ZEVs in the new vehicle fleet. To support this position, GM relied on a report dated January 2001 by National Economic Research Associates, Inc. and Sierra Research, Inc. entitled *Impacts of Alternative ZEV Sales Mandates on California Motor Vehicle Emissions: A Comprehensive Study* (the January 2001 NERA/Sierra Report).

The January 10, 2003 ISOR referred to GM's earlier comments regarding the fleet turnover effect and to the January 2001 NERA/Sierra Report. The ISOR stated that the ARB staff analysis of these arguments was outlined in the *ARB Staff Review of Report Entitled "Impacts of Alternative Sales Mandates on California Motor Vehicle Emissions: A Comprehensive Study"* (October 31, 2001) (the 2001 ARB Staff Review) prepared during the prior rulemaking. In this document the staff concluded that the January 2001 NERA/Sierra Report significantly overstated the effect of the ZEV program on fleet turnover, and that the fleet turnover effect would not cause the ZEV regulation to result in an overall emissions increase. The ISOR also described a 2002 RAND report

entitled *Driving Emissions to Zero – Are the Benefits of California's Zero Emission Vehicle Program Worth the Costs?*, in which the authors chose not to include any fleet turnover effect in their quantitative emission and cost-effectiveness analyses of the ZEV regulation.

In comments submitted on March 26, 2003 in this rulemaking, NERA/Sierra provided an update to their previous analysis. Submitted along with the written comments was an updated model that addressed the fleet turnover impact of the staff's March 5, 2003 modified proposal. The updated NERA/Sierra model was used to analyze a range of scenarios concerning future costs and regulatory requirements related primarily to the March 2003 Proposal, but also to the January 2003 Proposal. Under the various scenarios considered, the ZEV Mandate would result in emissions disbenefits in the South Coast Air Basin. The analysis indicated that without major cost reductions in excess of what is currently foreseen, overall emissions would increase in the South Coast Air Basin under the ZEV mandate at least through 2020 relative to what they would be in the absence of the mandate – with the exception of the single year 2020 for one scenario – even though emissions from new vehicles subject to the mandate would decrease.

The March 26, 2003 NERA/Sierra comments also addressed the conclusions of the RAND report referenced by ARB staff, and asserted that the authors' reasons for excluding fleet turnover were not valid. They noted that a previous 1996 RAND report had come to a different conclusion. (National Economic Research Associates, Inc. and Sierra Research, Inc.)

Agency Response: As indicated, the NERA/Sierra assertions that the ZEV regulation will actually increase emissions due to the fleet turnover effect were previously raised in the 2001 ZEV rulemaking.

The staff's analysis of these arguments was outlined in the 2001 ARB Staff Review, which concluded that the NERA/Sierra report significantly overstated the purported effect of the ZEV program on fleet turnover and resulting fleet-wide emissions. The 2001 ARB Staff Review is incorporated by reference. Major considerations leading to its conclusions included:

- The cost increases assumed by NERA/Sierra were overstated.
- Manufacturers will not necessarily be able to pass along all increased costs.
- Small price increases can be addressed by a variety of manufacturer marketing practices and will not necessarily reduce sales.
- The NERA/Sierra emission modeling failed to take into account recent changes to the LEV II program.

The 2001 ARB Staff Review went on to demonstrate that when using more reasonable ARB staff assumptions rather than the assumptions used in the NERA/Sierra analysis, the NERA/Sierra model projected an average per vehicle increased cost of roughly $25 to $40 rather than the $250 to $400 estimated in the January 2001 NERA/Sierra Report.

Staff believed that at these modest levels, such increases would have an insignificant effect on vehicle sales. Even if one accepts the NERA/Sierra premise that any cost increase, no matter how small, will reduce vehicle sales, staff concluded that the ZEV regulation as amended in 2001 would still result in an emission decrease, rather than the emission increase alleged in the NERA/Sierra report. Further staff analysis was provided on pages 80-108 of the December 2001 FSOR.

In the January 2003 ISOR (pp. 46-49) for the current rulemaking, staff updated its assessment of the fleet turnover issue. First, staff noted that the proposed changes put forth in the January 2003 staff proposal served to reduce the number of pure ZEVs that will be needed in model years 2005-2011 as compared to the 2001 amendments. The estimated savings from this change ranged from $375 million to almost $3.7 billion over the MY 2005-2011 period, depending on the types of vehicles manufacturers choose to build.

In addition, staff noted that its estimate of the incremental cost of a PZEV has been further reduced from the level assumed in the 2001 rulemaking. Based on analysis of recently certified PZEVs, staff concluded that the incremental cost to build a PZEV is $100 per vehicle rather than the $200 per vehicle assumed in the *2001 ARB Staff Review*. Although the cost difference per vehicle is small, it has a large effect on the total cost of the program given the large number of PZEVs that will be built as compared to the other vehicle types. The reduction in the estimated total incremental cost to manufacturers over the MY 2005-2011 period due to this reduced PZEV cost is roughly $350 million.

Moreover, staff noted that the analyses conducted during the 2001 ZEV rulemaking did not take into account the use of banked credits. The use of banked credits could allow several manufacturers to significantly reduce or eliminate the production of pure ZEVs and other ZEV program vehicles during the early years of the program. This would serve to dramatically reduce manufacturer compliance cost from the levels assumed in the 2001 NERA/Sierra Report.

Based on the above considerations, staff concluded in the January 2003 ISOR that the originally proposed amendments would have a smaller effect on fleet turnover than the ZEV regulation as amended in 2001. Given that the effect of the 2001 version of the regulation was demonstrated to be minimal, staff concluded that fleet turnover would likewise play a minimal role under the January 2003 staff proposal.

Turning to the updated 2003 NERA/Sierra model, there are some respects in which it addresses points raised in the 2001 ARB Staff Review. Specifically:

- The model now takes into account the value of fuel savings achieved by hybrid electric vehicles.
- The model no longer assumes that ZEV technology remains constant over time (that is, it now includes scenarios under which there is technical improvement over time, leading to cost reduction).

- The model appears to correctly model the credit values for different types of AT PZEVs.

Meanwhile, the ARB staff has concluded that AT PZEVs for which the value of fuel saved exceeds the assumed incremental cost should be treated as having a zero incremental cost – consistent with the NERA/Sierra approach – rather than having imputed net manufacturer cost savings as had been the case in previous staff analyses.

As a result of these changes, the areas of difference between the ARB approach and the NERA/Sierra approach have narrowed as compared to the 2001 analysis. Nevertheless, significant differences remain as described below.

With that background, the staff has performed an analysis in which the amendments covered by the April 2003 Board Resolution and the ARB cost assumptions are incorporated into the updated 2003 NERA/Sierra model. This analysis again indicates that the effect of the amended ZEV regulation on vehicle prices and sales will be insignificant and the regulation accordingly will not increase emissions.

Updating the Model. The first step in this process was to update the model to reflect the April 2003 Resolution. (The model as submitted was based on the March 2003 version, under which the ZEV requirement for the alternative path for 2009 and beyond was "to be determined." To account for this uncertainty, NERA/Sierra prepared two scenarios, neither of which fully corresponded to the ultimate Board action). To accomplish this change, staff started with the NERA/Sierra scenario that most closely resembled the Board action, and then adjusted the percentage of AT PZEVs allowed in each model year to correspond to the allowable percentages given the April 2003 modifications.

The results of this adjustment are shown in Table 11 below. Note that the "ZEV tax" (the NERA/Sierra measure of the per-vehicle price increase due to the regulation) is somewhat higher under the April 2003 version than under the model as submitted. This is due to the fact that the number of ZEVs required under the April 2003 modifications was higher than was assumed in the NERA/Sierra scenario.

Substituting the ARB Assumptions. The second step was to substitute the ARB assumptions in several key areas, as follows:

- The incremental cost for a PZEV was reduced to $100.
- The incremental cost for an AT PZEV was reduced to $2,350 in the near term and $700 in the long term.
- The credit level earned by an AT PZEV was increased to reflect "high voltage high power" technology.
- The incremental long term cost for a ZEV was reduced to $9,300.
- The assumed demand for ZEVs was increased by a factor of two over the level used in the model.

The results of these changes are also shown in Table 11 below. The combined effect of these changes is to dramatically reduce the "ZEV tax" to $42 in MY 2005 and $70 in MY 2010.

The MY 2015 and 2020 results are somewhat higher, but these figures require careful interpretation. In the NERA/Sierra model, the incremental cost of the ZEV program in a given year is driven by the regulatory requirements that will be in place six years later. (This is due to the fact that under the ZEV regulation the compliance obligation faced by a manufacturer in a given year is based on its previous sales, with a six year lag.) In the regulation reflecting the April 2003 Resolution, there is a significant jump in the pure ZEV obligation in MY 2018 – the year that the requirement returns to the "red line" as defined in 2001. This 2018 jump in the regulatory requirement shows up in the NERA/Sierra model as a 2012 jump in the incremental cost of the program. Thus the increase in estimated program cost in the 2012 timeframe is driven by requirements and estimated vehicle costs for 2018, which are subject to considerable uncertainty. For example, by that time the Independent Expert Review Panel will have conducted its review and the Board will have made adjustments as necessary to reflect the state of the technology.

Table 11
Per Vehicle Estimated Increased Cost

	2005	*2010*	*2015*	*2020*
Model as submitted	$198	$281	$322	$321
Modified to reflect April 2003	$195	$291	$337	$328
Modified to use ARB assumptions	$42	$70	$117	$110

Factors Not Considered. Finally, we note that there are a number of factors that serve to reduce the cost of the program, but are not taken into account in the modeling results. For example:

- Manufacturers have accrued significant quantities of banked ZEV credits, which serve to reduce the cost of compliance. Staff estimates that several manufacturers have banked credits sufficient to allow them to postpone building any new pure ZEV vehicles until MY 2008 or beyond. The availability of banked credits clearly will reduce the incremental cost of the ZEV program in its early years.
- The estimated incremental costs used in the model do not take into account the value of any financial incentives, which could be significant. For example, the conference version of the energy bill currently before the U.S. Congress would provide incentives of $5,000 to $8,000 for fuel cell vehicles placed in service prior

to 2013, and would provide incentives of $650 to $3,400 for the first 80,000 hybrid electric vehicles sold by each manufacturer.

- The 2003 amendments provide increased flexibility for manufacturers. Relevant amendments include:
  - The imposition of the "NEV cap" in the silver category is delayed until MY 2009. This further increases manufacturers' ability to use banked credits to achieve compliance.
  - Fuel cell vehicles placed in any ZEV program state are allowed to count towards compliance in all ZEV program states through MY 2011. This reduces the number of such vehicles that will be required nationwide and will result in a reduction in manufacturer costs.
  - Excess PZEVs placed in MYs 2003 and 2004 are allowed to count towards the silver category through MY 2006. This will make it easier for some manufacturers to take full advantage of the silver option and allow for cost reduction.

We expect that when these factors play out in program implementation, the real world cost impact of the ZEV program and its impact on sales will be further reduced from the levels calculated by the updated NERA/Sierra model.

To summarize, the ARB concludes – based on staff's past and updated analyses – that there is minimal risk that the ZEV regulation as amended in 2003 will increase emissions in California or in the South Coast Air Basin.

With regard to the 2002 RAND Report, staff has not reviewed in detail the arguments and counter-arguments advanced by the report authors and the commenters, but rather emphasizes two points. First, as staff noted in the January 2003 ISOR, the RAND report found that "there are good arguments on both sides of this debate." Staff's purpose in quoting the RAND findings was to emphasize that the inclusion of fleet turnover effects is not a completely settled issue – as implied by NERA/Sierra – but rather is subject to debate. Second, and more important, it is agreed by all parties that consideration of the fleet turnover effect is not relevant for small price increases. In the words of the commenter, "NERA/Sierra modeling acknowledges that relatively modest cost increases may not be reflected in increased California costs." Thus the issue, as always, turns on the magnitude of any purported price increase.

23. Comment: Excess emissions associated with the production and marketing of hydrogen fuel have not been accounted for in the analysis of environmental impacts of the proposed regulatory changes. Hydrogen derived from natural gas will be the predominant production technique, and such hydrogen, whether produced in centralized or decentralized facilities would result in increased emissions. In the case of centralized production, higher emissions result from the increased need for tanker truck deliveries compared to gasoline. In the case of decentralized production (on-site production and refueling capable facilities), higher emissions would result from the reformation of natural gas and that these emissions would not be captured by stationary source

emission controls because the fall under the threshold for control or mitigation. (Tom Austin, Sierra Research)

Agency Response: The clearly articulated goal regarding establishment of hydrogen as the future energy carrier for transportation is use of renewable fuels for production of hydrogen. Just as with the vehicle technology, the fuel infrastructure technology is in the developmental stages. Until commercialization of fuel cell vehicles is reached, fleets will be the primary users of fuel cell vehicles. It is likely that a combination of centralized and decentralized hydrogen production facilities will be utilized. Demonstration of a variety of generation methods will most likely be pursued in order to gain critical experience with production of hydrogen fuel. If a decentralized station can serve 80 fuel cell vehicles, as many as 34 stations could create the early hydrogen infrastructure network.

The ZEV regulation promotes both near-term and long-term vehicle technologies that yield emissions reduction benefits in different time frames. Hydrogen fuel cell vehicles and other ZEVs are expected to yield significant emission reduction benefits beyond 2015 from both direct and upstream sources. One could argue that simply mandating PZEVs would achieve greater emissions benefits in the near term than requiring relatively small numbers of ZEVs. However, for long-term achievement of California's air quality goals, the ZEV program accepts near term sacrifices in potential air quality improvements in order to drive vehicle emissions to zero. The infrastructure to support such vehicles may follow the same path.

While it makes sense to assess the near-term emissions reduction benefits of incremental technological improvements on existing combustion engine technology, ZEV technologies are much more fundamental and challenging to implement on a large scale. Near term hydrogen generation techniques may not be optimized for emissions performance at this time, however, as the market for hydrogen matures, increasingly efficient and environmentally benign processes of generation are expected to dominate the market. Assessing fuel cell vehicle benefits solely on near-term upstream emissions reductions is inappropriate.

Calculating the total emissions impact using the data provided in Mr. Austin's comments (12,000 mile per year, 0.03 grams per mile) results in up to 0.003 tons per day NOx from the maximum 2,750 fuel cell vehicles that could result from the regulation by 2011. This compares to the 1.02 tons per day of NOx benefit of the ZEV program in 2010; a 0.3 percent loss in benefits from the program.

(b) Cost Issues

24. Comment: The advancement of nickel zinc technology will significantly reduce the incremental cost when compared to nickel metal hydride or sodium nickel chloride. Incentives for all technologies to reach volume production will further reduce incremental costs. Provide incentives to advanced battery technology manufacturers for early delivery of new products and development of next generation products.

Specifically, nickel-zinc technology should be brought to market now, and credits can be used to spur volume production. (ElectriCab)

Agency Response: When the ARB adopted the 2001 amendments, it did so with an understanding that near-term compliance with the "pure ZEV" portion of the regulation would be expensive for manufacturers. The ARB anticipated, however, that continued development work would lead to more economical approaches that could be employed in modest quantities as the required vehicle volumes increased. While many different battery chemistries have been pursued, the most promising batteries in terms of cost and performance are nickel metal hydride and lithium polymer. The regulation continues to promote battery EVs and any battery chemistry that can be shown to be cost-effective and have good performance may be used in battery EVs.

25. Comment: The staff report is unreasonable in its representation of zero change in battery incremental vehicle cost through 2012, while representing a 99 percent reduction in fuel cell incremental costs. (ElectriCab)

Agency Response: The very stark difference in cost projections reflect the relative state of development of battery and fuel cell technology. Battery costs are based on historical data and reflect a much more mature technology when compared to fuel cells. The large projected decrease in fuel cell cost is reasonable given that the technology is still in the initial research and development phase and manufacturers continue to make large investments in future development.

26. Comment: The economic analysis needs to consider lifecycle costs differential when addressing battery electric vehicles. The increased up-front cost for battery electric vehicles is typically offset by an 80 percent reduction in on-going fuel costs. (ElectriCab)

Agency Response: An extensive analysis of all costs including lifecycle costs for a variety of vehicles was included as part of the ZEV program review in 2000 (California Air Resources Board, Staff Report, 2000 Zero Emission Vehicle Program Biennial Review, August 7, 2000). The conclusions of the analysis were that 2003 battery electric vehicles are significantly more expensive than conventional vehicles on both an initial and lifecycle cost basis. This held true even under alternative scenarios with increased battery life and increased gasoline price. We acknowledge that modest improvements have been made in the cost and durability of certain advanced batteries but have concluded that these improvements are not extensive enough to overcome the initial up-front battery cost.

27. Comment: The cost of hydrogen fuel itself is going to be many times that of electricity for battery EVs. The assessment fails to compare the cost of electric charging infrastructure vs. hydrogen infrastructure. (ElectriCab)

Agency Response: With the development of new fuels or technologies the near-term costs are always higher in comparison to those that have existed for some time.

However, these costs must be viewed in the context of the goal that the ARB is trying to achieve. The purpose of the pure gold ZEV obligation is to maintain significant pressure on manufacturers to continue promising ZEV technology development. The ARB expects that the costs of hydrogen infrastructure will decline with the development of the technology.

28. Comment: I support credits for plug-in hybrids. Production plans for engine hybrid electric vehicles by major auto manufacturers will quickly bring down costs of power batteries, electric motors, and electric controllers. (Louis Browning, Representing the EPRI Working Group)

Agency Response: Generous credits are provided for plug-in hybrids as discussed in the responses to Comments 125 and 126. The ARB agrees that volume production will significantly reduce costs of key electric drive components.

29. Comment: Compensation for only a small fraction of the damage caused by refinery emissions could make EVs affordable for those in areas impacted by bad air. (Morrow)

Agency Response: Assessment of fees on refineries to offset costs of vehicle technologies is outside of the scope of ARB's authority and outside the scope of this rulemaking.

30. Comment: We need a simple requirement that one automaker produce electric vehicles. Let other automakers subsidize the production. The vehicles must be available by catalog at all other automakers. One standard and one program will lower costs. (Taylor, Kemenesi, Jensen, Sanders, Harris, Vandersloot, Sefton, Taylor, Reis, Steinheimer, Josephson, Koloski)

Agency Response: Due to the extremely competitive nature of the automotive industry, it is not practical or reasonable to require one automaker to produce EVs for the entire industry. Credit trading provisions in the regulation encourage one or more companies to produce ZEVs and then sell their credits to other manufacturers if such a scheme is cost effective. However, the projections for batteries even when produced in volume show the overall costs are still prohibitive for a commercial market.

31. Comment: The new CARB document refers to PZEVs recently certified by seven different manufacturers. These vehicles are characterized by small displacement engines (1.8 to 2.5 liters) with 5 of the 7 being four-cylinder engines and the other two being in-line 5 and 6 cylinder designs, respectively. CARB begins its analysis of vehicles by stating that the PZEVs actually produced by five of the seven manufacturers have not been considered in developing the new cost estimate because "it is not clear that some manufacturers have been able to simplify and reduce cost more effectively than others". The manufacturers whose PZEVs CARB staff has chosen to ignore in its analysis are Nissan, Volkswagen, Volvo, Ford, and BMW. The two manufacturers whose PZEVs were considered by CARB staff are Honda and Toyota. One premise for excluding the PZEVs produced by the other manufacturers is that those manufacturer's

current systems are not representative of the systems those manufacturers will use in the future. There is no basis for this premise as there is no discussion of which elements of those systems CARB staff believes will be changed by their manufacturers. Further, each manufacturer will optimize emission control system design to comply with the PZEV requirements in light of a number of factors including OBD II system requirements, likely warranty claims, and the potential for recall due to failure of in-use vehicles to comply with applicable standards. As a result, it is to be expected that the level of complexity and cost of different vehicles' emission control systems will differ. The selective choice of which PZEVs to consider is a major flaw that biases the new CARB analysis of PZEV costs. (Sierra Research)

Agency Response: The commenter suggests that ARB staff has inappropriately ignored the costs of numerous PZEVs in making its analysis of PZEV costs. In its cost analyses, ARB staff projects long-term, learned-out costs of high volume production systems. In accordance with this practice, staff estimated that the Honda and Toyota systems best represent what all manufacturers would strive to achieve in the future. Given additional time, however, both Toyota and Honda might do even better in further reducing their system costs. While other manufacturers may have current production systems that are more complex and costly and incorporate less durable components, staff estimates that these other manufacturers will need to simplify and upgrade their vehicles to match the performance of the Toyota and Honda vehicles or risk losing sales. Consumers value vehicles with good long-term dependability and durability as well as a competitive price. Therefore, other manufacturers must match the costs and performance of the best products or risk losing market share in the long run. The commenter apparently is focusing on short-term costs to manufacturers as a whole, which do not provide a good basis for evaluating regulatory options for achieving reduced emissions from future vehicles. The ARB approach has been very successful in projecting the costs of meeting more stringent future regulatory requirements in the Low Emission Vehicle program.

32. Comment: With respect to Honda, CARB states that the price differential between the LEV and PZEV version of the 2003 model-year Accord EX with automatic transmission is $150. This price differential is attributed to the additional precious metal content of the PZEV catalytic converter. CARB also notes that the PZEV was originally intend to be certified as a SULEV rather than a PZEV and it continues to believe that the incremental cost of zero evaporative emission control systems is about "about $10". Based on this staff concludes that "it appears that Honda is not charging significantly more" for the PZEV emission control system warranty relative to that which applies to the LEV version. The basis for inferring the costs of compliance with the zero evaporative emission, exhaust emission and warranty requirements for the Honda PZEV cannot be determined from the Initial Statement of Reasons. In my opinion, CARB staff should have solicited that cost data directly from the vehicle manufacturer, which is not something CARB staff appears to have done. In addition, staff does not indicate how the costs for the Honda system, which apply to a small vehicle with a four-cylinder engine, would change for larger vehicles. (Sierra Research)

Agency Response: The commenter believes staff should have just asked Honda about its PZEV costs rather than pursue the analysis contained in the staff report. Staff, however, did utilize some information provided by Honda during certification relative to the precious metal loading in their catalysts in combination with precious metal prices currently in effect to arrive at the estimate of the additional cost of their PZEV relative to their LEV vehicle. Staff did double check with Honda regarding the certification information to ensure that it was correct. Staff has previously had discussions with Honda relative to their product design life to arrive at the conclusions contained in our analysis. Therefore our costs were derived with some input from Honda. The commenter also suggests that our cost projections for a "small vehicle with a four cylinder engine" might change for larger vehicles. However, the small vehicle being discussed is actually in EPA's mid-size car category and is one of Honda's best selling vehicles. The Accord also utilizes a 2.4 liter engine, which is at the upper range of the current PZEV engine displacements (the largest is the BMW 6 cylinder at 2.5 liters). Given that manufacturers can meet their PZEV requirements with high volume mainstream models such as the Accord and some other similar size models, our cost estimate should be representative of future PZEVS.

33. Comment: With respect to the Toyota, staff simply states that there is no price differential between the same Camry model regardless of whether it is certified as ULEV or a PZEV but does note that this fact "may be because the dominant sales package is expected to be the PZEV". Again, the basis for inferring the costs of compliance with the zero evaporative emission, exhaust emission and warranty requirements for the Toyota PZEV cannot be determined from the Initial Statement of Reasons and it is unclear why staff did not solicit cost data directly from the vehicle manufacturer. In addition, staff does not indicate why it believes this system could be used to achieve PZEV compliance on other Toyota vehicles, which include many trucks and SUVs. (Sierra Research)

Agency Response: The commenter concluded that the Toyota example contained in the staff report did not provide a basis for determining PZEV costs. Staff only highlighted the Toyota PZEV, however, as another noteworthy example of a relatively simple but effective PZEV emission control system that currently exists. Staff relied on evaluation of the Honda cost details in arriving at the price differential that was stated in our report. The commenter also believed that the Camry emission control system architecture did not establish feasibility of other Toyota models being able to meet the PZEV requirements with the same simplicity. Staff estimates that a sufficient number of passenger vehicles in Toyota's model lineup similar in size to the Camry would be available to meet Toyota's PZEV obligations with similar architectures. This would include Corolla models, small pickup trucks, small SUVs and many more of their higher volume models. Sierra Research suggests staff should "solicit cost data directly from the vehicle manufacturer" but staff efforts to obtain costs from manufacturers in general have historically resulted in overstated costs.

34. Comment: Based on its analysis of the two PZEVs, CARB staff concludes that "the incremental cost of PZEVs relative to SULEVs is likely to be less than $100 as vehicles

are optimized in the next few years". Staff makes it clear that the $100 includes their incremental cost estimate of $10 for zero evaporative emission control systems. Therefore, staff is predicting that the increased cost of exhaust emission control system hardware and the emissions control warranty will be no more than $90 per vehicle. Staff makes no mention of contacting either Honda or Toyota to determine from those manufacturers what the actual incremental cost of the two referenced PZEVs is relative to a SULEV, ULEV or LEV. The history of CARB's cost estimates for the three components of incremental PZEV cost relative to SULEVs is summarized in Table 12. (Sierra Research)

Table 12
History of CARB PZEV Cost Estimates ($)

Cost Component	August, 2000	October, 2001	January, 2003
Zero Evap.	50 to 150	10	10
Exhaust Hardware	50 to 150	60 to 85	~90
Warranty	300 to 500	125 to 150	~0
Total	500	200	100

Agency Response: The commenter again suggests that staff should ask Toyota or Honda directly about their PZEV costs rather than estimate them from available data. These estimates are difficult to obtain from manufacturers in general and when we do get them, they tend to be overstated.

35. Comment: All PZEVs certified to date have demonstrated compliance with the zero-emission evaporative emission requirements using an interim test procedure described in CARB Manufacturer's Advisory Correspondence (MAC) 2001-003, which applies only to pre-2005 model-year vehicles. It is not clear what test procedure will be required for 2005 and later model-year vehicles nor that it will be technically feasibly to certify 2005 and later model-year vehicles to the zero evaporative emissions standards. Given this, it is unclear whether PZEVs will be available in the 2005 and later model-years. In addition, it is unclear that even if CARB's $10 estimate for the cost of compliance with the zero evaporative emissions standard is valid for current PZEVs that it would continue to apply to 2005 and later model-year vehicles. In my opinion, if the requirements for compliance with the zero evaporative emission standards are more stringent after the 2004 model-year than for the 2003 and 2004 model-year, CARB's cost estimates based on current systems will be invalid and will likely substantially underestimate the actual cost of compliance. (Sierra Research)

Agency Response: The commenter is concerned about PZEV costs relative to zero evaporative emission control systems because a revised the test procedure is scheduled for 2005 and later model-year vehicles. A revised test procedure might result in the need to improve current zero evaporative control systems, the commenter speculates. However, at this time, with 2005 model certification underway, we are

unaware of such an issue. Therefore, there is no reason to adjust our current cost estimate.

36. Comment: Sierra Research has obtained accurate information regarding the future product plans and estimated costs of the major motor vehicle manufacturers doing business in California. In an attempt to verify and validate CARB's latest PZEV cost estimates, my partner Mr. Austin and I contacted five of the six large-volume manufacturers and many of the intermediate-volume manufacturers subject to the ZEV mandate. Mr. Austin and I asked representatives of those companies to provide us with available cost information regarding PZEVs on a confidential basis.

The information Mr. Austin and I received indicates that even the lowest manufacturer estimates of the hardward cost associated with the production of PZEVs are higher than staff's new $100 estimate or staff's previous $200 estimate of the total incremental cost of PZEVs. I have concluded that the CARB staff did not obtain clear and precise estimates of the costs of producing PZEVs or the warranty costs of PZEVs from any of the manufacturers that Mr. Austin or I contacted. All manufacturers contacted indicated that there would be incremental warranty costs associated with the 150,000 mile PZEV requirement (as compared to the CARB estimate of zero). While most manufacturers were unable to precisely quantify these costs, those who did indicated that those costs translated to hundreds of dollars per vehicle. The cost estimates we have received indicate that the cost of compliance with the PZEV requirements, taking into account incremental hardward costs and higher warranty costs compared to SULEVs will be equal to or greater than CARB staff's original estimate of $500 per vehicle. (Sierra Research)

Agency Response: The commenter states that their firm contacted numerous PZEV manufacturers concerning their costs, and that none provided them with costs approaching the estimates of CARB staff. Again, this is not surprising since manufacturers often hire this firm to provide aggregated cost estimates for industry in rulemaking events. Unfortunately, the costs resulting from this process have historically been very unreliable, with costs often times an order of magnitude higher than production vehicles have reached after several years of learning and high volumes are achieved. This may stem from the tendency of industry to project short-term costs whereas ARB staff is more concerned about long-term, learned out costs as being a better determinant of the appropriateness of moving forward with a regulatory requirement.

37. Comment: In addition to underestimating the cost of producing PZEVs relative to SULEVs, CARB staff has failed to account for the fact that the true incremental cost of producing PZEVs needs to be assessed relative to vehicles certifying to less stringent (and therefore less expensive) LEV and ULEV II standards not, in general, SULEVs. Further, in the absence of the ZEV mandate, vehicle manufacturers would be required to comply with the fleet average exhaust NMOG standards applicable to passenger cars and light-duty trucks as well as heavier vehicles by certifying all of their products to the various exhaust emission standards in such a way as to minimize compliance costs.

Manufacturers are planning to attempt to certify significant numbers of larger vehicles to SULEV exhaust standards. (Sierra Research)

Agency Response: While it is true that absent the ZEV mandate manufacturers would certify vehicles to less stringent standards than PZEV, under the "cleaner federal vehicle" provisions of the LEV II program, they would still need to certify significant numbers of their passenger cars and light trucks to the federal bin 3 and bin 2 (equivalent to the California SULEV standard). According mobile 6, the implementation schedule for Tier 2, 30 percent would phase-in to bin 3 beginning in 2007 and 55 percent two years later. In addition, 10 percent would phase-in to bin 2 in 2007 and 25 percent in 2009. If manufacturers choose to comply with the exhaust emission standards such as "to minimize compliance costs", it makes sense that these are the vehicles they would choose to certify as PZEVs under the ZEV requirement, since the incremental cost would be significantly less than vehicles meeting less stringent standards such as LEV II and ULEV II. This being the case, it would not be appropriate to include the incremental cost of LEV II or ULEV II relative to SULEV.

38. Comment: As discussed above, the need to certify vehicles to PZEV (and AT PZEV) standards for purposes of compliance with the ZEV mandate requires not only that vehicles meet the SULEV exhaust emission standards for 150,000 miles but also the zero evaporative emission standards. However, larger vehicles will have larger fuel tanks and therefore it will be much more difficult for them to comply with zero-evaporative emission standards for certification as PZEVs. Therefore, manufacturers that planned to certify larger vehicles as SULEVs will not be able to certify those vehicles as PZEVs. Instead, because of the zero-evaporative emission requirements, manufacturers will be forced to certify smaller vehicles that might have otherwise remained certified as LEV II and ULEV II exhaust emissions standards as PZEVs. As a result, manufacturers' cost of compliance with the fleet average exhaust NMOG standards will be increased. (Sierra Research)

Agency Response: As noted in previous responses, manufacturers do not need to certify their larger vehicles to the PZEV standard in order to meet the ZEV requirement. Given the larger engines used by these vehicles and the increased cost associated with reducing the larger volumes of engine out exhaust, it's unclear why manufacturers would choose to do so if their goal is to minimize compliance costs. In fact, by certifying smaller vehicles to the PZEV emission standards at a lower cost, manufacturers continue to certify their larger vehicles to the higher LEV II and ULEV II standards, minimizing compliance costs.

39. Comment: Based on CARB's assumptions regarding the mix of vehicles manufacturers would produce in the absence of the ZEV mandate as well as with the January, 2003 and March, 2003 versions of the ZEV mandate, manufacturers will be required to certify between 25% and 50% of their production of passenger cars and lightest trucks that would have otherwise been certified to standards less stringent than the SULEV standards (e.g., ULEV II or EPA Tier 2 Bin 4 and Bin 3) as PZEVs or AT PZEVs. (Sierra Research)

Agency Response: It is unclear what point the commenter is trying to make here. If he is suggesting that absent the ZEV requirement manufacturers would certify vehicles to less stringent standards, then staff agrees. However, the manufacturers would incur additional costs since they would need to certify their larger vehicles to more stringent emission standards in order meet the fleet average NMOG requirement.

40. Comment: In the 1998 LEV II rulemaking, CARB staff indicated that the cost of SULEVs relative to ULEVs would be on the order of $60 to $95 per vehicle. This additional cost should have been accounted for by CARB staff in its estimates of the cost of PZEVs with respect to the ZEV mandate. (Sierra Research)

Agency Response: As noted above, in order to minimize compliance costs, it would behoove manufacturers to certify vehicles that would otherwise meet the very low emissions standards of Tier 2 bins 3 and 2 to the PZEV emission standard. Furthermore, as illustrated by the 2003 Honda PZEV, it would appear that staff may have overestimated the incremental cost of going from ULEV to SULEV.

3. Specific Concerns Regarding the Regulatory Proposal

(a) Regulatory Treatment of Different ZEV Technologies

41. Comment: While I do also encourage fuel cell vehicles and other alternative fuel vehicles, I do not agree with substituting them for battery EVs in the mandate. (Mizany)

Agency Response: Supporters of battery EV technology have argued that additional battery EV products will help build the market for ZEV products. They have also maintained that continued development of battery products provides a “safety net” in the event that fuel cell technology encounters impenetrable barriers. The auto manufacturers, on the other hand, have argued that the need to devote engineering the ARB and resources to mid-term battery EVs will actually detract from the pace of fuel cell commercialization. Moreover, many manufacturers have stated that they would prefer to target their investment towards fuel cell technology rather than battery EV technology, because they believe that fuel cells show promise of future market commercialization while battery EVs do not. Due to this fact, the ARB has provided auto manufacturers with the alternative compliance path that provides substantial ZEV credits towards fuel cell vehicles. However, manufacturers are still free to use battery EVs through the "base path" to meet the ZEV regulation, or to use battery EVs to meet up to 50 percent of the alternative path.

As noted in the response to Comment 1, the necessary improvements in battery cost and performance needed for commercialization have not occurred. Requiring that automakers place substantial numbers of battery EVs will not reduce cost, but rather will draw resources away from other promising technologies now being developed. As a result, manufacturers are no longer actively pursuing this approach.

42. Comment: The ZEV mandate should not single out fuel cell vehicles for extra large credits and should not provide credit for fuel cell infrastructure. Fuel cell and battery ZEVs should be on equal footing. (Brooks)

Agency Response: See the response to comment 41 above. In addition, automakers have chosen to pursue proton exchange membrane (PEM) fuel cells for vehicle applications due to their low temperature operation and potential for low-cost manufacturing. Over the last decade, industry has made impressive advances in hydrogen-air PEM fuel cell stack technology. As a result, several automakers are now placing the first prototype vehicles into research and demonstration applications, and almost all large automakers are committed to demonstration fuel cell fleets over the next several years.

The proposal reflects this expectation and provides regulatory incentives based on four stages of development prior to 2017. Each stage is designed to foster the placement of vehicles in order to push toward viable commercialization as quickly as possible. Credits for ZEV types decrease significantly as the program matures. The difference in credit between battery EVs and fuel cell EVs evens out by 2012.

The final amendments do not provide credit for hydrogen infrastructure.

43. Comment: I urge the ARB to reserve the "gold standard" designation in ZEV credit awards for pure ZEVs. (Schneck)

Agency Response: Under the final amendments, only pure ZEVs such as battery electric and hydrogen fuel cell vehicles will receive "gold" ZEV credits. However, under the alternative path, automakers may use AT PZEVs to satisfy the pure ZEV portion of the requirement until 2017. This adjustment to the amount of AT PZEV credit that can be used to satisfy the pure ZEV requirement has been added to reflect the reality of current ZEV technology and to take advantage of current opportunities in AT PZEV technology.

44. Comment: I urge the ARB to create stronger consumer motivation for purchase of ZEVs by awarding ZEV credits to purchasers of ZEVs, as well as to manufacturers. (Schneck)

Agency Response: We fail to see the value in providing ZEV credits to consumers since they only have value in the context of compliance with the regulation and therefore only have value to OEMs. However, the State of California has been providing monetary incentives to consumers to encourage ZEV purchases. Up until December 31, 2002 consumers received $9,000 per vehicle and through June 2004, consumers can receive $5,000.

The final amendments should further motivate manufacturers to keep ZEVs on the road, since manufacturers will be able to earn additional credits for 1997 through 2003 model year vehicles that are re-leased after an initial three years of service.

45. Comment: While we appreciate the ARB's proposal, the proposed regulation significantly undervalues Type III ZEVs if the manufacturer does not achieve the "floor" value. Manufacturers that choose the 2001 compliance base path do not receive fair value for fuel cell vehicles they choose to place in California. (Toyota)

Agency Response: Fuel cell vehicles earn the same credit on either the base or alternate path. The intent of keeping the base case as a compliance option for manufacturers is to provide flexibility while maintaining the rules as they were established in the 2001 regulation. It is appropriate to maintain the base path option for manufacturers that want to rely on the compliance strategy they pursued under the ZEV regulation as amended in 2001. We recognize that the alternative path will be attractive; this is intentional since an objective is to get newly produced ZEVs on the road as soon as possible.

46. Comment: I am concerned that the mandate is too complicated, and that it invites lawsuits that will hold up any progress in air quality. I propose that categories be based on emissions, and that credits are based on function, rather than technology. EVs should be made available to drivers who want them. (Elaine Lissner, EV driver)

Make the program simple by having each vehicle earning one credit. (Cagna, L'Amoureux)

Agency Response: We agree that a simple ZEV mandate is a good idea, however each manufacturer has a unique product plan and approach to meeting the mandate that should be accounted for when developing the regulation. Although having each vehicle earn one credit may simplify the ZEV program it does not encourage and provide regulatory incentives for the most desired technologies such as fuel cell and battery EVs. These ZEV technologies are an expensive compliance option that achieves the most significant benefits to air quality, energy security, resource diversity and global warming. Therefore it is important to provide such technologies and investments with the appropriate credits. Also see the response to Comment 7 regarding relative credit levels and the reasons for encouraging specific technologies.

47. Comment: Each credit is assigned to a vehicle operating and licensed in California. If a vehicle is removed from service so are its credits. (Brandenburg)

Agency Response: The ZEV program is not set up to remove credits when vehicles are removed from service. The rationale for this approach was that the technology-forcing objective of the regulation was met when the vehicle was produced (e.g. all of the necessary components were designed and purchased). We agree that manufacturers should be encouraged to keep their vehicles on the road, and manufacturers will accordingly earn credits if they re-lease vehicles or offer vehicles for sale. Also, compliance with the regulation is the responsibility of the OEM. The OEM does not have control of how the vehicle is used, where the vehicle is used, or how long it is used

once it is placed in the consumers control so to link compliance to the use of the vehicle is inappropriate.

48. Comment: I suggest that two types of credits be established one for commercial and one for domestic (consumer), each separate and cannot be mixed. (Brandenburg)

Agency Response: It would be impossible to track commercial and consumer ZEV placements and because both placements result in similar air quality benefits and production, they should receive equal credits. Also see the response to Comment 47 regarding linkage of compliance with vehicle use.

49. Comment: Encourage automakers to make available gliders to smaller EV producers. An EV should include any 2, 3, 4, or more wheeled vehicle that is licensed for the road. (Brandenburg)

Agency Response: Battery EVs developed using a glider or a new vehicle conversion receive the appropriate ZEV credits. The focus of the ZEV regulation is to achieve widespread penetration of zero- and near-zero technologies in the passenger vehicle fleet. Therefore, the regulation addresses production by the major original equipment manufacturers (OEMs). Other vehicle types make up only a small fraction of the vehicle miles traveled and are addressed separately under other ARB regulations and programs.

50. Comment: Specialty vehicles should be categorized by type according to their range performance and rapid charge capability. (ElectriCab)

Agency Response: Under section 1962(d)(5)(A) and (B), credits are provided to ZEVs based on these exact characteristics. The provisions on assigning a specialty vehicle to a particular ZEV Tier are described in Section II.B.8 above.

51. Comment: Define Type II EVs as vehicles having range greater than 100 miles. (ElectriCab)

Agency Response: Under section 1962(d)(5)(A), Type II vehicles are defined as having a range greater than 100 miles.

52. Comment: Assign two credits per vehicle with advanced battery technology that exhibits high energy density, extended range, and rapid charge capability. (ElectriCab)

Agency Response: Type 0, Type I, and Type II ZEVs are distinguished according to range performance only, while Type III ZEVs meet the Type II range requirement but must also be capable of routine fast-refueling. Since only range and rapid refueling impact performance in an air quality context, these are the most appropriate metrics to use for setting credits.

53. Comment: We encourage the ARB to extend the Type II multiplier for MYs 2006-2007 to MY 2010. Once introduced we believe that ATTI highway-speed ZEVs will clearly demonstrate the functionality of such models, both for the commercial and personal use sectors. (ATTI)

Agency Response: The credit system is established to provide regulatory incentives for the early introduction for ZEVs and to provide incentives for developing and commercializing advanced ZEV enabling technologies. Therefore, the credits are reduced over time. The intent of the ARB is to provide equal credit for all ZEV technologies when produced in commercial quantities.

54. Comment: I urge you to close the sport utility vehicle/light truck loophole and raise the weight limit of those vehicles counted in the ZEV mandate. (Heckeroth)

Agency Response: The 2001 ZEV amendments addressed this issue of heavier light-duty trucks by providing that beginning in MY 2007, heavier sport utility vehicles, pickup trucks and vans will be phased into the sales figures used to calculate each automakers' ZEV requirement. When the phase-in is complete in MY 2012, this will increase the number of vehicles used to calculate the ZEV requirement from about 1 million to more than 1.7 million. In Executive Order G-03-069 the Executive Officer reaffirmed these provisions.

55. Comment: Provide incentives to full function electric vehicles through accelerated early introduction credits in 2003, 2004, and 2005. These credits will encourage large automakers to resume production of vehicles and will also enable the smaller manufacturers to expand their operations. Recommended credits for 2003-2005: 20 (which is half of Type III) and consistent for multipliers proposed for AT PZEVs (particularly if the AT PZEV early introduction multipliers remain at 6.0). (ElectricCab)

Agency Response: Due to the significant costs and technical challenges that remain for commercialization of Type III vehicles (fuel cells) and the supporting infrastructure, it is important to provide regulatory incentives for the placement of fuel cell vehicles. The only way to do this is to provide significant regulatory credits for making fuel cells while still providing some regulatory incentive for battery EVs (Type II vehicles).

56. Comment: Transportation systems should continue to qualify for ZEV credits through 2011. The cap of 10 percent should be eliminated, as Transportation Systems produce multiple levels of environmental advantages, including reductions in traffic congestion. (ElectriCab)

Agency Response: The amendments to section 1962(g)(5) extend the provisions on ZEV credits for transportation systems through MY 2011. The incentives in the ZEV regulation for station car/carsharing programs and transportation system credits are relatively generous. For instance a vehicle placed in a transportation system receives the applicable ZEV credits (20 for a Type II vehicle) and then an additional 9 credits for being placed in a transportation system. In order to achieve the goals of the ZEV

program, which is to commercialize ZEVs, these credits appropriately may only be used to meet 10 percent of a manufacturer's ZEV requirements.

57. Comment: Define the sell-through date as April 30 of the following calendar year for individual purchases. For fleet orders, the sell through date should equal the delivery date of the last vehicle and the ZEV credit level should be determined by the contract date (first vehicle). (ElectriCab)

Agency Response: The modifications to the original proposal limit full placement credit for 2001 and 2002 MY vehicles to vehicles that are placed by September 30, 2003. To receive placement credit for 2003 and subsequent model year vehicles, vehicles must be placed by June 30 following the model year. ARB believes that these timelines provide sufficient time for ZEVs to be leased, sold, and placed in fleets, while recognizing potential placement challenges.

58. Comment: I support a gold standard for Type II ZEVs to ensure continued development of battery technology. (Carl Johnson, Deputy Commissioner, New York Air and Waste Management)

I request that the Board maintain some sort of mandate that would include battery electric vehicles. (Paul Scott, RAV4 EV driver)

EVs are still an extremely viable option for meeting the ZEV mandate, and they are obtainable and manufacturable today. (Ed Thorpe, EV driver)

I disagree with the ARB's new proposal favoring hydrogen fuel cell vehicles. I suggest that the Board close loopholes in the regulation that allows auto makers to produce SUVs, so that transportation options that make more sense can exist on our roads. (Steve Heckeroth, EV driver)

Battery electric vehicles work. Don't back down and get rid of the requirements. Set a reasonable percentage requirement. (Dr. Carter, EV Driver; Marc Geller, EV Driver)

Agency Response: See the response to Comment 1 and Section II.B.1..

59. Comment: We would also encourage ARB to consider extending multipliers for other Types of ZEVs if there appears to be sufficient progress in product development to so warrant. (ATTI)

Agency Response: The ARB welcomes new technologies with potential to help California meet air quality goals and therefore adopted amendments to the ZEV regulation that include multipliers for various technologies. The credit structure is performance-based and does not specify the actual technologies. The ARB believes the existing overall credit structure provides an appropriate balance given the status of advanced vehicle technologies today.

(b) Impact of the Proposed Amendments on the Production of ZEVs

60. Comment: Further deterioration of the ZEV gold standard, as proposed in the ARB Report, will send a strong signal to the public, to key battery EV component manufacturers, as well as key investors in those companies, that battery electric vehicles are not viable. We need CARB to maintain the course set in 1990 and maintained in 2001. (CapiTech)

We would encourage you to recognize that there are California companies and employees who are working today on the zero-emission vehicles that the state first envisioned in 1990 and are investing significant funds in California because they believe there is a market for these vehicles. Please uphold the state's commitment to the ZEV program and the incentives that are important to its success. (EVI, HyGen Industries, ISE Research)

I oppose the proposed supplemental changes. The current the ARB proposal guarantees that there will be no ZEVs placed in service in California this decade. (Dana Muscato, Chief Executive Officer, Phoenix Motorcars)

Do not weaken the ZEV program. Doing so would devalue any chance we might have of earning credits by making electric vehicles and more importantly, send a signal from CARB that these cars are not ready and that hurts our market. (ElectroMobility)

I urge the Board to stay the course for keeping ZEVs on U.S. streets. (Diego Miralles, EV Works)

Agency Response: The above commenters are involved in zero emission vehicle design, engineering, financing, infrastructure or production. Research and development work by firms other than the major auto manufacturers has played an important role in advancing the state of ZEV technology and exploring possible market applications. The ZEV mandate has helped to encourage such work over the past years.

Nevertheless, the fundamental fact remains that no pure ZEV technology is ready for near-term volume deployment, as discussed in the response to Comment 1. Given that fact, it is necessary to modify the regulatory requirements to better reflect technology and market conditions. We acknowledge that this will reduce immediate pressures on some major manufacturers to purchase ZEV credits or pursue other near-term solutions. At the same time, the revised requirements will allow manufacturers to concentrate their resources on technologies that in their view demonstrate a sound business case and a potential for long-term payoff. We believe that this is the best course to follow to accelerate the mass-market introduction of ZEVs.

To the extent that feasible and cost-effective applications exist in the near term, then such applications can be pursued by their proponents. The amended regulation still provides significant incentives for battery EV production should a manufacturer decide to pursue that course.

61. Comment: We ask that you help the many, not the few and choose the public over special interests like carmakers and oil companies. (Witucki)

We urge you not to “pull the plug” on this program, but instead allow it to achieve our shared goals. (BAAQMD)

Zero Emission Vehicles should remain the goal and we should continue to have strong incentives or requirements for such vehicles. The ARB proposal will eliminate the gold standard and only support technologies that are already occurring, rather than drive change with tough regulations. The 2001 proposal is decent as it stands. I suggest that it just be refined with added flexibility and less complexity. (John Boesel, President, CALSTART)

We oppose the ARB's proposal. If you move ahead with the ARB proposal today, California will, in effect, relinquish our leadership role in driving zero emission technology for the globe. (Tim Carmichael, Clean Air Coalition)

I urge you to enforce the ZEV mandate. I would actually prefer that the ARB reinstate the original 1990 mandate. (Webber, L’Amoureux)

Agency Response: The 2003 ZEV amendments maintain the goal of zero emissions and California’s leadership role in driving zero emission technology. The long-term vision, as always, is the commercialization of zero emission transportation. We believe that the amendments are necessary to address current technology and market status, but the amended regulation still imposes ambitious targets. The approach embodied in the amended regulation, which calls for phased production of pure ZEVs, large-scale near-term introduction of PZEVs and AT PZEVs, and a future review of technology status by the Independent Expert Review Panel, continues to force technology improvements and provides the best road map towards eventual commercialization and air quality improvements.

62. Comment: We are opposed to the ARB's proposal. We urge the ARB to reject it and to maintain the guiding principle of your 2001 decision. There are two problems with the ARB proposal. First, it gives up too quickly on present day ZEV technologies that are providing ZEV miles. There are cars on the road today that should be in fleets and in advanced transportation systems. Second, the alternative fuel cell path is a recipe for failure that we've already tried. We have to have a serious gold portion of the program, now, in order for people to believe the out years. We spent many hours talking to the ARB about our specific concerns, none of which were reflected in the ARB proposal. We hope that there is some way within the structure of the Administrative Procedure Act that this Board could find a system so that there are alternative policy choices laid out for you before you come to the Board hearing. We seriously hope that this Board will think about how to reform its regulatory process, and its hearing process to deal with these very complicated technical decisions in a better manner that we've seen in the last few months. The regulation continues to get more complicated. It's

very difficult to have a successful regulatory program that nobody in the public can really understand. We hope that we learn from that lesson and in the future try to have simplicity as a guiding force in the regulatory process here. One of the pillars of regulatory success is to have certainty for the public and for the regulated industries. And the only thing that's been certain about this program is the certainty that it will constantly change. (Sandra Spelicy, Planning and Conservation League)

Agency Response: We agree that there are ZEVs in use today that are providing ZEV miles. But these vehicles have been heavily subsidized by manufacturers. Moreover, economies of scale due to increased production volume are not sufficient to make these vehicles cost competitive as discussed in the response to Comment 1. Thus the ARB has concluded that it is necessary to amend the regulation to allow manufacturers to pursue technologies that appear to have a long-term business case. The creation of the alternative path is intended to provide such a mechanism. We believe this is the best approach available to accomplish the underlying goal of ZEV commercialization.

With regard to the process of ARB deliberation, in the March and April Board meetings the ARB was presented with alternative policy choices regarding the structure and stringency of the program. Slide 60 of the ARB presentation at the March Board hearing specifically identified several major issues before the ARB, including the ZEV requirement under the alternative compliance option in MY 2009 and beyond, the role of battery EVs, long term silver production levels, and ZEV credit for infrastructure. Slide 12 of the ARB presentation at the April Board meeting specifically identified issues that were still unresolved, including 250 vs. 500 vehicles for the initial fuel cell vehicle demonstration, the number of fuel cell vehicles to require in future years and the supporting rationale, should the ARB provide incentives or mandate battery EVs, and should plug-in HEVs be treated as pure ZEV. All of these issues involved choices among possible alternatives and were discussed at the hearing. In particular the issue of whether the ARB should incentivize or mandate battery EVs speaks directly to the major points raised by the commenter, and the ARB had a clear opportunity to support the commenter's recommendation had it chosen to do so. Thus the record does not support the commenter's contentions that the ARB was not presented with policy alternatives or that the issues were too complex for the Board to comprehend.

63. Comment: Given the impact that this program's vision has had not only on vehicle innovation in the United States but on vehicle innovation around the world, we urge the Board to reinstate the one percent ZEV deployment requirements that were contained in the revisions proposed on January 10, 2003. (INFORM)

Agency Response: We do not believe that it is appropriate to require near-term ZEV deployments at the one percent credit level given current technology status. Such requirements would impose significant costs but would not be sufficient to lead to commercialization.

64. Comment: I oppose the ARB proposal because the expected number of commercial ZEVs is zero. The Board should not approve the March 5th proposed modifications, but

rather push for battery electric vehicles. Keep a strong mandate and enforce it. Join forces with other supporting state bodies, like the CEC, PUC and legislature. (Tom Gage, AC Propulsion)

Agency Response: See the response to Comment 1 and Section II.B.1. for ARB's position on current battery technology. In regard to joining forces with supporting state bodies, the ARB continually participates with the CEC and other appropriate stakeholders in the evaluation of concepts that lead to improvements in air quality.

65. Comment: Hydrogen fuel cells have the potential to improve air quality, reduce the risks of global climate change, and provide energy security and independence. There are compelling reasons for the State of California to continue to provide strong stimulus to encourage continued development of advanced technology and confront initial commercialization barriers. (Ballard)

Agency Response: We believe that the adopted amendments are consistent with this recommendation. The new alternative compliance path is specifically intended to allow manufacturers to comply with the regulation through aggressive pursuit of hydrogen fuel cell technology.

66. Comment: For more than a year now, we have been working to develop a shared car/station car program for Sacramento. In addition to reducing the number of trips made in the region, our aim is to convert some of those trips to vehicles that use cleaner fuels, especially electricity. Success for our vision and our efforts is greatly dependent upon your agency's retention of the current Zero Emissions Vehicle Mandate. We respectfully urge you to hold to the long-term vision you adopted only a few years ago. (Point West Area Transportation Management Association, South Natomas Transportation Management Association)

Agency Response: The 2001 amendments to the ZEV program added incentives for the placement of vehicles in "transportation systems," which are projects that exhibit shared use, intelligence, and/or linkage to transit. These incentives are retained in the 2003 amendments and their sunset date is extended from MY 2008 to MY 2012. These incentives apply to any ZEV program vehicle (ZEV, AT PZEV or PZEV). At present the proponents of such programs are generally unable to procure pure ZEVs other than NEVs for station car or shared car use. This is due to the major manufacturers' discontinuation of pure ZEV production. As outlined in the response to Comment 1 above, we believe that it is necessary to amend the program in light of the current status of technology development.

67. Comment: First of all, do not approve the ARB's March 5 proposed modifications. It is not in California's best interest. Second, accept the fact that you cannot force the car companies to build electric vehicles. You lost that battle, but do not concede the war because of it. Keep pushing for electric vehicles. California needs them. Third, you have a mandate, keep it, strengthen it, and enforce it. The mandate is a credit mandate. Car companies can produce EVs or they must buy credits from those who

do. Let the car companies off the hook on production, but make sure they have to purchase all credits from any company that builds and sells safety-certified electric vehicles. (AC Propulsion)

Agency Response: The intent of the alternative compliance path created in the 2003 amendments is to allow manufacturers to focus their efforts on specific technologies rather than being forced to simultaneously support work in a variety of areas. We acknowledge that this will reduce immediate pressures on some major manufacturers to purchase ZEV credits or pursue other near-term solutions. At the same time, the revised requirements will allow manufacturers to concentrate their resources on technologies that in their view demonstrate a sound business case and a potential for long term payoff. We believe that this is the best course to follow to accelerate the mass-market introduction of zero emission vehicles.

68. Comment: I urge the Board to reject the current amendments. Battery EVs are at an unfair disadvantage because automakers have not effectively marketed them and the buying process has not been user-friendly. (Kimberly Rogers, EV driver)

I urge the Board to maintain a strong ZEV requirement. Auto companies have not tried hard enough to make battery electric vehicles work, and what consumers want should be a consideration in the Board's decision. (Zan Dubin Scott, RAV4 EV driver)

Agency Response: During the 2000 Biennial Review and the 2001 rulemaking there was considerable discussion regarding automaker's ZEV marketing efforts. The ARB's primary conclusions at that time were:

- Those companies that actively marketed EVs to retail customers made broad-based promotional efforts that attempted to assess the potential retail market for EVs. Other manufacturers used marketing efforts appropriate for the fleet market.
- The process of leasing an EV, as reported by EV drivers and those who attempted to lease vehicles, was described as far more difficult than the process of acquiring a conventional vehicle. Although the evidence presented was anecdotal, rather than survey-based, the ARB believed that taken as a whole this testimony provided persuasive evidence that such difficulties indeed occurred in real world EV leasing.

The ARB acknowledges the controversy that exists over manufacturer marketing efforts. The rationale for the 2003 amendments, however, was primarily based on cost considerations and technology trends rather than market demand. That is, based on current evaluations of technology, manufacturers are unable to market ZEVs in the near term at a price that is competitive with conventional vehicles. Those vehicles that have been placed to date have been heavily subsidized by manufacturers. Requiring the placement of large numbers of vehicles under these circumstances would be extremely costly but would not accelerate progress towards sustainable commercialization.

69. Comment: I urge you to not weaken the ZEV program. Doing so would delay the requirements for ZEVs and devalue any chance we might have of earning credits and

even more importantly, send signals from ARB that these cars are not ready and that hurts our market. (ElectroMobility)

Agency Response: The ARB remains firmly committed to the ZEV program. ZEVs continue to be an important component in California's efforts to achieving ambient air quality standards. However, legal challenges to the ZEV program prevented ARB from implementing and enforcing the regulation in MY 2003 and MY 2004. To allow ARB to move forward and realize benefits from the ZEV program, the regulation was amended to address elements in conflict with the lawsuit and to recognize the current and anticipated state of technology.

(c) The Potential for a ZEV Blackout

70. Comment: We urge CARB to prevent a near-term blackout and address the potential credit glut by requiring automakers to produce new ZEVs to meet pure gold requirements in the 2005 to 2012 timeframe. (California ZEV Alliance, Sierra Club, Campbell, Muerle, PEVDC, Raybon, Jessop, Cagna, L'Amoureux, Simmons, Marquis, Williams, Hyde, Montgomery, BAAQMD, SF Clean Cities Coalition, Redwood Empire Clean Air Vehicle Coalition, Parcher, City of Huntington Park)

I suggest some kind of compromise for the ZEV regulation that would prevent a ZEV blackout and strengthen or maintain the State's ZEV requirements. (Scott Briasco, Electric Transportation Program Manager, Los Angeles Department of Water and Power)

We recommend that CARB eliminate the multi-year ZEV "disappearance" resulting from the use of previously banked NEV credits. (CAPCOA)

The ARB proposal does not resolve the problem of "ZEV blackout," it exacerbates the problem by allowing automakers to continue to earn multiple credits for MY 2002 vehicles through September 2003. (Cal ETC, SF Clean Cities Coalition)

Agency Response: The ARB agrees that the potential for a vehicle "blackout" is significant. The alternative compliance path was established to address concerns related to blackout as well as costs of battery EVs and the status of development of fuel cell EVs. The alternative compliance path focuses on fuel cells, but still provides incentives for battery EVs. The number of vehicles required will ensure that automakers choosing the alternative compliance path are providing serious research and development efforts toward zero emission fuel cell vehicle technology. The final amendments also provide greater incentives for automakers to keep existing ZEVs on the road and in the hands of consumers during this timeframe by allowing automakers to meet up to 50 percent of the alternative compliance path obligation with new or re-leased battery EVs.

71. Comment: I am very concerned that the proposed amendments erode the provisions of the rule, leaving behind a mere shell. Without compulsory mandates,

many automakers may shut down their research and deployment of the cleanest vehicles. (Verduga-Peralta)

Agency Response: As noted in the response to Comment 70, the revised amendments now provide an alternative compliance path that will require the continued research and development of pure ZEV technologies. The ARB expects that most automakers will elect this option. In addition, the amendments will also result in greater numbers of AT PZEVs which will further the long-term development of technologies needed for pure ZEVs.

72. Comment: You have the ability to come up with some scheme that requires the availability of at least one production electric vehicle for purchase by private individuals in the State of California. (Jensen)

Agency Response: Manufacturers are given maximum flexibility to meet the pure ZEV requirements and can choose to meet the requirements with fuel cell or battery EVs or both. Therefore, there are still many opportunities and incentives for manufacturers to produce battery electric vehicles. However the direction of the ARB was to encourage hydrogen fuel cell vehicles.

73. Comment: Require a continuous stream of EVs to be produced every year. (Kimme)

The ZEV program needs strengthening in the following areas. There should be no gaps in the production cycle. I urge the ARB to formulate a revised ZEV mandate that returns to the goals of just a few years ago. (Siebert)

Agency Response: See the responses to Comments 1, 70 and 71 above.

74. Comment: We recommend that CARB require that 50 percent of the credits used to comply with the gold requirement be generated by ZEVs placed within a year or two of their credit use. (California ZEV Alliance, Campbell, Muerle, Hastrup)

A minimum number of ZEVs must be physically placed in service during all model years. Cap the amount of ZEV obligation that can be met with banked ZEV credits. (ElectriCab)

Agency Response: The objective of these comments is to prevent a blackout of vehicles in any given timeframe. The ARB has addressed the blackout issue as discussed in the response to Comment 70.

75. Comment: We believe that a continuing substantial early introduction multiplier is necessary to avoid a blackout of ZEV production. We are concerned that the proposal will cause a multi-year blackout on ZEV production and the resulting lack of battery and drive system volume price reductions. We suggest that a “phase in multiplier” for Type

II vehicles valued at 2.0 for MY 2003 and 1.5 for MY 2004 by adopted. (Phoenix Motorcars)

Agency Response: The ARB has addressed the blackout issue as discussed in the response to Comment 70. In addition, credits for battery EVs are already established at appropriately high levels and adopting phase-in multipliers at this time would not provide adequate lead-time for automakers to alter production plans for 2003 and 2004 vehicles.

76. Comment: There is no reason to drop the pure ZEV requirement to 1% which only serves to blackout the requirement to put pure ZEVs into service. (Adams)

Agency Response: Under the adopted amendments, the pure ZEV requirement is returned to 2 percent for the primary compliance path, consistent with the 2001 version of the program.

77. Comment: Battery EV technology is good, but the methodology used to get into the market has been flawed. I request that the Board keep some level of ZEV requirement for the near term as a fallback until fuel cells are commercially available. (Patricia Lakinsmith, EV driver)

Agency Response: The amendments include an option for automakers to place fuel cell vehicles under an alternative compliance path. Automakers may meet up to one-half of the alternative compliance plan with larger numbers of battery EVs. The ARB, however, does not expressly require the production of battery EVs due to reasons cited in the response to Comment 1.

78. Comment: Many electric vehicle drivers are scheduled to lose their vehicles over the next year. If there is any incentive that could be employed to encourage automakers to keep these vehicles on the road longer, it would prevent an immediate ZEV blackout and be greatly appreciated by the drivers. (PEVDC)

Agency Response: The final amendments provide three new incentives designed to address this point. First, the extended service multiplier in section 1962(f) has been expanded to include MY 1997 to 2003 ZEVs. Secondly, a vehicle manufacturer can now meet up to one-half of its alternative compliance path obligation with credits generated from keeping existing battery EVs on the road during the MY 2005 to 2008 timeframe. And third, a new multiplier of 1.25 has been added for ZEVs offered for sale or with extended leases.

79. Comment: The proposal invites automakers to come back with problems later, it doesn't give incentive to make plug-in hybrids, and the blackout will essentially halt the industry. I ask that the Board consider the Cal ETC proposal in regards to plug-in hybrids. (Tom Addison, BAAQMD)

Agency Response: For the ARB's position on the concern for plug-in hybrid incentives, see the responses to Comments 125 and 126. The ARB has committed to establishing an Independent Expert Review Panel to assess the state of technology and provide background information that will assist the ARB in assessing regulatory requirements for the long term. For the response to the concern regarding a blackout period, see the responses to Comments 70 and 71.

(d) Alternative Compliance Path

(i) Alternative Compliance Path Volume Targets

80. Comment: Inclusion of the trucks in 2007 makes the ramp up of PZEVs and AT PZEVs too fast. The mandate increases from 10 percent to 16 percent, due to the inclusion of the light trucks, which in my company's case about doubles the volume. While this is happening the vehicle credits per unit are dropping down. They phase out. So as the demand for credits go up, the vehicle credits decrease. By 2008, most of the credit glut (if there is one) is done. (Kelly Brown, Ford Motor Company)

Agency Response: The ZEV regulation provides credit multipliers for early years of the program in order to establish a ramp up of production for different vehicle types. The ARB considered the combined effect of the phase out of these early introduction multipliers and the phase in of truck volumes when establishing the program's requirements and believes that the volume of vehicles necessary to comply with the regulation are feasible. Steady-paced progress towards the program's intended commercialization ramp of vehicle volumes including light duty trucks is important to realizing the intended goals of the program. The considerable flexibility and lead-time provided in the regulation make the regulation reasonable. In addition, in the future the Independent Expert Review Panel will advise the ARB on AT PZEV technology status.

81. Comment: I propose you eliminate the need for an alternative compliance path which gives you a real number of ZEVs that are easy to understand and easy to enforce. ZEV credits should be reserved for vehicles that have either zero emission or a category known as ILEV, inherently low emission vehicles. These vehicles should be the alternative compliance path. None of the current production hybrids or PZEVs are in the ILEV category. Require 10 percent ZEVs now, not in 2005. Fill in the shortfall in the number of ZEVs with natural gas, propane and ILEV hybrid cars (propane or natural gas). We don't need any gasoline hybrids.

Here's what my 10 percent looks like. The top two percent could be either fuel cells or battery electric vehicles. The next four percent could be either gold or you could fill the whole six percent up with gold if you want. If you can't do that, give me some CNG vehicles. The bronze category is the propane. Rather than see hybrids and PZEVs get credits, let's get some of these other clean technologies that are already acknowledged by you as being clean enough to go in the carpool lane. (Jerry Pohorsky, EV Driver)

Agency Response: The commenter suggests that essentially the ZEV categories be based on the fuel type used. However, the goals of the ZEV regulation are to achieve maximum air quality benefits and foster commercialization of pure ZEV technologies, which will ultimately have the greatest benefit to air quality. The ZEV program establishes performance and technology based categories to achieve these goals. Specifically, the PZEV category is an emissions certification classification that is 90 percent lower emitting than the next cleanest emission standard. Additionally, the PZEV classification requires the car to meet zero evaporative emission standards and provide a 15 year/150,000 mile warranty on the emissions components. These attributes are not fuel specific; alternative fueled vehicles like propane or CNG powered cars may meet these requirements and be used to comply with the regulation. The AT PZEV category requires a vehicle to meet the same requirements as a PZEV and to make use of technology that enables pure ZEV technology. The ARB believes this combination of performance based emissions requirements and technology enabling requirements best supports the program's goals. Providing credit for gasoline powered PZEVs and AT PZEVs allows California to capture the significant air quality benefits that can be achieved through mass deployment. Alternative fueled vehicles face infrastructure and consumer awareness issues that hurt their near-term deployment potential.

82. Comment: I propose that the ARB modify the fuel cell quantities to be in line with higher projections that the fuel cell industry, the Department of Energy, and automakers have established. The specific recommendation would be 500 fuel cells by 2008, 5,000 by three years beyond, and 30,000 by three more years beyond. (Jason Mark, Engineer & Director of Clean Vehicles Program, Union of Concerned Scientists)

Agency Response: The projections publicized by the industry, the Department of Energy and the press were nationwide or worldwide production values. Scaled for California's market therefore, we believe that 250, 2,500 and 25,000 are more appropriate volumes for the timeframes described.

83. Comment: The Board should oppose the ARB proposal because it does not push zero emission vehicle advancement with clear, enforceable and increasing regulatory goals over the next decade and beyond. I suggest the following modifications: (1) redesign the alternative compliance pathway to allow other ZEV technologies to compete – making sure there is a fuel cell floor; (2) set a minimum requirement for car companies to produce at least 5,000 fresh ZEVs, fuel cell equivalent that is cumulatively in the 2009 – 2011 period, then restore the ramp to the 2001 regulation. (Bonnie Holmes-Gen, American Lung Association)

Agency Response: The ARB believes that the addition of requirements in the post 2008 timeframe as described in response to Comment 88 responds to the commenter's request for clear, enforceable and increasing regulatory goals over the next decade and beyond. Regarding suggestion (1), see the response to Comment 85. The response to comment 91 addresses the commenter's suggestion number (2) regarding 2009 through 2011 volumes. With regard to returning to the 2001 ramp in 2012, we believe

this timeframe is too early and too sudden to return to the 2001 ramp. Continuing with the phased volume approach through two additional phases (2012-2014 and 2015-2017) will provide a more feasible ramp to full commercialization volumes and a return to the 2001 regulatory path in 2018.

84. Comment: I urge the Board to retain the 2001 ZEV requirement of 2% beginning 2008, keep 250 fuel cell vehicle production requirements for the interim, and require 2,000 Type II ZEVs over the next 5 years. (Henry Hugo, SCAQMD)

Agency Response: We believe that the approach included in the amended regulation provides for a greater likelihood for success. The use of phased periods of demonstration with re-evaluation at each phase of the program as it is implemented – as well as the ability of manufacturers to use battery electric vehicles to meet the alternative path requirements – creates a more realistic path for commercialization.

85. Comment: We agree with the ARB's proposal to split the alternate compliance path between battery technologies and fuel cell technologies. The goal should be to have 3,000 to 5,000 battery technology vehicles on the road during this 2001 to 2008 timeframe. We believe the split between battery technology and fuel cell technology must be a requirement. There must be a floor requirement for battery technology and for a fuel cell technology. (Greg Hansen, Production EV Drivers Coalition)

Agency Response: The final amendments provide the flexibility to manufacturers to use battery EVs to meet up to half of their alternative path requirements. We recognize that if technology breakthroughs occur, significant volumes of battery EVs will be needed to reduce cost. For that reason, a ratio of 10:1 and 20:1 have been established for the substitution of Type I and Type II battery EVs respectively for fuel cell vehicles on the alternative path. The ARB chose not to require both battery electric and fuel cell vehicles under the alternative compliance path due to the reasons stated in the response to Comment 1. Splitting resources between fuel cell and battery development is not constructive for either technology. The base path allows manufacturers to use banked credits and continues to provide substantial credits for various zero emission vehicle technologies. The ARB's goal for the alternative path is to ensure continued production in the near term of the promising zero emission vehicle technology, fuel cells.

86. Comment: We'd like to see additional credits for pre-2001 vehicles to be brought back on the road. This is MOA vehicles, out-of-state vehicles and other used vehicles, because we have a definite shortfall of blackout between 2003 and 2005 or 2006, even with a battery requirement. Anything that can be done to encourage these vehicles to stay on the road would be very helpful. I think credits within this alternate compliance path would be able to do that. (Greg Hansen, Production EV Drivers Coalition)

Agency Response: The ARB agrees with this comment. The amendments have been modified to include a provision allowing re-leased battery electric vehicles to offset fuel cell vehicles in the first phase of implementation at a ratio of 33:1.

87. Comment: There should be additional credits, maybe a multiplier credit of 20 percent or so for vehicles that are offered for sale or for open lease. This would avoid the problem that many of our drivers have had of having their vehicles taken from them. (Greg Hansen, Production EV Drivers Coalition)

Agency Response: The ARB agreed with this comment and have included a provision providing a multiplier of 1.25 for vehicles sold or offered with open extended leases.

(ii) Floor Requirements for Production of Type III ZEVs After MY 2008

88. Comment: We urge that the Board require a minimum production requirement for ZEV vehicles in 2009 and later model years. (Environmental Health Coalition, CAPCOA, BAAQMD, Ennes, CEERT)

We strongly urge the Board to keep the ZEV gold standard requirement to promote the introduction of hydrogen fuel cell vehicles and to extend this requirement beyond 2008. (SCAQMD)

We recommend modifications to the ARB proposal that would restore the gold ramp-up of ZEVs. (Roland Hwang, Senior Policy Analyst, Natural Resources Defense Council)

I recommend that a number for fuel cells be set now for post 2009, because absence of a number sends a signal that the program ends in 2009. (Carl Johnson, Deputy Commissioner, New York Air and Waste Management)

Agency Response: As directed by the ARB, the regulation as adopted includes minimum production requirements for 2009 and beyond. As stated in the Description and Rationale for The ARB's Additional Proposed Modifications to the January 10, 2003 ZEV Regulatory Proposal, issued March 5, 2003, given the uncertainty involving pure ZEV technology development, it is difficult to set appropriate post 2008 targets at this time. The ARB recommended that the Board determine the program structure for those years at a future regulatory hearing, based on input from an Independent Expert Review Panel. The ARB was not suggesting that the ZEV program cease to have a pure ZEV requirement after 2008, but that establishment of that requirement be assessed at a later date when better understanding of the technological feasibility was possible. However the ARB also stated in that document that the presence or absence of a fixed long-term ZEV requirement was fundamentally a policy issue because there was not sufficient technical information to make a quantitative finding.

Much of the ARB's discussion at the hearing focused on the importance of clear volume targets in the alternative path after 2008. These targets are important because they clarify California's expectations of technology development as growing and improving. For this reason, the regulation was modified to include volume targets in each successive phase of the alternative path that are based on a ten times increase in production for each 3 year increment. These numbers were derived from estimates by

the U.S. Department of Energy of fuel cell technology development and ramp production up to meet the program's original volume requirements by 2018. The clarity provided by volume requirements in successive phases of the program provides incentive for aggressive investment technology improvement, cost reductions, and supporting industry suppliers. Additionally, the use of an Independent Expert Review Panel to periodically provide assessment of the technologies used to meet the ZEV regulation's requirements will ensure that the Board is able to adjust the pace of volume requirement growth if ultimately necessary.

89. Comment: In the fuel-cell vehicle pathway, a minimum commitment of ZEV vehicles must extend into the future, beyond 2008. We have to have commitments for zero after 2008. Each year, beginning in 2009 and through 2011, the rule should require that fuel-cell pathway participants produce enough fuel-cell vehicles to equal 500 vehicles per year per manufacturer. (Sierra Club)

Agency Response: As described in the response to Comment 88, the amendments have been modified to include increasing volume requirements for MY 2009-2011 and 2012-2014. However, we have not specified a target of 500 fuel cell vehicles per manufacturer because a requirement derived by market share is more appropriate. A target of 2,500 vehicles for all large automakers is set for 2009 through 2011. On average, the regulation will require that each large manufacturer produce 357 Type III ZEVs per year. However, the requirement is based on a market share and will therefore require that the largest manufacturer make the most vehicles and the smallest manufacturer make the fewest vehicles. A market share approach is appropriate because it is consistent with the structure of the regulation as a whole, which establishes percentage requirements based on annual California sales.

90. Comment: The Kirsch Foundation opposes the ARB's proposal. Most of the ARB's changes erode the program's potential to drive clean vehicle technology. We would like to see a return to the 2001 amendments. The biennial reviews should end since they create an incentive for companies to generate results conducive to further changes. Trading needs to occur between automakers and other companies earning credits. We urge you to stay the course and affirm the path you set just two years ago. There are three necessary components we require to support the proposal. First, we would like to see a significant number of non-NEV ZEVs between 2005 and 2008 and 2012. Increased incentives for plug-in hybrids and stronger requirements for conventional hybrids. While the ARB did a commendable job revising hybrid classifications, the issue of plug-in hybrid incentives and larger numbers of ZEVs have not been adequately resolved. We were disappointed in a few key elements, which included only requiring 250 total ZEVs to be produced in the next five years. We're especially disappointed with no plans for a program post 2008. Also, an end to the technology neutral approach is something else we found to be very disconcerting. Choosing only fuel cell vehicles could essentially set the program up for defeat when we look at regulations again in 2008 or at another point, if technology had not advanced significantly. (Todd Dipaola, Steve and Michelle Kirsch Foundation)

Agency Response: The final 2003 amendments contain specific program requirements for MY 2009 and beyond, do not include biennial reviews, and allow for trading between automakers and other companies earning credits. With regard to other issues raised by the commenter, as noted in the response to Comment 1 above, the ARB believes that it is necessary to modify the program to take into account current technology and market trends.

91. Comment: Establish a minimum requirement for car companies to produce at least 5,000 fresh ZEVs (fuel cell equivalent) cumulatively in 2009-2011 and restore the ramp to the 2001 program. (ALA, UCS, NRDC)

Agency Response: The regulation requires manufacturers on the alternative path to produce their market share of 2,500 Type III ZEVs in MY 2009 through 2011 phase rather than 5,000 as suggested by the commenters. The requirement for 2,500 vehicles was derived from estimates by the U.S. Department of Energy of national fuel cell technology development and deployment, scaled aggressively for California. The Board will make use of an Independent Expert Review Panel to assess technology progress. If, in the time leading up to the MY 2009-2011 phase it is apparent that a more aggressive volume requirement is warranted, the Board may modify the program to take advantage of greater availability of ZEVs.

As suggested by the commenters, the ramp to the 2001 program requirements is accomplished by use of the phased volume requirements. The 2001 volume requirements are rejoined in MY 2018.

92. Comment: The proposal appears to make a perplexing and unnecessary retreat from the ZEV mandate in its complete silence on any post-2008 obligation. This provision should be amended to ensure that a strong commitment is made to zero emission vehicle commercialization, including but not limited to fuel cell technology. It should establish aggressive but predictable new requirements for fuel cell and other ZEV development. (Burton-Sher)

Agency Response: As described in the response to Comment 88, above, the final amendments include requirements for ZEVs for post 2008 under both the primary and alternative compliance paths. Additionally, the alternative compliance path includes mechanisms manufacturers can use to meet the gold ZEV requirements using a combination of fuel cell vehicles, battery electric vehicles and re-lease of battery electric vehicles. The ARB agrees that the alternative path should promote commercialization of both battery electric and fuel cell zero emission vehicle technologies.

93. Comment: The proposed changes have no requirement after 2008 for manufacturers using the alternative compliance path. They relegate the gold category to a small demonstration of fuel cell vehicles between MY 2005 and 2008, with no gold requirement thereafter. (SF Clean Cities Coalition, Redwood Empire Clean Air Vehicle Coalition)

Agency Response: The final amendments include requirements for ongoing technology development and progressively larger numbers of pure ZEVs after MY 2008 for manufacturers using the alternative compliance path as described in the response to Comment 88 above.

94. Comment: The revised the ARB proposal does not provide a workable pathway for the success of zero-emission vehicles. It requires only a handful of one type of ZEVs per automaker per year, with no requirement for ZEVs after 2008, and gives automakers a forum to make the usual arguments about why they should not be required to make ZEVs in the future. If adopted, there will no longer be a ZEV program or requirement in California. There will only be a limited fuel cell research and development requirement in the short term. (Cal ETC)

Agency Response: See the responses to Comments 88 and 92.

95. Comment: We suggest that the ARB keep the volume requirements for fuel cells left "to be determined" at a future date, since it is premature to meaningfully plan these volumes now. Post-2010 ramp-ups for all vehicles are a concern, and we suggest that reviews be retained. (Ben Knight, Honda, GM, Nissan)

As you consider how much of a role the fuel cell may play in future automotive applications, remember that you have the automotive, fuel cell and infrastructure experts from the around the world at your doorstep. DC supports the Expert Review Panel, but wait for the report before you make any decision for 2009 and later model years. The right number for today is TBD. (DaimlerChrysler)

In the near term the requirements are achievable, at least out through 2008. However, there's some pieces that aren't sustainable in the longer term, 2009 and beyond. The minimum ZEV requirement needs some evaluation. (Kelly Brown, Ford)

Agency Response: As discussed in the response to Comment 88, the inclusion of volume targets post MY 2008 was identified by many commenters and ultimately the Board as critical to the success of the program. These targets are important because they clarify California's expectations for technology development growth and improvement. The Independent Expert Review Panel will provide assessment of the technologies used to meet the ZEV regulation's requirements and will ensure that the Board is able to adjust the pace of volume requirement growth if ultimately necessary.

(iii) Credits for Fuel Cell Vehicles Placed Outside California

96. Comment: The credit for non-California fuel cell vehicles is disappointing. In fact, California could see no fuel cell vehicles to 2008 and all of them could be placed elsewhere in the U.S.. (White)

Agency Response: The ARB believes that an important objective at this point in the ZEV program is to force ongoing technology development through the production of the

vehicles themselves. The intent of the amendments is to arrive at a target production number for Type III ZEVs that makes sense given the state of the technology, and that would not need to be "multiplied" due to the implementation of the California program in other states. Given the small number of vehicles involved, from an air quality standpoint the location of the near-term placements is of no consequence. The ARB recognizes the importance of maintaining a visible fuel cell program in California from a public education and publicity standpoint, however, and fully expects that the majority of the initial demonstration vehicles will be placed in California due to the California Fuel Cell Partnership, other initiatives underway involving infrastructure and support issues, and our climate. If this turns out not to be the case, then the section 177 state provision can be reconsidered in advance of its planned 2012 sunset date.

97. Comment: No credits should be provided for vehicles placed outside of California. (Cal ETC)

I was appalled to learn that the proposal will allow automakers to earn credit in California for deploying ZEVs in other states. Why give credits for ZEVs we will never see in California? (Rogers)

We fail to see the value to California of placing fuel cell vehicles in other states, and wonder why the ARB would even suggest that vehicles placed in other states could gain California ZEV credit. (SF Clean Cities Coalition, Redwood Empire Clean Air Vehicle Coalition)

Do not give credit for ZEVs sold outside of California. (Henry Hugo, South Coast AQMD)

Credit should not be granted for vehicles placed in other states. Automakers should be encouraged to place ZEVs in the California areas that are most severely impacted by poor air quality. (CVAG)

Do not allow Type III ZEVs placed in service outside California to count toward the ZEV requirement. (ElectriCab)

We oppose the proposal to grant ZEV credit in California for fuel cell vehicles placed in other states such as New York and Massachusetts. Allowing credit for vehicles placed in other states would not provide any incentive for federal funding of advanced fuel cell technology demonstrations in California. (SCAQMD)

Agency Response: Federal Clean Air Act section 177 allows other states to adopt motor vehicle standards that are identical to California's, and New York, Massachusetts and Vermont require compliance wit the California ZEV requirements. The core requirements for these states must remain the same as California's. We believe that 250 fuel cell vehicles are sufficient to meet the technology development needs in the initial MY 2005-2008 stage. If Type III ZEVs placed in other states are not allowed to count towards California compliance, then manufacturers would have to produce 1.7

times the California vehicle number. This would result in a substantial and unnecessary cost burden.

98. Comment: The "travel" provisions must ensure that California receives a fair share of fuel cell vehicles on its roads. The ARB proposal allows any FCV placed in another state that has adopted the California auto emission standards to be counted. Instead, only a portion of the out of state vehicles should be counted in California to ensure that the state receives a fair share of vehicles. (CEERT)

Agency Response: The ARB is aware of the concern that California receive its fair share of the fuel cell vehicles and will be carefully keeping track of vehicle placements. We believe that with the California Fuel Partnership, and with the present and planned hydrogen infrastructure developments throughout California together and with our strong market influence, a more than adequate percentage of fuel cell cars produced will be placed California. An advantage to the Northeast state placements would be the increased exposure of a larger size market of fuel cell vehicles that may in turn increase the overall pressure and demand for cleaner vehicles. If for some reason this becomes a problem, the Board can revisit and amend the regulation.

99. Comment: There should be a phase-out of the "travel" provision because the proposed credit structure would negatively impact the placement of AT PZEVs. (Carl Johnson, Deputy Commissioner, New York Air and Waste Management)

I recommend that the regulations include a specific provision to sunset the pilot program phase of the alternative compliance strategy – section 1960(d)(5)(D) – and add flexibility for fuel cell vehicles to be placed outside of California. Moving fuel cells beyond California will work better toward the goal of long term air quality benefits. (Christine Kirby, Manager of the Massachusetts Low Emission Vehicle Program)

Agency response: The final amendments now sunset this provision after MY 2011.

(iv) Other Alternative Compliance Path Issues

100. Comment: We propose that the Board increase the number of ZEVs that a manufacturer would have to produce under the alternative compliance option, and allow other ZEV technologies (besides fuel-cell vehicles) to meet this requirement.

Agency Response: The ARB derived the initial number of ZEVs that must be produced for the alternative path from an assessment of a number of factors including the current estimated cost of fuel cell ZEVs, appropriate volumes for demonstrations of technology and projections from manufacturers of their production capabilities in the near term.

Regarding use of technologies other than fuel cells to meet the alternative path, see the response to Comment 92 above.

101. Comment: Of particular concern is the need to have a requirement for battery EV production in the alternative compliance path. We shouldn't have to wait decades for fuel cell cars. (Hopkins)

Agency Response: The final amendments provide the option for manufacturers to use battery EVs to meet up to half of the alternative path requirements. In this way battery EVs continue to be encouraged as a compliance option. However, because the status of battery EV costs and performance have not met expectations, it is not appropriate to require manufacturers choosing the alternative compliance path to produce new battery EVs. For further discussion, see the response to Comment 1 and Section II.B.1..

102. Comment: We urge the Board to re-design the alternative compliance pathway in the ARB proposal to allow other ZEV technologies to compete, as long as a fuel cell floor is achieved. The number of vehicles required by 2008 should be increased to 500 vehicles with a minimum floor of 250 fuel cell vehicles. (ALA, UCS, NRDC)

Agency Response: Regarding use of other ZEV technologies in the alternative path, the final amendments are consistent with this recommendation, as discussed in the response to Comment 92. Regarding the number of ZEVs required by MY 2008, see the response to Comment 91.

103. Comment: I disagree with the auto manufacturers' claim that there is no demand for EVs and urge the Board to keep a requirement for battery EVs in the alternative compliance path. (Clare Bell, EV repair person)

Agency Response: See the response to comment 101. The primary concern with battery EVs is cost more than demand. Battery EVs offered to date have been substantially subsidized by manufacturers, and the ARB's battery experts project that future improvements will not be enough to make battery EVs cost-competitive with conventional vehicles.

104. Comment: The "floor" of 250 type III ZEVs for California should not be an alternative compliance strategy, but part of the 2 percent ZEV requirement. 2000 type II ZEVs should also be required. (SCAQMD)

Agency Response: The number of fuel cell and battery electric vehicles required in the early years represents the state of the technology and the associated costs. Consequently, requiring that automakers place substantial numbers of battery EVs or fuel cell vehicles will not be a catalyst for cost reduction or commercialization but rather will draw resources away from other promising technologies now being developed.

105. Comment: I support Dave Modisette's proposal. Maintain battery EV requirements in the alternative compliance path. It is a good idea to move the date for review to a later time. I am a supporter of plug-in hybrids. All types of vehicles should be sold so that Americans have true choice. (Steven Dibner, EV Driver)

Agency Response: With regard to the concern for battery EVs in the alternative compliance path, manufacturers have the option to meet up to 50 percent of their gold requirement with battery EVs under the alternative compliance path. Regarding the date of the next technology review. See the responses to Comments 125 and 126 for ARB's position on plug-in hybrids.

106. Comment: A proposal that is more moderate in the out years than recent proposals could work. It gives carmakers the flexibility to not do 100 percent fuel cells, but rather do a minimum number of fuel cells (50 percent) and earn the remaining credits in three ways. They could produce plug-in hybrid vehicles, city electric vehicles, or by keeping existing battery electric vehicles on the road past 3 years. (Verdugo-Peralta)

Agency Response: See the response to comment 92 regarding use of battery electric vehicles in the alternative path. Regarding use of plug-in hybrid electric vehicles to meet pure ZEV requirements, see the responses to Comments 125 and 126.

107. Comment: Another idea would be to introduce two categories that are better than the silver level. You could propose a platinum level or gold 1 level for fuel cells only. Just "gold" or gold 2 could be a competitive category – so that an OEM could double the number of FCVs in Platinum or gold 1 or produce battery-powered vehicles. Another idea could be to exclude FCVs from gold 2 for a few years so that these technologies are nurtured. (Verdugo-Peralta)

Agency Response: This comment suggests providing options in the alternative path such that battery EVs can be used to meet a portion of the zero emission vehicle requirement. The final amendments allow this by providing manufacturers with the option to meet up to half of their Type III ZEV requirement with battery EVs. We believe this structure appropriately provides options to use both battery electric and fuel cell technology to meet the "floor" obligation.

108. Comment: The AT PZEV volumes in the long term don't reflect a market demand. PZEVs can handle greater than 6 percent of the market. It is from an emissions standpoint dead on equal to an AT PZEV. So, you don't lose anything from an environmental basis if you let PZEVs satisfy the AT PZEV category. In the long-term (post 2008), we think it makes sense to allow greater flexibility to use mixes of ZEVs, AT PZEVs and PZEVs. (Kelly Brown, Ford Motor Company)

Agency Response: AT PZEVs are PZEVs that make use of ZEV enabling technology. The gold requirement is aimed at commercialization of ZEVs. A primary premise of the alternative compliance path requirements is that the trade-off for fewer ZEVs should be greater commercialization of vehicles that further enable development of technologies that support ZEVs. Hence, only AT PZEVs are allowed to offset the two percent ZEV requirement when a manufacturer is making use of the alternative compliance path.

109. Comment: We support grid-connected hybrids as a viable pure ZEV technology. The alternative compliance path must be technology neutral. Battery electric vehicles must be required in the alternative compliance path, not just an option. (Bill Mason, PEVDC)

Agency Response: Because grid-connected hybrids are capable of tailpipe emissions we do not believe they should be treated as pure ZEVs in the regulation. The alternative path gold obligation focuses on moving ZEV technologies forward towards commercialization through the staged demonstration of new vehicles, with at least half of the obligation being met with Type III ZEVs. We are reluctant to impose both a battery electric and fuel cell production requirement because the alternative path is an option for manufacturers. The base path allows manufacturers to use banked credits and continues to provide substantial credits for various zero emission vehicle technologies. The primary goal of the alternative compliance path was to ensure continued production in the near term of the promising zero emission vehicle technology, fuel cells.

110. Comment: We propose the following changes: (1) have modest, but known ZEV requirements in each and every year from 2005 through 2014; (2) the 2001 base requirements pathway in the ARB proposal should reflect the actual provisions of the 2001 adopted ZEV regulations, after correcting legal issues; (3) there should be some phase out of eligibility of silver vehicles in the alternative compliance pathway to meet a manufacturer's gold obligation; (4) provide an easy incentive multiplier to close the placed-in-service loop-hole which contains no minimum requirement for a vehicle to be in CA. (Dave Modisette, Director, California Electric Transportation Coalition)

Agency Response: The final amendments are generally consistent with recommendations (1) and (3). Concerning recommendation (4), ARB staff has explored options for ensuring that vehicles remain in California to receive ZEV credit and has determined that the legal authority does not exist to require minimum placements times as part of the ZEV percentage requirements. Also, see the response to Comment 47 regarding linking compliance with vehicle use.

Recommendation (2) relates to differences between the 2001 regulation and the 2003 base path. The rationale for the specific 2003 amendments is provided in the response to Comment 14.

(e) AT PZEVs

(i) General AT PZEVs Issues

111. Comment: Under the alternative compliance option, an automaker can meet their 2 percent ZEV requirements with silver vehicles indefinitely. We propose to revise this by phasing out eligibility of silver vehicles in the gold category, such that they are completely out by 2015, at which time only pure-ZEVs would qualify. We propose that beginning in 2009 only silver with total credit of 0.7 or greater (without early introduction

multipliers) would qualify for credits under the gold system. Beginning in 2012, only silver vehicles with a total credit of 2.0 or greater (without early introduction multipliers) would qualify under the gold system. (Cal ETC)

Agency Response: The final amendments as adopted doe not allow automakers to comply with AT PZEVs in the alternative compliance option indefinitely. Specifically, in MY 2018, AT PZEVs no longer apply to the gold obligation as the program returns to the 2001 structure.

AT PZEVs are intended to foster technical improvements and affordability of components necessary to build ZEVs. The AT PZEV option, and in particular, the HEV options within it, will help bring about the necessary technical improvements, increased manufacturing capability, cost reductions, and consumer acceptance of ZEV componentry and features. The amended regulation ramps down credit earned by AT PZEVs and sunsets lower credit earning AT PZEV types, thus partially addressing the commenters underlying concerns.

112. Comment: The ARB has correctly assigned more credit to the advanced component credit allowance for more powerful systems as the greater the system power the greater the enabler of the fuel cell future. Based on third party costs and the number of motor/power electronics systems, the credit for HEVs that ultimately became Type E, should be increased from 0.5 to 0.6. (Toyota)

Agency Response: ARB staff evaluated the relative merits of higher power (Type E) vs lower power (Type D) HEV systems and concluded that higher power systems are somewhat more valuable for ultimate commercialization of pure-electric ZEVs and so they merit higher credit. However, staff also believes that credit should not depend on power capability alone. Both Type D and E systems are based upon high voltage (>60 volt) components that will be necessary in pure-electric ZEVs. Their use in HEVs will result in design improvements in and increased production of components necessary for control of high voltages as well as the necessary technician training to safely service high voltage systems on vehicles.

While the cost of advanced technology componentry may sometimes be a secondary factor in considering what credit to assign, in the case of HEVs, cost and power should not be the only considerations in determining credit.

Even though they exhibit higher peak power capability, Type E HEV drive systems are not yet “drop in” replacements for full-time electric drive vehicles because their duty cycle or continuous power ratings are not yet adequate.

113. Comment: Data suggest that the ARB’s estimates for AT PZEV costs are low and don’t comprehend the range of vehicles and costs likely to be built in response to the proposed regulation. The proposed phase-down of advanced component credits assumes cost reductions not supported by this data. (Toyota)

Agency Response: The ARB does not claim that the scheduled phase-down of HEV advanced componentry credits is due to projections in cost-reductions alone. This phase-down was incorporated for a variety of reasons including technical maturity, growing market acceptance and to coincide with the phase down of credits for other ZEV program vehicles. Keeping the relative credit values is important within the structure of the regulation. The ARB Independent Expert Review Panel will examine the state of AT PZEV components, and depending on these results, the ARB may reconsider the MY 2011 and later HEV credit assignments, including the MY 2011-2014 phase-down.

114. Comment: I recommend that to get AT PZEV credit, a vehicle must be a grid rechargeable hybrid with an all-electric range of at least 10 miles, or use hydrogen in an internal combustion engine, or create hydrogen for a fuel cell using a reformer. There should also be a paragraph that allows CARB to declare other technologies as AT PZEV if deemed a significant advance on current low pollution technology. (Adams)

Agency Response: The only commonly considered exceptions to the commenter's list of qualifying AT PZEVs are non-plug-in HEVs and CNG vehicles. Both of these vehicle types are still worthy of consideration in the program. Non-plug-in HEVs will still promote improvements in electric drive technology and batteries for quite some time. CNG vehicles will also provide valuable experience with compressed gas fuel that helps develop future use of hydrogen.

115. Comment: Due to VW's position of entering the large manufacturer category in the 2008 model year, we will be in the unique position of reducing our PZEV volume from 50 percent of California fleet to 30 percent of our fleet from the 2007 to 2008 model year. CARB should consider extending extra AT PZEV credit for manufacturers willing to produce excess PZEV volumes through the 2011 model year. (VW)

Agency Response: The regulation provides sufficient lead time, averaging, banking and credit trading options for automakers to plan for the transition from intermediate to large without having to make large changes in a single model year. Automakers with large, sustained PZEV sales may also consider selling these excess credits to other automakers to help defray the costs of ongoing PZEV production at high production volumes. Automakers also have the option of certifying identical vehicles as SULEVs instead of PZEVs to improve manufacturabilty and parts commonality while reducing their warranty obligations on these vehicles, thereby reducing costs. Earlier introduction of AT PZEVs would also help soften the intermediate-to-large transition.

116. Comment: We suggest that the ARB reconsider the limited and declining credit values of AT PZEVs or add a review within this decade, because the volume of AT PZEVs required in the out-years grows unrealistically large. (Honda)

Agency Response: AT PZEV base credit values are not all scheduled for a decrease in credit, only AT PZEV HEVs are. Furthermore, AT PZEVs are only an optional component of the regulation in lieu of producing a much smaller quantity of ZEVs. The

ARB agrees that a review will be necessary and will reexamine the credit for AT PZEVs based on the findings of the Independent Expert Review Panel.

117. Comment: The proposal greatly weakens the AT PZEV requirements for hybrid electric vehicles and does not provide meaningful incentives to encourage plug-in hybrids. (Cal ETC)

Agency Response: The final amendments result in substantial increases in the production of AT PZEVS if automakers choose to take full advantage of the alternative path option. We believe that in the near term, it is likely that many or most of these AT PZEVs will be HEVs. Credit for plug-in HEVs has been increased to the maximum feasible amount in order to incentivize this class of HEVs.

118. Comment: The proposal effectively kills the true ZEV requirement by allowing vehicles that are not true ZEVs to qualify as gold vehicles indefinitely. (SF Clean Cities Coalition, Redwood Empire Clean Air Vehicle Coalition)

Agency Response: Under the final amendments, AT PZEVs do not qualify as ZEVs, they are an option to ZEVs once the floor requirements for Type III ZEVs are met for manufacturers using the alternative compliance path. The alternative compliance path is sunsetted after MY 2017.

119. Comment: We support the inclusion of significant credit for hydrogen storage, hydrogen-fueled internal combustion engines, and hybrid electric drives as AT PZEVs. Doing so promises to accelerate the introduction of hydrogen-fueled vehicles. (Stuart Energy)

Agency Response: The ARB agrees and has significantly increased the AT PZEV credit available for vehicles with each of these desirable features.

120. Comment: We are concerned the market is unwilling to adopt unfamiliar and unproven technology such as hybrid electric vehicles. The volume of HEVs required will be seriously outside the scope of market acceptance. These high numbers provide no emission benefits over PZEVs. DaimlerChrysler has made suggestions on this subject to reduce or remove this concern, and we remain willing to pursue reasonable alternatives with the ARB. (DaimlerChrysler)

The economies of scale needed to optimize production costs for ZEVs do not require the Executive Officer to award AT PZEV credit to hybrids. Even if AT PZEV credits would create such economies of scale, the appropriate volumes will be reached at much lower production levels than required in the ARB proposal. A more direct way to serve the goal would be to award higher levels of credits for the production of ZEVs. (GM)

Agency Response: The ARB recognizes the commenters' concern with market acceptance of HEVs, but the AT PZEV category is only an option to making ZEVs, and HEVs are only one of several vehicle options within the AT PZEV category.

Automakers could choose, for example, to make substantially fewer CNG vehicles instead of HEVs. Furthermore, initial market acceptance of the early market 4-seater HEVs available appears very promising, with automakers manufacturing them at maximum planned volumes due to strong customer interest, frequently having to resort to waiting lists until demand can be satisfied.

We recognize that no significant additional air quality benefits exist over PZEVs, but believe that the ZEV enabling aspects warrant additional credit.

121. Comment: Giving ZEV credit to hybrids is futile. It confuses the issue of lessening air emissions with federal fuel efficiency standards, two entirely different things. (Dennison)

Agency Response: The ARB believes that HEVs act as a legitimate technology "bridge" to ZEVs by making use of substantial electric drive technology, and that improvements in fuel efficiency are only a secondary, unrelated, side benefit of early-introduction HEVs. For example, it is entirely possible for a vehicle to still earn AT PZEV HEV credit under the amended ZEV regulation with poor fuel economy relative to its size class if its market objective is improved acceleration performance.

(ii) Qualifying Criteria for AT PZEVs

122. Comment: We recommend modifications to the ARB proposal that would require AT PZEVs to backfill any differences between the 2001 amendments and whatever transpires at the end of the board meeting; and the adoption of credit levels for future AT PZEV vehicles. We oppose, from a technical perspective, the inclusion of the 42-volt, level 1 vehicles. (Roland Hwang, Senior Policy Analyst, Natural Resources Defense Council)

Agency Response: The ARB believes that 42 volt (Type A) HEVs have technical merit, but only in the early years of HEV introduction as the electric drive industry is still maturing. This amendment accordingly allows Type A HEVs to qualify for AT PZEV credit, but restricts them with no more credit than a conventional PZEV and only temporarily qualifying as AT PZEVs until 2008.

123. Comment: We support the number of AT PZEVs necessary under the alternative compliance option, but this should be a requirement, not an alternative. We believe the number of AT PZEVs possible is even greater than this and suggest increasing the AT PZEV requirements as soon as possible. (SCAQMD)

Agency Response: The ARB's priority objective continues to be the market introduction and mass commercialization of ZEVs. Incorporating an AT PZEV requirement will not satisfy this objective, so AT PZEVs should remain an option to production of ZEVs. However, as long as automakers continue to experience near-term challenges with larger volume technical demonstration and additional cost of ZEVs, substitution of AT PZEVs is temporarily the most feasible means of satisfying a significant portion of the

ZEV regulation. Automakers have the flexibility of selecting from a variety of vehicle types within the AT PZEV option so they may take advantage of their particular strengths and expertise.

We agree that the number of AT PZEVs produced may indeed be larger than "required" when automakers fully exercise the AT PZEV option, but that the proposed requirements are still necessary, challenging, but achievable.

(iii) Specific Treatment of Plug-in Hybrids

124. Comment: We recommend that manufacturers be pushed to provide greater numbers of plug-in hybrids. (CAPCOA)

Agency Response: The ARB agrees and has incorporated several changes in the AT PZEV credit determination that result in increases in total credit earned by plug-in HEVs. These include changes that allow them to earn a combination of zero emission range and advanced componentry credit where these used to be alternatives, and increases in the amount of zero emission range credit they receive.

125. Comment: Provide stronger incentives for plug-in hybrids during the transitional period. Current incentives appear to be inadequate to encourage automakers to invest in this technology. We recommend that CARB create greater incentives for production of plug-in HEVs based on the pure-ZEV miles produced by these vehicles during the 2005 to 2011 timeframe. (California ZEV Alliance, Campbell, Muerle, Geller, Gilmer, Raybon, Jessop, Cagna, Simmons, Marquis, Williams, Hyde, Montgomery, Rhodes, WCLO, Community Health Works, BAAQMD, SF Clean Cities Coalition, Redwood Empire Clean Air Vehicle Coalition, Gutierrez, Rodriguez, Kimme, Griffith, WCLO)

Agency Response: The ARB agrees and has incorporated changes in the AT PZEV credit determination that result in increases in total credit earned by plug-in HEVs. Plug-in HEVs are also eligible for a substantially extended phase-in credit multiplier of 6 times through 2008, and 3 times from 2009-2011. Note that proposed levels for credit for plug-in HEVs are now generous enough that the ARB had to also add a "cap" to restrict the maximum value attainable for highest-range plug-in HEVs to the same value earned by a Type III ZEV. The ARB believes that this level of incentive for plug-in HEVs within the regulation is appropriately generous.

126. Comment: We recommend that the Board provide stronger incentives for a high quality hybrid EV that will provide real "pure zero emission" miles and accelerate the introduction of ZEVs. (City of Huntington Park)

Agency Response: The ARB agrees and has re-structured the AT PZEV credit structure so that plug-in HEVs that offer more than 10 miles of ZEV range now receive substantially more credit. Although this credit remains in the AT PZEV category, it is now possible for certain types of plug-in HEVs to earn nearly as much credit as a Type III ZEV.

127. Comment: Plug-in hybrids fueled by gasoline should not be admitted in the pure ZEV category because they are capable of vehicle emissions of criteria pollutants. (Brooks)

Agency Response: The ARB agrees. The 2003 ZEV amendments maintain plug-in HEVs in the AT PZEV category and do not categorize them as pure ZEVs.

128. Comment: We urge that grid-connected HEVs be treated equally with battery-electric vehicles for gold ZEV credit. Grid-connected HEVs can provide substantial ZEV miles, improve marketability, and enable technology for fuel cell vehicles. (NEVCOR)

Allow plug-in hybrids with significant ZEV miles to be counted in the gold standard. (Hastrup)

Agency Response: Since its inception in 1990, a key element of the ZEV program has been the attractiveness of the fact a pure ZEV will not experience emissions reduction degradation over time. Plug-in HEVs have many attractive features and could potentially provide more zero emission miles than some battery EVs. Unfortunately, as they age, they are still subject to component failures that may result in substantial emissions increases that would remain undetected by routine Bureau of Automotive Repair inspections for as long as 2 years.

129. Comment: I suggest that the Board make the regulations simpler and include a significant gold standard for ZEVs and plug-in hybrids. (Tim Hastrup, EV driver)

Agency Response: The amended regulation is now substantially simpler than the 2001 regulation; in particular see the changes to determination of credit for ZEVs by range and refueling time only, and the simplification of HEV credits within the AT PZEV category. Also, see the response to Comment 128 above.

130. Comment: I urge the Board to reject the ARB proposal and reaffirm the 2001 program amendments. I recommend incentives for plug-in hybrids. (Mike Kane, EV driver)

Agency Response: Regarding retaining the 2001 ZEV amendments without change, see the response to Comment 1 and Section II.B.1..

The ARB supports further incentives for plug-in HEVs and has substantially increased credit available to them.

131. Comment: Make the mandate move towards ZEVs in a progressive way, and focus on the near term, not the distant future. I suggest that plug-in hybrids are a clean technology that can be made today at reasonable cost. (Dr. Frank, UC Davis)

Agency Response: The ARB agrees and has made further improvements and clarifications to the AT PZEV portion of the regulation in order to further encourage progress towards advanced ZEV technologies in the near term. Progressive improvements include "temporary" credit for mild HEVs (Type A and B) that sunset in MY 2008, sunset of Type C in MY 2011, and phase down of Type D and E HEVs through MY 2015. AT PZEVs that earn zero emission VMT credit, including plug-in HEVs, also qualify for an extension in their phase-in multiplier through 2011 to further encourage their consideration. Note that Plug-in HEVs now earn so much ZEV credit that the ARB also had to cap the maximum they could achieve so they could not exceed a Type III ZEV.

132. Comment: We support increased early credits for AT PZEVs with zero emission miles traveled. These hybrids could play a significant role in increasing the proportion of zero emission miles traveled in disproportionately impacted urban areas, while providing all the performance and features consumers expect, plus the convenience of refueling with gasoline for cross-country trips. We recommend a credit equivalent to five SULEV level vehicles be allowed. We recommend addition of an equivalent "floor" of Type II ZEVs and AT PZEVs with a minimum Zero Emission Range Credit for all pollutants of 1.25. (SCAQMD)

Agency Response: The ARB agrees, and has increased the credit for AT PZEVs that earn zero emission VMT credit. The credit for plug-in HEVs varies with range and features, but even the minimum plug-in HEV with only 10 miles of zero emission range can now earn up to 1.9 credits before multipliers while 5 PZEVs earn only (5 X 0.2) = 1.0 total credit.

133. Comment: The EPRI study indicates that there will be mainstream potential for both plug-in and non-plug-in hybrid vehicles. (Amanda Miller, Representing the EPRI HEV Working Group)

Agency Response: The ARB also believes that if plug-in HEVs were available, that there would be significant market potential for them. Credit for plug-in HEVs has been increased under the proposed amendments to further encourage one or more automakers to consider selling these as part of their AT PZEV option.

(iv) Specific Treatment of Mild Hybrids (Types A & B)

134. Comment: Automakers must be encouraged to commercialize hybrid vehicle technology that utilizes a significant amount of electric drive power, rather than that which uses the electric technology for a mild power assist. Maintain the commitment to the promotion of hybrid technologies that obtain a substantial portion of their power from electric drive power. (Environmental Health Coalition)

Agency Response: While the ARB agrees that HEVs with substantial electric drive power are more desirable in terms of advanced technology development and deployment, it is also beneficial in the near term to encourage certain other HEVs. The

final amendments offer reduced credit for mild HEVs (Types A and B) and phase out credit for these HEV types by MY 2009.

135. Comment: The ARB proposal allows weak hybrids to qualify for AT PZEV credit, and does not provide meaningful incentives to encourage stronger hybrids, including those with ZEV range such as plug-in hybrids. (SF Clean Cities Coalition, Redwood Empire Clean Air Vehicle Coalition)

Agency Response: The ARB believes that it is appropriate to allow AT PZEV credit to weak (Type A & B) HEVs, but only for an interim period ending in MY 2008 during which the HEV market share is small and these low-power technologies are still relatively advanced when compared to conventional vehicles. We agree that stronger HEVs, and in particular, plug-in HEVs are worthy of more significant credit, and changes to the AT PZEV credit determination have increased the credit for them to much higher levels. See the responses to Comments 125 and 126.

136. Comment: We recommend that the Board require high-quality HEVs with strong linkages to pure ZEVs in the silver category. We recommend at a minimum, the 13 percent peak power requirements be retained for hybrids qualifying for AT PZEV credit. (California ZEV Alliance, Raybon, Jessop, Simmons, Marquis, Williams, SF Clean Cities Coalition, Community Health Networks, Parcher)

Agency Response: The benefits of HEVs leading to ZEVs does not depend solely on the power capability of the electric drive relative to the engine, but rather on the operating voltage and power capability of the electric drive by itself.

137. Comment: Encourage automakers to commercialize hybrid vehicle technology that uses a significant amount of electric drive power. (Gilmer)

Agency Response: The ARB agrees and has created a separate class for higher power HEVs (Type E), with 50 kW or more peak power capability, and has provided them with the highest credit available to non-plug-in HEVs.

138. Comment: It appears that the advanced componentry scoring proposed would allow overly generous credits for low power and voltage hybrids. There would be no incentive for automakers to offer anything more than mild hybrids. We believe advancing hybrid technology is an important goal the ARB proposal currently does not address. Establishing a new category between gold and silver for plug-in hybrids, and mandating increasing numbers of these vehicles to be produced would accomplish this goal. (BAAQMD)

Agency Response: The ARB agrees that advancing HEV technology is an important objective. This is why the credits for all low voltage and low power HEVs sunset early while ongoing AT PZEV credit is allowed only for high voltage systems with power of at lease 10 kilowatts (Types D and E). We also agree that it is worthwhile to further encourage automakers to consider plug-in HEVs and has chosen to increase the

amount of credit available to them under the AT PZEV option. Phasing out these very mild HEV credits, phasing down the credit for mild and strong HEVs (Types D and E), and maintaining the credits for plug-in HEVs also accomplishes the commenter's goal and encourages automakers who wish to take advantage of the HEV option to move beyond mild HEVs.

139. Comment: VW can demonstrate that high-powered, low voltage hybrid concepts can offer environmental benefits equal to high voltage concepts at reduced costs. VW recommends that CARB either eliminate the voltage design parameter in the hybrid section (and rely on the three proposed power levels (50 kW, 10 kW, and 4 kW)) to distinguish the credit amount of each tier or change the definition for Type two hybrids to allow either 10 kW **or** 60 Volts. (VW)

Agency Response: The ARB agrees with this comment. There are proposed low voltage HEV designs that have merit beyond the former low power HEV classes. We have accordingly created a new class (Type C) for high power, low voltage advanced technology HEVs that offer significant HEV technology improvement, but still do not foster the necessary development of high voltage systems that are needed for pure electric drive ZEVs.

The ARB believes that this new category should be retained longer than other low power HEV classes, and has extended the credit sunset for these Type C HEVs to 2011.

140. Comment: Giving ZEV credit to hybrids is futile, as well as in violation of federal law. (Morrow, Chen)

Agency Response: The ARB disagrees and believes that allowing AT PZEV credit for HEVs will ultimately lead to the development and deployment of pure electric ZEVs, which is the reason they are part of the ZEV program. In addition to the gradual improvements in electric drive components that are resulting from the encouragement of HEVs, some automakers are now making direct use of their actual HEV components on their Type III ZEV prototypes.

We know of no federal restrictions that prevent California regulations from encouraging the deployment of ZEV technologies in vehicles. If the commenter is referring to assorted conflicts with federal CAFE standards, the amended regulation does not reward vehicles for improved fuel economy. It would, in fact, allow AT PZEV credit for an HEV that provided only modest improvements or even a decrease in fuel economy if, for example, its market emphasis was for improved acceleration performance instead of fuel savings. Hybridization does not in and of itself improve the highway fuel economy of a gasoline vehicle without other significant modifications to the engine, such as downsizing.

(f) Treatment of Neighborhood Electric Vehicles

141. Comment: The City of Chula Vista is writing to urge your continued support for neighborhood electric vehicles as an alternative mode of transportation to automobiles whenever possible. Without your support, the NEV manufacturers may decide to discontinue manufacturing NEVs. Your continued support in the NEV industry is greatly appreciated. (City of Chula Vista)

Agency Response: The ZEV regulation encourages a variety of ZEV types. To the extent that NEVs are used to make zero emission trips, they benefit air quality and are an appropriate participant in the ZEV program.

142. Comment: We encourage the ARB to extend the NEV multiplier for model years 2005/2006 through model year 2008. The extension will encourage more use of NEVs, which we believe have many applications. (ATTI)

Agency Response: The ARB has considered the role of NEVs in the ZEV regulation and has decided that for now, the credits provided for NEVs is appropriate. The credit levels for NEVs is appropriate at this time because the goals of the ZEV program include the successful commercialization of zero emission transportation that can substantially compete with conventional vehicles. Therefore, focusing on full function battery EVs and fuel cell vehicles is more appropriate. However, the ARB has continued to be open to collection of data and information regarding the relative impact of NEV use.

143. Comment: Some NEVs are not street legal, making displacement of internal combustion essentially nil. In particular, the GM Pathways program fails to meet the ElectriCab's performance requirements in the urban transportation market. As such, its associated ZEV credits should never be certified. However, other NEVs do meet our service criteria, and their credits should be recognized. In either case, NEV credits should be limited in both total percent make-up and forward transferability in meeting the full ZEV requirement. (ElectriCab)

Agency Response: NEVs are electric low speed vehicles that meet a legal classification adopted by the National Highway Transportation Safety Association (NHTSA). While the ideal application for various NEVs varies, all legally certified NEVs must meet NHTSA safety standards. The ARB recognizes that there are wide ranges of potential applications that are well suited to NEVs and the number of NEV's produced could affect the number of other types of ZEVs produced.

Given this, the credits earned by the various ZEV products are designed to encourage manufacturers to produce a variety of vehicle types, rather than all NEVs. Specifically, the value of NEV credits decreases from 1.25 in MY 2003, to 0.625 in MYs 2004 and 2005, and levels out at 0.15 in MY 2006 to encourage the development of City and full function ZEVs. In addition, beginning with the 2006 model year, the use of credits

earned from NEVs can only be used to meet a portion of the ZEV and/or AT PZEV categories.

Credits earned from NEVs can be used to meet up to 75 percent of the ZEV category obligation in 2006 and 50 percent in 2007 and beyond. In addition, credits earned from NEVs can be used to meet up to 75 percent of the AT PZEV category obligation in 2009 and 50 percent in 2010 and beyond.

Regarding the award of credits for particular programs, the ARB will ensure that all vehicle placements earning credit meet all necessary conditions.

144. Comment: NEVs need to receive more credits to manufacturers because they are an important, affordable vehicle to reduce both air pollution and traffic congestion. Further, NEVs have an essential role in various car share programs. (Dan Sturges, Executive Director, Mobility Lab)

Agency Response: See the responses to Comments 142 and 143.

145. Comment: The proposal should stick to .62 credits for NEVs because it keeps niche markets alive in master planned communities and replaces trips made by conventional vehicles. (Tom Fulks, Green Car Institute)

Agency Response: We recognize that there are wide ranges of potential applications that are well suited to NEVs. However, the number of NEVs produced could affect the number of other types of ZEVs produced. Given this, the credits earned by the various ZEV products are designed to encourage manufacturers to produce a variety of vehicle types, rather than all NEVs.

146. Comment: NEVs have an important place in California because they reduce emissions. (Michael Coates, Green Car Institute)

Agency Response: See the response to Comment 141.

147. Comment: The proposed regulations as related to NEVs are in conflict with the apparent California policy objectives. The proposed regulations exclude NEVs from transportation system credits and call instead for the use of city electric vehicles and PZEVs. DC suggests that the discount factor for NEVs be changed to 0.625 from 0.15 for model years 2006 to 2008. The Technology Review Panel or a parallel study should investigate the utility of NEVs in reducing vehicle trips and vehicle emissions in California. The result of the investigation should be a recommendation for how to value NEV credits for the 2009 and later model years. (DaimlerChrysler)

Agency Response: See the responses to Comments 142 and 145.

148. Comment: NEVs should comprise no more than 50 percent of a manufacturer's ZEV liabilities beginning in 2003. (ElectriCab)

Agency Response: See the response to Comment 143.

149. Comment: NEVs should never be given ZEV credits. (Thorpe)

Get rid of NEV credits. (Cagna)

Agency Response: The ZEV regulation encourages a variety of vehicle types. To the extent that NEVs are used to make zero emission trips, they benefit air quality and are an appropriate participant in the ZEV program. Although they may not serve the same function as full function or City EVs, they are still ZEVs that may fill a niche market. The placement of NEVs is a legal compliance strategy given the regulation as it exists and they have the potential to displace conventional vehicle trips. The substantial discount multiplier for NEVs should encourage production of full function ZEVs. In the near term, it would be unfair to manufacturers to change the near-term credit scheme since most have already developed near-term compliance plans.

(g) Leasing and Re-Leasing Issues

150. Comment: We propose an incentive-based multiplier that would encourage vehicle sales or leases that are longer than a standard 3 year lease with an additional 3 year re-lease provision. (Cal ETC)

Agency Response: In response to numerous comments made, ARB has added a multiplier to provide additional incentives for battery electric vehicles to be kept on the road longer. This one time multiplier of 1.25 applies to city and full function vehicles placed in model years 2004-2011, if they are either sold or leased for three or more years with the option to purchase or release for two years or more.

151. Comment: ZEV credits must only be granted for vehicles that are offered for sale or lease to the public. Leases without an option to purchase should not earn ZEV credits. Vehicles only count if they are on the road for a long time. (Hastrup)

Agency Response: During the early stage of development, on key objective of the ZEV program is the encourage the design and production of ZEVs and ZEV components. This objective is satisfied when the vehicle is built. We recognize that long-term vehicle use provides air quality benefits as well as useful practical experience, and therefore the regulation provides increased credit for extended service. We do not, however, believe that it is appropriate to completely deny credit to vehicles that are placed but not re-leased. Such vehicles have helped to advance the state of ZEV technology.

152. Comment: Future ZEV credits should be enhanced for automakers that choose to make their vehicles available for sale or open lease rather than closed leases which are forcing people out of ZEVs. (PEVDC)

Agency Response: See the response to Comment 150.

153. Comment: I request encouragement for re-leasing current ZEVs on the roads. (Tim Hastrup, EV driver)

I recommend incentives for the re-lease of battery electric vehicles. (Mike Kane, EV driver)

Agency Response: In response to numerous comments, ARB has added a multiplier to provide additional incentive for re-leasing existing ZEVs. For leases extended after April 24, 2003 (the date of Board action), a multiplier of .2 times the credit value of the vehicle if newly placed in that year may be applied for each year after three years of service.

154. Comment: SCE opposes the ARB proposal. The Board should keep battery electric vehicles a priority, and address the 2003/2010 blackout. SCE further requests that the Board consider how to encourage OEMs to release existing ZEVs because it is an important way for state agencies to meet their EPACT requirements. (Ed Kjaer, Southern California Edison)

Agency Response: See the response to Comment 1 and Section II.B.1. for ARB's position on current battery technology. The 2003 amendments do, however, provide incentives to keep existing battery electric vehicles on the road. Such incentives include allowing new or re-leased battery electric vehicles to count towards a manufacturer's alternative path requirement, providing enhanced credit if consumers are given the opportunity to purchase or re-lease the vehicle, and removing the requirement that manufacturers provide a battery warranty on re-leased vehicles. These incentives will help encourage continued availability of ZEVs to the extent possible.

4. Technology Issues

(a) Battery Issues

155. Comment: I urge the board to look ahead at what battery technology can do and not abandon battery electric vehicles. Lithium-ion batteries are advancing rapidly, and this can address many limitations battery electric vehicles currently have. (Dan Rivers, President, Compact Power)

Battery technologies such as thin film lithium-based polymer are viable options for battery electric vehicles. A strong ZEV regulation is needed to attract investors for advanced battery technologies. Reject any major changes to the mandate. (Robert Gibney, Chief Marketing Officer, Avestor)

I hope the Board will keep its options open concerning battery electric vehicles. Breakthroughs in lithium ion battery price and performance will allow current lead-acid vehicles with 50 miles range to be able to exceed 200 miles. One vehicle by ZAP will go 240 miles on a charge and have one hour recharge time. (Rhodes)

Agency Response: To assess the cost and performance of advanced batteries for electric vehicles, the ARB hired a panel of experts in 2000 to assess the state of technology. Their report concluded that the most widely used advanced battery technology, nickel metal hydride would cost vehicle manufacturers between $9,500 and $13,000 per vehicle in quantities of 10,000 to 20,000 per year. Even when manufactured at production levels exceeding one hundred thousand packs per year, total battery cost was estimated to be approximately $7,000 to $9,000 per vehicle.

The Panel also assessed the state of lithium-based technologies and determined that these batteries will be significantly more expensive than nickel metal hydride batteries at a production volume of around 10,000 packs per year. Even when produced in much larger volumes, lithium-based batteries will be more expensive unless substantially less expensive materials become available, and new manufacturing processes relying on automation, precision and speed are developed.

The ARB believes there have been only modest improvements in battery cost since the extensive review undertaken by the Battery Panel in 2000. A recent report entitled The 2002 Industry Report – A Critical New Assessment of Automotive Battery Trends, authored by one of the Battery Panel experts, focuses on batteries for advanced vehicles, primarily hybrid electric vehicles. Findings within this report pertaining to battery EVs are consistent with the ARB's assessment that current and reasonably projected battery electric vehicles will not play a significant role in personal transportation due to their inability to provide sufficient range at affordable cost.

156. Comment: Dr. Anderman's battery technology review was narrowly focused and not representative of the state of development for all batteries. There are other viable battery options for EVs. (Dan McCarthy, Chief Operating Officer, Evercel Incorporated)

Findings in the ARB report are based on incomplete battery data. Two hundred and fifty fuel cell vehicles over the next 5 years will do nothing to clean up California's air. (Robert Kittell, Engineer, Chairman and Chief Executive, Electricab Corporation)

Agency Response: The ARB contracted with Dr. Anderman to specifically review the most promising battery technologies being pursued by major automakers for use in electric vehicles. These batteries are at a development stage where it would be possible to produce them in larger quantities if cost and performance targets are met. While there are many other battery chemistries that could be pursued for vehicle use, the ARB is unaware of any that are being aggressively pursued with the potential for near-term application.

With respect to the emissions impacts of the 2003 amendments, see the response to Comment 20.

157. Comment: Our company is ready to commit large resources to bring to market battery electric vehicles that meet customer expectations. There is a great need for

CARB to maintain the minimum course on battery electric vehicles of the 2001 regulation. (Serge Roy, Hydro-Quebec)

A strong battery electric vehicle mandate is vital for getting automakers to produce them. The auto manufacturers have made marketing choices and mistakes that have impeded consumer understanding of EVs and their availability for purchase or lease, and as such, the success of battery electric vehicles should not be judged upon past sales. (Mike Thompson, EV driver)

I support maintaining a strong gold standard for battery electric vehicles that will ensure a sustainable energy future, and healthy environment. (Marylin Bardet, Solano County resident)

Agency Response: The ARB's decision to not expressly require battery EVs is not due to the limited placements of vehicles to date. Rather, the ARB has focused on stimulating research and development of fuel cell technology while still achieving the same air quality benefits through the placement of larger quantities of AT PZEVs and PZEVs. Until breakthroughs in electrochemical energy storage occur, requiring the continued placement of battery EVs will serve only to draw resources away from other promising technologies now being developed. Proponents that believe that these judgements are incorrect have the opportunity to test their products in the market. The amended regulation still provides significant incentives for battery EV production.

158. Comment: SMUD supports a strong ZEV mandate with significant battery electric vehicles and grid connected hybrids. I suggest that the ARB report under-estimates battery technology improvement. Volume production, process improvement and capital investment are needed to reduce battery cost. (Bill Warf, Systems Engineer for Sacramento Municipal Utility District)

Agency Response: See the response to Comment 1 and Section II.B.1. regarding battery EVs. The modified regulation still provides significant incentives for battery electric vehicle production should a manufacturer decide to pursue that course.

159. Comment: We believe that a variety of high voltage battery systems such as full function EVs, city EVs, and plug-in hybrids should be allowed to develop technology and market before 2012 as a safety net for the ZEV program. We encourage the Board to take steps to assure limited public availability of these technologies as soon as possible as well as to removing the biases for fuel cells over battery technology. (PEVDC)

Agency Response: See the response to Comment 1 and Section II.B.1..

(b) Fuel Cell Technology

160. Comment: Any support for fuel cell technology beyond that given to battery electric vehicles is inappropriate at best. (Siebert)

Agency response: See the response to Comment 1 and Section II.B.1..

161. Comment: CARB's latest version of the mandate effectively allows the automakers to get off the hook for providing ZEVs to us now, seemingly in exchange for the later delivery of better ZEV technology: the fuel cell. What proof has CARB obtained that assures them that the fuel cell technology will be ready when promised? (Lakinsmith)

Agency Response: Part of the rationale for the changes to the mandate reflects the ARB's efforts to better align the requirements to today's technology. As far as proof of future success – we obviously have none. The ARB believes that the 2003 amendments represent the most appropriate course, based on the fact that the automobile companies are investing large amounts of capital in pursuit of fuel cell vehicle commercialization. This fact makes it appear in their view that fuel cells vehicles have a near-term legitimate business case.

5. Independent Expert Review Panel

162. Comment: The Independent Expert Review Panel's composition and responsibilities must be more clearly and narrowly defined. It is imperative that the panel's composition be independent and free of direct economic interest. (CEERT, Sierra Club)

Agency Response: During the April 2003 hearing the ARB resolved through Resolution 03-4 that the members of an Independent Expert Review Panel will not have financial ties to motor vehicle manufacturers.

163. Comment: We have concerns about the undefined composition and responsibilities of this expert panel. The ARB proposal eliminates regulatory certainty and replaces it with a highly uncertain and potentially politicized process. (SF Clean Cities Coalition, Redwood Empire Clean Air Vehicle Coalition)

The role of the Independent Expert Review Panel needs to be carefully narrowed and constrained and not be given a policy making role and not taking the job of the Board. (V. John White, Sierra Club)

We are concerned that the proposal for a new Independent Expert Review Panel needs to be more clearly articulated to ensure that the sole decision-making authority over the ZEV program remains vested with the Board. The panel's role should be advisory only, and there should be strong and explicit assurances that it will be free of undue influence and conflict of interest. (Burton-Sher)

Agency Response: At the April 2003 hearing the ARB resolved through Resolution 03-4 that the members of an Independent Expert Review Panel will not have financial ties to motor vehicle manufacturers. In addition, the Board stated that the intent of the Panel is

not to make recommendations on regulatory action and that only the Board itself will decide whether amendments to the regulatory requirements are to be made. The Panel will report to the Board on the status of ZEV technologies and the readiness of various technologies for market and consumer acceptance.

164. Comment: We propose that the Panel be delayed until 2009 or 2011, so that there are several years of experience with the program before any technology evaluation takes place. (Dave Modisette, Director, California Electric Transportation Coalition)

The ARB proposes that the Panel make its first report in 2005. That is less than two years away. It makes much more sense to have the panel consider the technology and report results in 2006 at the earliest. (Sierra Club)

Agency Response: At the April 2003 hearing the ARB resolved through Resolution 03-4 that the members of an Independent Expert Review Panel will report back to the Board in time for the Board to consider this and other information to determine the appropriate regulatory approach on the commercialization of pure ZEVs in the 2009 and subsequent model years. It is anticipated that such a report should take place in the 2006 or 2007 timeframe to be most effective for the next phase of the program.

165. Comment: Move the Expert Review Panel to a post-2006 time frame and ensure the panel's scope is limited to technology review. (Bonnie Holmes-Gen, ALA, UCS, NRDC)

Agency Response: See the responses to Comments 163 and 164.

166. Comment: With the minimum ZEV requirement we think the ARB has taken a correct approach. It's too difficult to determine how many ZEVs make sense especially when they're bound to be fuel cells in the 2009 and beyond period. We support the expert review panel and the ARB and the Board can make use of the Fuel Cell Partnership for input and to learn. The requirements in 2009 ought to be based on the conclusions of that panel, without abdicating your authority to the panel. (Kelly Brown, Ford Motor Company)

Agency Response: In recognition of the need to assure a continuum of ZEV vehicle production to foster ZEV development, the ARB has set combined total production requirements under the alternative path for Type III vehicles of 2,500 from MY 2009-2011, 25,000 from MY 2012-2014, and 50,000 from MY 2015-2017.

These will be reevaluated by the ARB after the Independent Expert Review Panel reports to the Board on the status of ZEV technologies and the readiness of various technologies for market and consumer acceptance.

6. ZEV Infrastructure Considerations

167. Comment: If any infrastructure is to receive credit, it should be for the more mature and currently useful AVCON standard rather than hydrogen/fuel cell related infrastructure that is decades from any usefulness in reducing pollution or gasoline usage. (Geller)

Agency Response: Credits for ZEV infrastructure present separate issues that are better addressed outside this rulemaking. Following the hearing for the 2003 amendments to the ZEV regulation, ARB staff did an extensive analysis of whether ZEV credits should be awarded ZEV credits for hydrogen infrastructure as part of an informational Board Hearing item in September 2003.

168. Comment: Credits for fuel infrastructure should not be fuel specific. Credits should only be given for infrastructure that supports zero emission miles traveled. (Adams)

Agency Response: See the response to Comment 167.

169. Comment: ETEC has charging infrastructure capable of meeting the requirement for 60-mile range with 10 minutes of charging. We believe that deleting this credit is counterproductive to the ARB goals. We encourage the Board to keep the fast charge credit in place. (ETEC)

Agency Response: ARB ended the provision for 60-mile range with 10 minutes of charging in order to take the next step forward in advancing technology by emphasizing both a greater than 100 mile range and fast charging – thus making ZEVs, on a performance basis, more competitive with conventional vehicles.

170. Comment: Allow ZEV credits for battery electric rapid charging infrastructure as part of a transportation system (10 to 20 credits per station with rated power of at least 35.2 kW). (ElectriCab)

Agency Response: See the responses to Comments 167 and 169 above.

171. Comment: I urge the ARB to provide greater ZEV credit incentives for advances in telematics that support ZEV infrastructure. (Schneck)

Agency Response: See the response to Comment 167.

172. Comment: We propose that hydrogen infrastructure installations which meet strict requirements for zero criteria emissions and zero carbon emissions be given “gold level hydrogen infrastructure” recognition, and that appropriate incentives be provided. (Stuart Energy)

Agency Response: See the response to Comment 167.

There are several ways the development of hydrogen infrastructure is currently being addressed. The California Fuel Cell Partnership is providing an excellent forum for working on developing fueling interfaces, codes and standards. The ARB is a partner in the Partnership and will continue to work with it to develop hydrogen infrastructure. Lastly, the ARB has a regulatory mechanism called the Clean Fuels Outlet Program, which triggers infrastructure investment from energy providers once the penetration of alternative fuel vehicles exceeds 20,000 statewide.

173. Comment: We encourage you to consider partial credits for slower (20 to 30 minute) charge times as our experience has shown that vehicle operators find these recharge times to be acceptable. (ETEC)

Agency Response: For battery EVs, ARB believes the range of the vehicle is the most important factor and the best indicator of how useful the vehicle is. At the same time ARB wanted to simplify the ZEV credit system. Thus, the current system of credits for battery EVs was developed based on range values.

174. Comment: Please keep and extend the ZEV mandate, standardizing on one EV charging "paddle" for electric charging stations. (Christodora)

Agency Response: In June 2001 ARB standardized the charging system for battery EVs. Section 1961.2, title 13, CCR provides that in MY 2006 all new battery EVs must include the conductive charging system. This requirement remains in place for any new battery EV produced in MY 2006 and later.

175. Comment: Rapid re-fueling should not be defined with respect to on-board energy storage capacity. The current definition would encourage smaller fuel tanks as a means of making the requirement more attainable. Rather, ARB should set flow-rate standards for rapid fueling of battery and fuel cell electric vehicles. The flow rates could be 200 amps for electric vehicles. (ElectriCab)

Agency Response: Rapid refueling is characterized as a ZEV's demonstrated capability to accept fuel or electric charge until achieving at least 95% state of charge or rated fuel capacity in 10 minutes or less. This criterion for Type III ZEVs reflects the consumer's need to purchase vehicles that have significant usable range and are capable of being refueled quickly.

7. Credit and Banking Considerations

176. Comment: We urge you to summarily reject any changes to the status of earned credits for three reasons: 1) it unfairly punishes companies like ours who responded to the challenge of providing ZEVs into the marketplace; 2) it will pose further setbacks on the implementation of the broader ZEV program; and 3) it puts at risk the integrity and credibility of the agency and the rulemaking process. (Toyota)

Agency Response: This comment refers to proposals that the ARB require fresh ZEV production or limit the use of banked credits. The ARB agrees, and the final amendments are consistent with this recommendation. ARB does not want to penalize auto manufacturers that have risen to the challenge to place ZEVs. By maintaining the original ZEV requirement structure ("base path") and offering an alternative compliance path, the ARB's intent is to provide a balance that does not penalize manufacturers for early ZEV production while addressing the need for continuous production of ZEVs.

177. Comment: I urge the ARB to strongly stimulate operation of a ZEV credit market to include use of credit statistics and ZEV credit auctions on the Internet and clarification of ZEV credit banking and trading regulations. (Schneck)

Agency Response: ARB staff has considered developing and maintaining a ZEV credit system with Internet access to participants in the ARB ZEV credit bank. Participants in the ZEV bank can include auto manufacturers, transportation managers and credit brokers. However, the resource requirements to develop and maintain a real-time Internet access system are prohibitive at this time.

178. Comment: I urge the ARB to establish ZEV debits in connection with State inspection of vehicles in impacted air basins. (Schneck)

Agency Response: The goal of the ZEV regulation is to reach ZEV commercialization. To that end the ZEV regulation requires auto manufacturers to manufacturer a certain number of ZEVs to advance towards ZEV commercialization. Establishing ZEV debits in connection with the California State Smog Inspection Program would put an additional burden on the local air quality districts. The ARB is charged with the authority to regulate mobile sources in California providing a consistent approach to address the magnitude of the number of vehicles in the State of California and the large impact they have on air quality. Also, penalizing manufacturers because cars have been retired, sold out of state or otherwise taken out of service is not appropriate since manufacturers do not have control over such activities.

179. Comment: Inter-manufacturer ZEV credit trading should be allowed. (Hastrup)

Agency Response: As provided for in the regulation since its initial adoption, manufacturers are allowed to trade credits among each other. See section 1962(g)(6).

180. Comment: Formally establish the ZEV bank, finalize the ZEV credit trading documentation, and facilitate ZEV credit trading transactions. (ElectriCab)

Agency Response: After the current amendments to the ZEV regulation are finalized, ARB staff will begin working again with stakeholders in establishing the appropriate ZEV credit reporting mechanisms.

181. Comment: I suggest that you bank the ZEV mandate penalties and give them to entrepreneurs who develop and sell electric vehicles. (Deshmane)

Agency Response: Entrepreneurs that develop and sell electric vehicles are already offered incentives in the form of ZEV credits and cash incentives from consumers that buy electric vehicles. To date there have been no ZEV mandate penalties assessed.

182. Comment: ZEV credits should be encouraged and marketed for use as State Implementation Plan qualified offsets. (ElectriCab)

Agency Response: ARB has several regulations and programs that address emissions from mobile sources such as the ZEV regulation. The State Implementation Plans (SIPs) that local air districts develop and implement are a separate regulatory mechanism to comply with national ambient air quality standards. Allowing ZEV credits to be used to offset requirements in the SIPs would have the effect of reducing the regulatory tools to decrease emissions from mobile sources.

8. Legal Issues

183. Comment: The Executive Officer's new proposals to amend the ZEV rule and proceed with its implementation include two severability clauses. The first provision is in the section concerning hybrid vehicles. It states, "In the event that all or part of section 1962(c)(4)(B)1.-4. is found invalid, the remainder of section 1962, including the remainder of section 1962(c)(4)(B)1.-4. if any, remains in full force and effect." The second severability clause is found at the end of the proposed text at section 1962(k). It provides, "Each provision of this section is severable, and in the event that any provision of this section is held to be invalid, the remainder of this article remains in full force and effect."

Merely including such severability provisions in a regulation will not establish severability. At a bare minimum, severance is only permissible when the challenged law is "grammatically, functionally, and volitional separable." *Calfarm Ins. Co. v. Dukemejian*, 48 Cal.3d 805, 821 (1989).

The "volitional" test for severability requires a guess as to whether the enacting body would have wanted a severed enactment. Courts are willing to speculate somewhat as to whether a severed initiative or statute would likely have been adopted. However, under settled principles of administrative law and precedent, courts engage in no such speculation with respect to agencies requesting severance of complex regulations like the ZEV regulation.

Schenley Affiliated Brands Corp. v. Kirby, 21 Cal.App.3d 177 (1971), still states the general proposition concerning severability in rulemaking. The court confronted a liquor marketing regulation that was partially invalid but contained a severability clause which the court described as a "stereotyped affirmation, routinely attached prior to the actual contingency." *Id*. at 199. The court held that such a severability clause does not suffice to sever a complex regulation because "[e]xperience, evidence and debate should proceed the selection of regulatory topics. Neither the agency nor a reviewing court

should deal in abstractions." *Id.* Further, courts cannot sever regulations based upon the post-hoc explanations of an agency or its counsel. Courts can only look at the rulemaking record. *See Pacific Gas & Elec. Co. v. PUC*, 85 Cal.App.4th 86, 96-7 (2000).

If ARB truly intends to have a portion of the ZEV rule implemented without other parts of the rule, then it must consider the economic and environmental consequences and the feasibility of the rule that would remain after severing had occurred. Further, ARB did not in the ISOR describe the cost or economic impacts of a severed regulation. For any partial-invalidity scenarios that ARB finds acceptable, it must fully discharge its rulemaking duties as if it were promulgating those severed regulations. For example, ARB must account for a ZEV regulation with no credits for PZEVs, in the event the zero-evaporative emission standard is invalidated, and for a ZEV regulation with no credits for gasoline-electric hybrid AT PZEVs. In the absence of a rulemaking record in full compliance with the APA and other rulemaking disclosure requirements, any partial regulation will be an illegal, underground regulation. *See Tidewater Marine Western, Inc. v. Bradshaw*, 14 Cal.4th 557 (1996). (Sierra Research)

Agency Response: The issues raised regarding the severability clauses are highly speculative, because they are dependent on a judicial determination that the HEV provisions or others are invalid. The ARB believes that the amendments are being lawfully adopted and thus the question of severability will not arise.

We agree that the *Schenley* case states the general principles concerning severability in rulemaking. The commenter only challenges whether the "volitional" test is met by the two severability clauses, since the criteria for "grammatical" and "functional" are clearly satisfied. With regard to the "volitional" test, the *Schenley* court points out that "a declaration of severability, although not conclusive, is persuasive evidence of the enacting acting body's intent," *Schenley Affiliated Brands Corp. v. Kirby*, 21 Cal.App.3d 177, 199 (1971). In *Schenley*, there was no expression of the agency's intent other than the "stereotyped affirmation" in the severability clause itself. In contrast, the Board's Resolution 03-4 contains the following recitals, affirmed in the Executive Order adopting the amendments:

> It is the Board's intent that if any provision of the ZEV regulation as amended in this rulemaking is found invalid for any reason, then the remainder of the regulation shall remain in full force and effect; this is evidenced by the text in section 1962(c)(4)(B)5. [(c)(4)(B)7. in the final amendments] and (k) of the staff's modified proposal,
>
> While the amendments being adopted in this rulemaking – particularly the optional compliance requirements of section 1962(b)(2)(B), and the section 1962(c)(4)(B) provisions on the advanced ZEV componentry PZEV allowance for use of a qualifying HEV electric drive system – offer manufacturers substantial additional flexibility in progressing towards pure ZEV commercialization, the Board remains committed to that ultimate

objective; if either or both of the above provisions are found to be in whole or part preempted by federal law, the Board chooses to enforce the remainder of the amended regulation over the prospect of retaining the current ZEV regulation when its enforcement has been enjoined;

Under California law, an invalid regulatory amendment does not repeal an earlier version of the regulations, *see, e.g., Valdez v. Cory*, 139 Cal.App.3d 773, 792 (1983); 59 Ops. Cal. Atty. Gen. 298, 299 (1976).

The commenter cites no severability cases or statutes for the proposition that an agency must provide additional analyses and make additional determinations regarding a potentially severed portion of a regulation before a severability clause can be given effect. The cited *Tidewater* case did not pertain to severability at all – it involved wage orders promulgated by the Industrial Welfare Commission without conducting a rulemaking. It certainly cannot stand for the proposition that every time an agency seeks to include a severability clause in a regulation it must make a whole set of additional findings and disclosures.

184. Comment: The ZEV regulation was originally adopted in 1990, with mandatory quotas then scheduled to take effect in MY 1998. In 1996, ARB postponed those quotas to MY 2003. The post-hearing procedures in the 2001 ZEV rulemaking continued into the spring of 2002.

Because the ZEV quotas have never gone into effect on an industry-wide basis, the Executive Officer has now brought the ARB to the point once again where, in CEQA parlance, the Board is being asked to "commit the agency to a definite course of action," namely implementation of the quotas in MY 2005. (*see* 14 CCR § 15352(a), which defines "approval" as the decision by a public agency "which commits the agency to a definitive course of action.") ARB first approved the concept of a ZEV mandate in 1990, but its CEQA obligations did not end at that time. There was no serious analysis of the potential impacts of the ZEV mandate under CEQA in 1990, nor could there have been. Even if one tries to characterize the requested action now as a revision to existing regulations, the Board's obligations for a proper CEQA review have been triggered, because it must now consider whether any "[n]ew information, which was not known and could not have been known" at the time of any prior CEQA review. (Public Resources Code § 211666(c); *see Fort Mojave Indian Tribe v. California Dept. of Health Serv.* (1995) 38 Cal.App.4th 1575, 1597.) (Sierra Research)

Agency Response: Consistent with past ARB practices, the ISOR compared the anticipated environmental impacts of the proposed amendments to the environmental conditions existing if no amendments were adopted and manufacturers were accordingly required to comply with the outstanding ZEV regulation. The ZEV requirements were originally adopted in a 1990-1991 rulemaking, and then were amended in rulemakings conducted in 1992-1993, 1996, and 1998-1999. Each of these rulemakings was subject to an environmental review. If a project such as a rulemaking is amending previously adopted regulations that were subject to environmental reviews,

an agency may appropriately conduct its new environmental review solely on the impact of the amendments on the preexisting regulation. *See Black Property Owners Association v. City of Berkeley*, 22 Cal.App.4th 974, 985-986 (1994), *Benton v. Board of Supervisors*, 226 Cal.App.3d 1467, 1475-1482 (1991) and *Temecula Band of Luisino Mission Indians v. Rancho California Water Dist.*, 43 Cal.App.4th 425, 437-438 (1996).

Newly acquired environmental information should appropriately be considered by the ARB in the 2003 ZEV rulemaking, and the ARB has done so pursuant to the ARB's functional equivalent program certified by the Resources Agency. But that new environmental information is to be considered in the comparison of the effects of the amendments proposed for adoption and the effects of the preexisting regulation. The fact that there is new information does not change the "baseline" against which the amendments are evaluated.

185. Comment: Under the APA and the Health and Safety Code, ARB cannot properly assess the costs and burdens of the ZEV rule in the ISOR by comparing the quotas that the Executive Officer is now asking the Board to adopt to the prior (and never implemented) versions of the ZEV quotas. Such an approach would have the effect of masking the full consequences of ARB's decisions from public review and debate. It is not enough to consider the limited and purely hypothetical change in the economic impact between a rule that never took full effect and a newly proposed rule. The real question is simply this: how would the Board's action actually affect the California economy and its businesses and consumers, *now* when the status quo does *not* include any quotas. A "ZEV quota vs. No ZEV quota" comparison is essential in the ISOR (which, unlike the Form 399, must be circulated to the public in compliance with the APA). That question must be addressed using the best available current information about costs and potential economic impacts. (Sierra Research)

Agency Response: Under the APA, an agency's obligation to assess economic costs and impacts relates to the anticipated economic costs and impacts of the proposal, in this case the proposed amendments. (*See* Gov't Code § 11346.3(a)(1) and (2).) As noted above, the amendments were to be viewed with the backdrop of the preexisting regulation being amended, not a situation where the preexisting regulation is ignored.

Nevertheless, it is important to note that the ISOR clearly identified in Table 5.3 the estimated incremental cost for MYs 2005-2011 of the staff proposal compared to a "no ZEV regulation" scenario. The overall cost savings in Table 5.4 were calculated by comparing the annual incremental cost of the staff proposal shown in Table 5.3 to the annual incremental cost of the 2001 amendments shown in Table 5.2. While the staff's ultimate cost estimates for the staff proposal appropriately involved a comparison with the costs under the preexisting regulation, no attempt was made to "mask" the Table 5.3 cost comparison to having no ZEV program.

186. Comment: The APA requires the Board to examine and discuss candidly any requirements or expectations concerning the possible need for State subsidies or other fiscal impacts. *See, e.g.*, Gov't Code § 11346.5(a)(6). When, (as in this case) the

proposal might require purchase incentive subsidies (particularly for battery-powered ZEVs) or affect gasoline tax revenues, an assessment of fiscal impacts is mandatory, as the current Executive Officer apparently stated in connection with the last rulemaking. (Sierra Research)

Agency Response: We do not anticipate that the 2003 ZEV amendments will be accompanied by, or lead to, new purchase incentive subsidies for battery EVs. The alternative compliance path added in this rulemaking allows a manufacturer to comply with the regulation without producing new battery EVs, and the ARB does not project the introduction of substantial numbers of new battery EVs resulting from the amendments. In the context of this rulemaking, the fiscal impacts analysis need not address long-term impacts on gasoline tax revenues.

187. Comment: CEQA requires careful review of all aspects of a regulation and its reasonably foreseeable impacts. This is true even in "certified" rulemaking programs, like ARB's air program. For rulemakings like the present one, the specific procedural rules for consideration of environmental impacts and the alternatives to staff proposal are quite clear, and the require "strict compliance."

ARB staff reports must consider environmental effects and evaluate alternatives – "The analysis shall address feasible mitigation measures and feasible alternatives to the proposed action which would substantially reduce any significant adverse impact identified." (§ 60006(b), title 17, CCR). Analyses that identify potential environmental risks, like those included with these comments, must be full addressed, and a "written response" to those comments and must be approved by the decision maker prior to taking final action. (§ 60007(a), title 17, CCR).

In situations like the present one, ARB's certified program requires it to consider alternatives. ARB must consider alternatives whenever evidence in the record supports "fair argument" that the project will have a significant effect on the environment.

When there is a disagreement among experts over the significance of an effect, the agency is to treat the effect as significant and prepare an EIR. ARB "must prepare an EIR [or its certified program equivalent] whenever substantial evidence in the record supports a fair argument that a proposed project may have a significant effect on the environment *[and] [i]f such evidence is found, it cannot be overcome by substantial evidence to the contrary.*" (*Gentry v. City of Murrietta* (1995) 36 Cal.App.4th 1359, 1399-1400.)

ARB cannot defend a negative declaration simply by reciting that it believes substantial evidence supports its cost assumptions leading to the negative declaration. To the contrary, ARB must assess the arguments and evidence in support of a finding of significance and determine whether that evidence makes out a "fair argument." "Under the fair argument approach, any substantial evidence supporting a fair argument that a project may have a significant environmental effect would trigger the preparation of an EIR." (*Communities for a Better Environment v. California Resources Agency* (2002)

102 Cal.App.4th 98, 113 (emphasis in original).) Applying that standard, ARB cannot possibly make a negative declaration because the record contains credible cost estimates that are different from ARB's and in turn lead to a diminution in fleet turnover that will negatively affect the air quality in California. Given how seriously ARB takes the ozone problems in California, a finding of significance on the basis of cumulative effects ought to be automatic on the evidence currently in the record. (Sierra Research)

Agency Response: We assume that the potential adverse environmental impacts of concern to the commenter are the adverse emissions impacts claimed to result from the "fleet turnover effect." The "fair argument" doctrine applies where an agency is making a decision whether to prepare an EIR or a negative declaration. The ARB has not asserted that its CEQA obligations under its functionally equivalent program can be satisfied with the functional equivalent of a negative declaration. We believe that the discussion in Section 6.2 of the ISOR – and its reference to and reliance on the *ARB Staff Review of Report Entitled "Impacts of Alternative ZEV Sales Mandates on California Motor Vehicle Emissions: A Comprehensive Study* (October 31, 2001) – satisfied the ARB's obligations to consider the potential adverse emissions impacts resulting from the fleet turnover effect.

Section 6.2 of the ISOR estimated the potential overall emissions impact of the staff's proposal, and expressed the staff's conclusion that the fleet turnover effect will play a minimal role under the staff proposal.

While the "fair argument" principle is relevant to determining what claimed adverse environmental impacts need to be fully analyzed by an agency operating under a certified program, it is not relevant to the question of what feasible mitigation measures and alternatives may need to be considered once the agency has determined whether the proposal will result in significant adverse environmental impacts. The ARB has determined that the fleet turnover effect will not cause the 2003 ZEV amendments to result in adverse emissions impacts. Therefore, it is not obligated to identify or implement feasible mitigation measures or alternatives. The commenter seems to argue that the identification and implementation of such measures and alternatives is required where a party has made a "fair argument" that there could be adverse impacts, despite the agency's environmental analysis and conclusion that these adverse impacts will not occur. CEQA imposes no such requirement.

188. Comment: In circumstances like those present here, any alternatives presented by the public during the comment period must be considered. In addressing public comments, "conclusory responses unsupported by empirical information, scientific authorities or explanatory information have been held insufficient." (*EPIC*, 170 Cal.App.3d at 628.)

In addition, ARB's required approach to final action mandates the adoption of feasible alternatives that will reduce environmental risks. As the ARB regulation states:

> Any action or proposal for which significant adverse environmental impacts have been identified during the review process shall not be approved or adopted as proposed if there are feasible mitigation measures or feasible alternatives available which substantially reduce such adverse impact.

§ 60006, title 17, CCR (emphasis added) (Sierra Research)

Agency response: See the response to the previous comment. Following the staff's environmental analysis, the Executive Officer has determined that the amendments will not result in adverse environmental impacts. Under those circumstances, she is not required to adopt alternatives that would reduce the unlikely possibility that the amendments may result in adverse environmental impacts.

189. Comment: Regardless of the time limits specified for rulemakings under the general terms of the APA, CEQA requires an additional 30-day comment period if any "significant" changes occur after the initial public comment period is completed. (PRC §§ 21092.1 (requiring more notice and comment if "new information is added"), 14 CCR § 15088.5(a) ("the term 'new information' can include changes to the project"), PRC § 21091 (requiring at least 30-days), 14 CCR § 15105 (requiring 30-day comment period). These requirements are "essential" to CEQA compliance. (*Ultramar, Inc. v. South Coast AQMD* (1993) 17 Cal.App.4th 689.) (Sierra Research)

Agency Response: The *Ultramar* case involved a situation where the certified agency provided less than 30 days notice of the initial environmental analysis prior to taking action on the proposed rule. More than 30 days notice of the original proposal was given in this rulemaking.

While there were significant modifications made to the originally proposed amendments, those modifications served to further reduce the overall costs of the ZEV regulation, thus lessening any claimed fleet turnover effect. The CEQA Guidelines provide for recirculation of an EIR when significant new information is added to the EIR after it is circulated for comment. (14 CCR § 15088.5(a).) Although "the term 'information' can include changes in the project," "New information added to an EIR is not 'significant' unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment on a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such effect (including a feasible project alternative) that the projects proponents have declined to implement." (*Id*.)

190. Comment: Whatever functions it might choose to delegate to the Executive Officer under the APA and the Health and Safety Code, the Board alone must act as the decision-maker under CEQA, and the decision to proceed with the ZEV rule cannot be made prior to completion of the environmental analysis mandated by the statute and the CEQA case law. Certified regulatory programs remain subject to all of the provisions of PRC § 21000 et seq. and 14 CCR § 15000 et seq. from which they have not specifically

been exempted. One such requirement is that the decision-maker respond to comments in writing before voting to approve a change.

In addition, CEQA provides that the decision-making body must personally review and certify the EIR and approve the written responses. (14 CCR § 15025(b).) Delegation of this function from the primary decisional body (in this situation the ARB) would be inconsistent with the very purpose of CEQA to promote informed and accountable decision making by those who adopt regulations. (Sierra Research)

Agency Response: Under Health and Safety Code sections 39515 and 39516, any authority the Board has may be delegated to the Executive Officer, and any authority that may be delegated is to be conclusively presumed to have been delegated unless the Board reserves the power to itself in writing.

The Board's regulation on responses to environmental assessments – section 60007(a), title 13, CCR – provides in part:

> (a) If comments are received during the evaluation process which raise significant environmental issues associated with the proposed action, the staff shall summarize and respond to comments either orally or in a supplemental written report. Prior to taking final action on any proposal for which significant environmental issues have been raised, the decision maker shall approve a written response to each such issue.

In Resolution 03-4, the Board made clear that it was "initiating steps towards final adoption," "subject to further environmental analysis." It then directed the Executive Officer, after going through the "15-day notice" supplemental comment process, to:

> then take appropriate final action adopting amendments in this rulemaking, after preparing a written response to all comments received that have raised significant environmental issues, and assuring that all feasible mitigation measures or feasible alternatives available that would substantially reduce any significant adverse environmental impacts have been incorporated into the final action.

The Executive Officer took final action adopting modified amendments by issuing Executive Order G-03-069. Attachment 4 consisted of an ARB Staff Response to Comments Raising Significant Environmental Issues Regarding the 2003 ZEV Amendments. In the Executive Order, the Executive Officer expressly approved each of the written responses in Attachment 4.

The Board, in implementing its own regulation, clearly intended that the Executive Officer would be the ultimate decision-maker in this rulemaking. Section 60007(a) refers to final action by "the decision maker," not "the Board." Under these circumstances, adoption of the Executive Order by the Executive Officer – after

approving the responses to environmental issues – accordingly constituted final action by the decision-maker consistent with the ARB's regulation.

191. Comment: The APA requires agencies to make a rulemaking file "available to the public." This "rulemaking file *shall* include . . . *[a]ll data and other factual information*, technical, theoretical, empirical studies or reports, if any, on which the agency is relying . . ." *Id*. (a)(7) (emphasis added). The Executive Officer's January 10, 2003, rulemaking notice accordingly averred that "[t]he Board has complied a record for this rulemaking action, which includes all the information upon which the proposal is based," and that "[t]his material is available for inspection upon request."

In fact, the recital in the Executive Officer notice was inaccurate. The ARB staff did not include in the rulemaking file, and has refused public access to, the most recent document listed in Section 9 of the ISOR (the "References" section) on the subject of battery costs, which is an April 2002 report attributed to Dr. Menahem Anderman. The staff at one point indicated that Dr. Anderman had been asked to prepare another document for public review prior to the hearing, but this process apparently was not completed more than 15 days before the scheduled public hearing – which would have been the minimum time needed for consideration of such a document under the APA, *see* Gov't Code section 11347.1(b) – or more than 30 days before the scheduled hearing, as required by CEQA.

While a specific prejudicial effect from this omission need not be shown under either CEQA or the APA, the noncompliance in this instance was both substantive and prejudicial. If Dr. Anderman's report was sufficiently important for the staff to include it in the list of references, then public review and comment should have been allowed. While the contents of the report are not public, access to it would be important to addressing the Executive Officer's proposed changes in the mandate related to battery EVs, and any other proposals that the Board may elect to consider in the rulemaking process. (Sierra Research)

Agency Response: Attachment II to the First 15-Day Notice was titled "Additions to and Deletions from the Rulemaking File." Section C stated as follows:

C. REMOVAL OF *2002 INDUSTRY REPORT* FROM RULEMAKING FILE

One of the 20 References listed on pp. 58-9 of the January 10, 2003 Staff Report: Initial Statement of Reasons (ISOR) was "Anderman, Menahem, *The 2002 Industry Report – A Critical New Assessment of Automotive Battery Trends*," Advanced Automotive Batteries, April 2002." (the *2002 Industry Report*). Shortly after issuance of the ISOR, the ARB received a request from a representative of Sierra Research, Inc. for copies of all References. In the course of responding to this request, ARB counsel concluded that the terms of the ARB's acquisition of the *2002 Industry Report* precluded its release outside the ARB. The author of this 124 page report was one of the three members of the ARB's 2000 Battery Technology Advisory Panel, along with Fritz Kalhammer

and Donald MacArthur. Under contract with the ARB, that panel had prepared the June 22, 2000 report "*Advanced Batteries for Electric Vehicles: An Assessment of Performance, Cost and Availability*," a publicly available report used in the 2001 ZEV rulemaking. The *2002 Industry Report* was prepared privately by Dr. Anderman's firm, Advanced Automotive Batteries, for limited distribution to subscribers. The ARB acquired a copy of the report from the firm at a cost of $6000. The second page of the *2002 Industry Report* includes the following legend: Limited: This Report is intended for use only within your organization and should not be made available to others."

Under these circumstances, ARB counsel determined that the ARB was not authorized to provide copies of the *2002 Industry Report* to interested parties outside the ARB, and Sierra Research was so notified. ARB counsel further concluded that it was inappropriate for the ARB to rely on the *2002 Industry Report* in the rulemaking since it was not available to interested parties without their having to purchase the report from the publisher for a substantial sum. Accordingly, the *2002 Industry Report* has been removed from the rulemaking file, and it is not being relied upon by the ARB in this rulemaking.

After determining that the ARB could not release the *2000* [sic] *Industry Report* to the public, the ARB contracted with Dr. Anderman to prepare a more abbreviated and updated report that could be made available to the public and used in the 2003 ZEV rulemaking. This report, "*Brief Assessment of Improvements in EV Battery Technology since the BTAP June 2000 Report*," was released to the public at the March 27, 2003 hearing, at which Dr. Anderman also testified. The list earlier in this Attachment of additional material being added to the rulemaking record includes the *Brief Assessment of Improvements in EV Battery Technology since the BTAP June 2000 Report*, as well as the first two title pages of the *2002 Industry Report*, and the June 26, 2002 Requisition form used to acquire the 2002 *Industry Report*.

This was a reasonable approach that violated no California law. The reports and studies that must be included in the rulemaking file are those upon which the agency relies, and the ARB has made clear that it is not relying on the *2002 Industry Report*. The ARB has added the *Brief Assessment* to the rulemaking file in accordance with Government Code section 11347.1(b) by making it available for a comment period of at least 15 days in connection with the First 15-day Notice. Contrary to the commenter's assertion, the supplemental 15-day comment period does not have to occur before the hearing. Rather, it must occur "before the proposed action is adopted by the agency," and adoption in this rulemaking occurs when the Executive Order is signed by the Executive Officer. Similarly, nothing in CEQA required the *Brief Assessment* to be available for 30 days before the hearing.

192. Comment: It is clear from other portions of the ISOR that other important documents, not listed in Section 9, are also missing from the rulemaking file and are not properly referenced. *See* GC § 11346.2(b)(2). These include the research mentioned

on page 12 of the ISOR concerning "the cost benefits of producing critical drive components at high volumes, the "comments provided to the staff" mentioned on page 11 (unless all the comments were oral and were never summarized in writing by the staff), the "study with EPRI" mentioned on page 14, and (unless it refers to an A.D. Little report) the "AB 2076 analysis" also mentioned on page 38. (Sierra Research)

Agency Response: The research mentioned on page 12 of the ISOR is Lipman, T. , *The Cost of Manufacturing Electric Vehicle Drivetrains*, Institute for Transportation Studies, U.C. Davis, February 1999, listed on page 59 of the ISOR. The comments to staff were not memorialized. We concur that, due to an oversight, the rulemaking file does not include the "study with EPRI in which ARB learned that grid-connect HEVs with 20 miles of zero-emission VMT have the potential to reduce criteria pollutants approximately 30 percent compared to conventional new vehicles" as described on p. 14 of the ISOR. But this point is extremely tangential to the substance of the rulemaking, as the ARB is not projecting the production of any plug-in hybrids with 20-mile zero-emission VMT, and none of the staff's emissions estimates factored in any such vehicles.

193. Comment: There are numerous other assertions by the staff in the ISOR which, if they have any empirical support, certainly cannot be based on the material in the rulemaking file. We have identified ten different instances. (Sierra Research)

Agency Response: The instances identified by the commenter generally fall within one of two categories. On several of the points, supporting references were added to the rulemaking file in accordance with Government Code section 11347.1(b) by the Notice of Public Availability of Modified Test and Supporting Documents and Information." We refer specifically to the documents listed on the Attachment II "Additions To and Deletions From the Rulemaking File" as Nos. 2, 6, 7, and 8. On other points, all of the necessary information was provided in the ISOR text.

194. Comment: The Executive Officer's proposed HEV provisions are preempted by the federal Energy Policy and Conservation Act ("EPCA"), 49 U.S.C. §§ 32901-32919. EPCA expressly preempts any state regulation "related to fuel economy standards or average fuel economy standards." 49 U.S.C. § 32919(a). The proposed credits for HEVs are plainly related to fuel economy standards because, just like in the 2001 ZEV mandate, they are aimed at forcing manufacturers to produce higher fuel economy vehicles.

The United States District Court for the Eastern District of California concluded that "the 2001 ZEV amendments relate to fuel economy standards because they clearly have the purpose of regulating the fuel economy performance of . . . the advanced technology hybrids that the Executive Officer predicts the industry will sell in California." Order Granting Preliminary Injunction, *Central Valley Chrysler-Plymouth v. Kenny*, CIV F-02-5017 (June 11, 2002).

The proposed regulation simply re-imposes, and in fact increases, the regulatory expectation of HEVs that began with the 2001 ZEV regulation. The Executive Officer has yet to provide any legal explanation as to how the proposed regulation can implement even more extensive HEV provisions than the 2001 regulation, which was invalid, and yet escape preemption. The Executive Officer has not disavowed any intent to regulate fuel economy.

As indicated in the accompanying technical discussion, and as is apparent from the proposed regulatory text, the proposed HEV provisions cannot be explained by any basis other than an intent to improve fuel economy. HEVs qualifying as AT PZEVs do not have to meet any emissions standard other than the PZEV standard, so there is no emissions-related basis or justification for assigning extra credits to AT PZEVs as the Executive Officer's proposals would do. ARB could just as well encourage PZEVs as AT PZEVs because they meet the same emissions standard. The Executive Officer must provide adequate explanation, consistent with ARB's authority under the HSC, the Clean Air Act and EPCA, for the proposed HEV credits. At this point [s]he has not done so.

The proposed rule awards credits to manufacturers who produce high voltage or high power hybrids. From a manufacturing perspective, there is no reason to produce a high-voltage, high-power hybrid other than to produce a vehicle that achieves higher fuel economy. There is no credible evidence that any manufacturer would produce a high-voltage, high-power hybrid for performance benefits "other than fuel economy," such as provide "advances in horsepower and acceleration."

From ARB's perspective, there is no "technology forcing" reason to reward high-voltage batteries and high-power propulsion as proposed in the new regulation. Upon examination, the proposed regulation is plainly rewarding aggressive hybrids and their higher fuel economy as ends in themselves, and not as a means to improve "ZEV technology."

First, the Executive Officer's documents display an erratic devotion to enabling ZEV technology. More effective means of enablement have been foregone. Fuel cell technology would plainly be advanced by a number of initiatives that the Executive Officer rejects. For example, the Executive Officer rejects credits for distributed generation programs and credits for hydrogen infrastructure. These alternatives would clearly enable fuel cell technology more than high-voltage, high power HEVs.

Moreover, if the HEV provisions were merely a technology-forcing transition-step to fuel cell vehicles, there would be no need for the large numbers of high-power or high-voltage HEVs being proposed. Economies of scale for traction motors, electronics, and batteries are achievable through a requirement of 100,000 such HEVs, yet the Executive Officer goes far beyond that threshold. It is inescapable that high-voltage and high-power HEVs are being mandated as an independent regulatory objective, and not as a transition technology.

Indeed, if the supposed "technological" benefits of high-voltage or high-power HEVs were critical, the Executive Officer ought to reward other technology far more than is being proposed. The credit given to actual fuel cell vehicles incorporating the electronics, motors, and batteries supposedly being "enabled" in HEVs is far too low in comparison to the credit given to HEVs. In a similar vein, the credit levels for other alternative-fuel vehicles with high-pressure fuel storage systems is likewise too low in comparison to hybrids.

It is no defense that the HEV provisions are "optional" because EPCA preempts ARB from even "adopt[ing]" a regulation related to a fuel economy standard, which is the position of the United States in the *Central* Valley case. (Sierra Research)

Agency Response: The ZEV regulation as amended in 2001 contained three references to fuel economy. First, the "alternative efficiency method" for determining the advanced componentry allowance for an HEV based qualification on the extent to which the fuel economy of the HEV exceeded the class average fuel economy by more than 30 percent. (§ 1962(c)(4)(B)(2).) Second, the "CO_2 reduction method" for determining the advanced componentry allowance for an HEV based qualification on the extent to which the HEV's CO_2 production, calculated solely as a function of its fuel economy rating, was less than the numerical value for CO_2 emissions specified in the regulation for comparable gasoline vehicles by more than a specified amount. (§ 1962(c)(4)(B)(1). Third, the high-efficiency multipliers for ZEV and AT PZEV was based on the extent to which the fuel economy of the California model exceeded by more than 50 percent the average fuel economy nationwide of models in its class. (§ 1962(e).)

The first two references listed above were the provisions that the federal District Court judge found to be covered by the EPCA express preemption clause. Although the ARB appealed the preliminary injunction, it has chosen to delete all three of the provisions listed above in the interest in moving the ZEV program forward and minimizing uncertainty. The amended regulation makes no reference whatsoever to any vehicle's fuel economy.

The intent of the amended ZEV regulation is not to regulate fuel economy. The objective of the amended provisions in section 1962(c)(4)(B) regarding AT PZEVs with a qualifying HEV electric drive system is clearly stated in this rulemaking – it is to reward vehicles that exhibit ZEV-enabling technologies to further the development and commercialization of "gold" ZEVs. That is similarly the intent of the provisions that treat a PZEV with a high pressure gaseous fuel storage system or a hydrogen storage system as AT PZEVs. See generally the findings on pages 7-8 of Resolution 03-4, which were incorporated by reference in Executive Order G-03-069.

There is a clear distinction between AT PZEVs and other PZEVs – all AT PZEVs must exhibit significant ZEV-enabling technologies in one form or another.

The rulemaking record demonstrates that there are reasons for a manufacturer to produce a high voltage or high power HEV other than fuel economy improvement. A recent Toyota advertisement for its "Hybrid Synergy Drive" touts the high performance characteristics of an advanced hybrid system. It states that Hybrid Synergy Drive – hitting the road in the fall of 2003 in the next generation Prius – "will inject a V6 SUV with the power and torque of a V8." (July 14 & 21, 2003 New Yorker Magazine, p. 1.) Toyota's testimony indicated that hybridization provides not just improved fuel economy but also reduced exhaust emissions and improved power performance. For a particular vehicle, a manufacturer could focus on one of these benefits depending on what the market wants. Power-boost elements of a hybrid system can allow the manufacturer to reduce engine size.

There is a clear distinction between AT PZEVs and other PZEVs – all AT PZEVs must exhibit significant ZEV-enabling technologies in one form or another. Moreover, in Resolution 03-4 the Board found,

> The use of an HEV electric drive system can reduce tailpipe emissions of NMOG, NOx and CO, by reducing the incidence of engine operating conditions that are associated with increased emissions of NMOG and NOx and by providing quicker starts with reduced start-up emissions, and the use of an idle start/stop feature will eliminate all tailpipe emissions during idling modes; thus while AT PZEVs with qualifying electric drive systems and PZEVs without such systems are subject to the same exhaust and evaporative emissions standards, stimulating the development of such systems will also aid manufacturers in certifying a broader range of vehicles – particularly heavier and higher-power vehicles – to the PZEV standards with a resulting emissions benefit;

This issue of allowing credits for distributive generation programs or hydrogen infrastructure is addressed in Comment 211.

It is difficult to identify a point at which the introduction of HEVs becomes so widespread that they may lose their technology-forcing function. Since different manufacturers may take different approaches or be at different developmental points, reaching some target level on a fleet-wide basis may not be a good indicator for individual manufacturers. And the independent expert review panel process provides a mechanism in which the Board can evaluate the status and function of ZEV-enabling technologies.

We do not believe that the credits afforded to actual fuel cell vehicles are too low in comparison to HEVs with ZEV enabling technologies. Most importantly, the limited numbers of Type III ZEVs produced a manufacturer choosing to use the alternative compliance path has the effect of eliminating the need to produce any more "gold" vehicles. In addition, in the final amendments the per-vehicle credits for MY 2006-2008 Type III ZEVs have been increased to 40 from the originally proposed 15.

Finally, it is clearly relevant to the express preemption claim that the mechanism for treating qualifying HEVs as AT PZEVs is only one option that manufacturers have in complying with the regulation.

195. Comment: Any state regulation "which frustrates the full effectiveness of federal law is rendered invalid by the Supremacy Clause." (*Perez v. Campbell*, 402 U.S. 637, 652 (1971).) The provisions for high-voltage or high-power HEVs frustrate the objectives of the comprehensive federal fuel economy program and are impliedly preempted. Corporate average fuel economy standards are a method of regulating fuel economy that reflects two critical federal objectives. Congress sought significant fuel economy increases through "a series of graduated mileage requirements" that would "ensure wide consumer choice by leaving maximum flexibility to the manufacturer" in deciding how to meet the specified CAFE levels. In other words, federal law regulates fuel economy without mandating which engines and propulsion systems consumers must buy or manufacturers must build.

The Executive Officer's proposed regulation robs consumers and manufacturers of the sovereignty, freedom and flexibility granted by federal law. Compliance with the mandate will require, as ARB staff predicts, large numbers of power-assist hybrids. ARB cannot claim that this is merely an "option" because (1) as a practical economic reality it is not an option, and (2) the only "alternatives" are other types of ARB-preferred vehicles, which are equally at odds with the federal objectives of the corporate averaging approach.

The Executive Officer is going far beyond a CAFE standard. The proposed regulation is designing vehicles, and yet no one at ARB is considering factors that are mandatory under federal laws, such as safety and the potential effect on the domestic automobile industry.

Given the objectives of EPCA and the clear conflict with those objectives posed by the HEV design standards the proposed regulation is impliedly preempted. Implied preemption can be found even where express preemption is not. *See, e.g., Geier v. American Honda Co.*, 529 U.S. 861 (2000).

The conflict with federal law presented by the proposed regulation tracks the question presented in *Geier*, which involved the National Traffic and Motor Vehicle Safety Act of 1966, 15 U.S.C. § 1381. A 1984 NHTSA standard intentionally gave manufacturers a choice whether to equip certain models with air bags or other types of passive restraints. *See* 529 U.S. 864-65. In a tort action governed by District of Columbia common law, Geier claimed that a specific Honda model should have been equipped with airbags rather than other passive restraints. Geier suggested that the federal standard be treated as a "minimum," and nothing more. *Id*. at 874. The Supreme Court rejected Geier's view, observing that NHTSA had "deliberately provided the manufacturer with a range of choices among different passive restraint devices." *Id*. at 875. Even though the tort law of the District of Columbia would have only had a direct effect on liability for the design of a single vehicle model, the Supreme Court still held

that the local law could not coexist with the flexible policy embodied in the 1984 NHTSA standard. *See Id.* at 881. ARB's proposed rule similarly cannot be saved on the premise that it does not require every vehicle sold in California to be a high-mileage hybrid.

Beginning with the 2001 regulation, and continuing with the present proposal, ARB has pursued policies fundamentally at odds with federal law and federal objectives. To the extent the Executive Officer has altered the HEV provisions from the 2001 mandate, she has done so as if the lawsuit brought against the 2001 mandate were merely an express preemption case that tripped up the 2001 mandate on some sort of technicality (*i.e.* ARB's incorporation of the federal fuel economy test procedures). However, the express preemption of EPCA goes far beyond any correction of that "technicality" in explanation of how ARB can design cars and trucks, even though EPCA protects manufacturers' flexibility; how ARB can require less than 18 months lead time; how ARB can ignore safety; how ARB can ignore any consideration of the domestic automobile industry; or how ARB can limit consumer sovereignty in the marketplace. (Sierra Research)

Agency Response: Courts recognize that there is a presumption against preemption of state regulation of health and safety matters and that a person invoking the supremacy clause "faces an uphill battle" to show preemption. *Hillsborough County v. Automated Med. Labs., Inc.*, 471 U.S. 707, 714-715 (1985).

The CAFE statute itself indicates an intent not to preempt California's motor vehicle emissions regulations, even if they have an incidental effect on fuel economy. The current CAFE statute sets initial average fuel economy standards for automobiles for model years 1984 and beyond. (49 U.S.C. § 32902(b).) It also establishes a process for amending these standards to a level determined to be "the maximum feasible average fuel economy level for that model year." *Id.* § 32902(c). Among the factors to be considered in making this determination is "the effect of other motor vehicle standards of the Government on fuel economy." *Id.* § 32902(f). This provision recognizes that motor vehicle emissions standards can permissibly impact fuel economy, and the term "[o]ther motor vehicle standards of the Government" encompasses not only federal emission regulations but California's as well.

Moreover, as originally enacted in 1975, EPCA included an even more explicit acknowledgement that Congress did not intend to preempt California vehicle emissions standards. EPCA provided an adjustment in the fuel economy standard for MYs 1978-1980 if a manufacturer demonstrated that "a Federal standards fuel economy reduction is likely to exist for such manufacturer." Pub.L. 94-163, § 502(d)(2)(A)(i), *reprinted in* 1975 U.S.C.A.N.N. (89 Stat.) 901, 904. A "fuel economy standards reduction" was defined as "the reduction in a manufacturer's average fuel economy in a model year which results from the application of a category of Federal standards." *Id*. § 502(d)(3)(C)(i), 89 Stat. at 905. Congress specifically included "[e]missions standards under section 202 of the Clean Air Act, *and emissions standards applicable by reason*

of section 209(b) of such Act" as a standard within this category. *Id*. § 502(d)(3)(D)(i), 89 Stat. at 905 (emphasis added).

Thus, far from seeking to preempt California's emissions standards program, when enacting the federal CAFE program Congress explicitly recognized and acknowledged California's unique authority to regulate vehicle emissions under Clean Air Act section 209(b). Congress recognized the relationship between emissions and fuel economy policies. While Congress intended to preempt states from establishing their own fuel economy standards for manufacturer fleets, both the structure of the CAFE statute and its legislative history demonstrate that Congress had no intention to preempt California from implementing automobile pollution regulations, even if they might incidentally affect fuel economy.

The *Geier* principle is not applicable here. In *Geier*, NHTSA vehicle safety regulations deliberately sought to impose a gradual phase-in of passive restraints (such as air bags). (*See* 529 U.S. at 881.) The federal regulations explicitly specified, by model year, the percentage of cars that must have which restraints. (*See* 49 F.R. 28962, 29009-10 (1984).) *Geier* involved a conclusive, comprehensive federal standard, not a minimum or average standard. (*See* 529 U.S. at 868 (discussing safety standards for brakes, which set a minimum standard and would not be preempted); *Harris v. Great Dale Trailers, Inc.* 234 F.3d 398, 401 (8th Cir. 2000) (*Geier* "strongly suggest[s] that a *minimum* federal safety standard will rarely, if ever, impliedly preempt more rigorous common law safety obligations" (emphasis in original)); *Choate v. Champion Home Builders Co.*, 222 F.3d 788, 796 (10th Cir. 2000) (distinguishing *Geier* from smoke detector safety standards for manufactured homes).)

EPCA's average fuel economy standard is a minimum standard. (*See* 49 U.S.C. § 32902(b); *Center for Auto Safety*, 793 F.2d at 1324.) That NHTSA, in theory, could set the standard at the "maximum feasible" level does not show otherwise. It is still a minimum, and (unlike in *Geier*) manufacturers can – and do – exceed that standard. (67 F.R. 5767, 5769 (2002) (light truck fuel economy has ranged from 20.5 to 21.3 miles per gallon).) In fact, manufacturers gain extra credits for exceeding the standard. (49 U.S.C. § 32903.) For example, three manufacturers have recently voluntarily committed to increase their SUV fuel economy by 25%. (67 F.R. at 5770.) Moreover, the passenger automobile standard is not now set at the "maximum feasible" level. Instead, it remains exactly as it was set *by Congress* (not NHTSA) for model years after 1984. (*Compare* 49 U.S.C. § 32902(b) *with* 49 C.F.R. § 531.5(a).) Congress obviously did not need to set the standard at the "maximum feasible" level. In fact, Congress has, for the last several years, prohibited NHTSA from amending that standard. The AT PZEV mechanisms do not fit within the narrow confines of *Geier*.

196. Comment: Section 209(a) of the Clean Air Act preempts "any standard relating to the control of emissions from new motor vehicles" and it also preempts any "condition precedent to the initial retail sale" that is related to "the control of emissions from any new motor vehicle." Under section 209(b), EPA shall waive that preemption for a California "standard . . . for the control of emissions" and also for "accompanying

enforcement procedures." The design specifications of the proposed California ZEV mandate are plainly related to the control of emissions and are a condition precedent to sale. The design specifications are thereby preempted by section 209(a). However, they are not a "standard" or "accompanying enforcement procedure" under section 209(b) for which preemption can be waived.

With respect to the design specifications as a "standard" under section 209(b), it is indisputable that the design specifications of the proposed California ZEV mandate (1) venture far afield from the type of "standard" permitted by the text, structure and history of the Clean Air Act and cases such as *Adamo Wrecking Co. v. United States*, 434 U.S. 275 (1978) and *Motor & Equip. Manufacturers Ass'n v. EPA ("MEMA")*, 627 F. 2d 1095 (D.C. Cir. 1979), and (2) the design specifications obviously do not set a quantitative level of emissions," *MEMA*, 627 F.2d. at 1112. For example, it is not credible to suggest that requiring a high pressure gaseous fuel or hydrogen storage system is tantamount to setting a "quantitative level of emissions." The same is true of requiring high-voltage batteries, regenerative braking, fuel-cells or any of the other design specifications.

The proposed ZEV rule commands and controls technology. This mode of regulating motor vehicles is flatly inconsistent with the Clean Air Act, where design standards only appear as carefully calibrated exceptions, and is even inconsistent with the original zero-emissions standard. Under the settled precedent of *MEMA*, the ZEV rule's design specifications are not "standards" under section 209(b), nor are they "consistent with section 202(a)," where EPA is required to set standards *applicable to emissions*," § 202(a) (emphasis added). Congress has carved out only limited exceptions where EPA may directly regulate the design of motor vehicles, such as sections 202(a)(5) and (a)(6), and it is obviously inconsistent with section 202(a) for ARB to regulate the design of motor vehicles in ways that EPA cannot.

The ZEV rule's design specifications are not "standards" under section 209(b) and are not consistent with the type of standards EPA must set under section 202(a). Therefore, the only way the design specifications might escape the immovable object of preemption would be if they were merely "accompanying enforcement procedures" for the real emission standards within the California ZEV mandate – *i.e*., the PZEV emission standard and the ZEV emission standard. It is, however, implausible to suggest that requiring a high pressure fuel storage system or a high-voltage battery or the other design specifications is a *procedural* requirement for purposes of enforcement, certification, or even maintenance. (Sierra Research)

Clean Air Act section 209 permits the federal government to waive preemption of regulations pertaining to new motor vehicles if those regulations are standards or enforcement procedures consistent with Clean Air Act section 202(a) of the Act. Section 202(a) in turn authorizes EPA to adopt vehicle emissions performance standards. With a few exceptions not relevant here, Congress has decided not to allow EPA to adopt design standards in lieu of performance standards. The proposed hybrid AT PZEV rules are essentially design standards that regulate size and power of the traction motors or batteries on hybrid vehicles. EPA would have no authority under

section 202(a) to adopt or enforce such design standards. While ARB has some latitude under the Clean Air Act to set differing standards for California, EPA has never granted a waiver of federal preemption that would allow ARB to enforce design standards. We do not believe that EPA has authority to do so under the Clean Air Act. (General Motors)

Agency Response: Even if elements of the amended ZEV regulation were to be characterized as "conditions precedent to the initial retail sale" rather than as "standards" or "accompanying enforcement procedures," they would be initially preempted by Clean Air Act section 209(a), since that subsection specifically refers to such conditions precedent. But in that case California could still receive a preemption waiver under Clean Air Act section 209(b). The 1979 *MEMA* court upheld U.S. EPA's Clean Air Act section 209(b) waiver of preemption for California regulations limiting the amount of maintenance that a manufacturer can require of motor vehicle purchasers in the written instructions which accompany new motor vehicles sold in the state. The court stated its agreement with the Administrator's conclusion that "the only relevant preemption provision is the express terms of subsection (a) [of Clean Air Act section 209] and that whatever is preempted therein is subject to waiver under subsection (b)." *MEMA*, 627 F.2d 1095, 1106. Looking to the language of the legislation, the court stated "The plain meaning of the statute indicates that Congress intended to make the waiver power coextensive with the preemption provision." *Id.* at 1107. The court then examined the history of the statute and concluded "The legislative history of section 209 supports the Administrator's interpretation that the waiver provision is coextensive with the preemption provision." *Id.* at 1108.

The qualifying criteria for AT PZEVs are related to emissions, see the response to Comment 12 [i.e. 2 before] provisions. Moreover, U.S. EPA has granted waivers or "within-the-scope" determinations for what could be considered to be design standards, in particular for the ARB's specifications for fill pipes and openings to assure compatibility with vapor recovery nozzles. (47 F.R. 1503 (January 7, 1977).) And U.S. EPA has generally characterized Clean Air Act section 209(b)(1)(C) as meaning that there would be a lack of consistency with section 202(a) under two circumstances: (1) if there is inadequate lead time to implement the new standards or other requirements, giving appropriate consideration to the cost of compliance within the applicable time frame, or (2) the federal and California test procedures impose inconsistent certification requirements so as to make manufacturers unable to meet both sets of requirements with the same vehicle. (*See, e.g.,* 46 F.R. 26371, 26373 (May 12, 1981).)

197. Comment: Under the current circumstances, ARB cannot proceed with adoption or implementation on the ZEV mandate. There are numerous environmental and economic issues that must be addressed and submitted for full public review, which are not even identified in the March 5, 2003 staff document. In particular:

- There is no economic impact statement for the proposed amendments published on March 5, and no such economic impact statement for any of the possible regulatory outcomes if a portion of the ZEV rule should be severed.

- There has been no determination (nor in Sierra's view would it be possible for ARB to determine) that the ZEV rule is "cost-effective," within the meaning of the Health and Safety Code, or that it minimizes burdens on the public, as contemplated under the APA.

- Similarly, there as been no assessment of the impact of the March 5 proposal on fleet turnover, the environmental effects of the ZEV mandate on evaporative emissions inventories from conventional vehicles, the indirect emissions associated with Type III ZEVs, or the multimedia effects of the ZEV mandate when methanol is used as a feed-stock for Type III ZEVs. (Sierra Research)

Agency Response: Final action on the amendments is appropriate.

- The commenter has cited no authority for the position that a new economic impact analysis was required to be published with the staff's proposed modifications released March 5, 2003. The estimated manufacturer costs and savings resulting from the adopted amendments are set forth in Section II.D. of this FSOR.

- Cost-effectiveness findings are contained in Resolution 03-4 and Executive Order G-03-69.

- Environmental issues raised were addressed in Attachment 4 to Executive Order G-03-69, as well as in this FSOR.

198. Comment: Under the APA, in addition to preparing an economic impact statement, ARB or the staff would also need to explain why under any mandate or other rule pertaining Type III ZEVs is necessary. Governments in three major regions of the world have committed large sums of money to funding research and development activities in support of advancing hydrogen and fuel cells. Given the federal government's overriding objective of bringing commercially viable fuel cell technology to the marketplace, the industry needs to focus on the core technological challenges – and this is precisely what the federal governments is trying to help the industry do. A requirement that a certain number of fuel cell vehicles be sold by a certain date as the ARB staff now proposes would work against the national goal because it forces vehicle manufacturers to lock into production when the technology is still in a "precommercial" stage. This could tarnish public perception around fuel cell technology. (Sierra Research)

Agency Response: Driven by California's air quality challenges, the state has been a world leader in motor vehicle emission control programs for more than a quarter century. The rationale for the alternative compliance path provisions is set forth in Section II.B.1. of this FSOR. There was substantial testimony to the effect that continued action by the state would have a beneficial effect on the development and commercialization of fuel cell vehicles. The Independent Expert Review Panel process

will give the Board the opportunity to monitor progress in ZEV technologies and revise the regulatory requirements if necessary.

199. Comment: The Health and Safety Code also requires ARB to analyze the ZEV rule as a "major" rule under HSC § 57005. The ZEV rule has never gone into effect on an industrywide basis, and there is no question that the costs of compliance with the rule will exceed $10 million, under the governing Cal-EPA guidance and the statute. Both by virtue of HSC § 57005 and the APA, the Board needs to conduct a full analysis of the alternatives to the mandate, including those presented by AIR in December 2002 and January 2003, and the option of not implementing any type of mandate. (Sierra Research)

Agency Response: See the response to Comments 184 and 185. Alternatives have been addressed in this FSOR.

200. Comment: Before the Board could take final action on the staff's proposal, it would need to be provided with substantial evidence to support the following positions, which are implicit in the staff's recommendations:

- With respect to requirements or credits for ZEVs, that the federal government has not already adequately incentivized the national effort to bring Type III ZEVs to market in an environmentally beneficial manner.

- With respect to AT PZEVs, that the credits being proposed are truly necessary and are the most cost-effective way of encouraging or supporting ZEV technology.

- That the AT PZEV credit rules will not change manufacturers' compliance strategies for the fuel economy requirements set at the national level.

- That the PZEV requirement is cost-effective, at the credit levels proposed by the staff for PZEVs. (Sierra Research)

Agency Response: We believe that the 2003 ZEV amendments are supported by substantial evidence in the rulemaking file.

9. Air Improvement Resource, Inc. Petition

The ARB received correspondences from Air Improvement Resource, Inc., dated December 20, 2002 and January 24, 2003, petitioning for the adoption of amendments to the ZEV regulations. The ARB responded through letters dated January 21, 2003 and February 24, 2003. Since the January 24, 2003 letter requested the consideration and adoption of the modifications provided by AIR at the already scheduled rulemaking hearing, the Board considered the comments in the context of the rulemaking. Therefore, the summarized comments and responses have been included in the FSOR.

201. Comment: The ZEV regulation should be amended to:

- Allow PZEVs and credits from PZEVs to satisfy all MY 2011 and earlier ZEV obligations, including those in the “gold” and “silver” categories as well as the “bronze” category.
- Allow banked credits from 2006 and earlier MY PZEVs to be used to meet “gold” and “silver” obligations for MYs 2011 and later.
- Defer the start the ZEV requirements, including the need to produce and sell PZEVs, until MY 2006. There is insufficient lead-time for an earlier start date “taking into account the need to maintain a level playing field among all the companies competing in the California market.”

Agency Response: The combination of the various amendments proposed by AIR would have the effect of providing an extremely lengthy delay before manufacturers will be obligated to introduce any pure “gold” category ZEVs in California. From a policy standpoint, the Board has clearly articulated the need to maintain a core zero-emission requirement to provide an incentive for further development. The tremendous progress that has been seen to date can at least in part be attributed to the existence of the ZEV requirement, and ARB believes that maintaining this requirement will accelerate the pace at which true zero technologies are commercialized. At the same time, given the wide-open nature of ongoing technical advances, the amendments provide increased flexibility for automakers to pursue specific strategies that in their view offer long-term promise. The Board believed that a mix of vehicle types offered the best chance for success.

The ZEV program as modified and adopted by the Board establishes performance-based emission standards for several categories of vehicles (PZEV, AT PZEV and ZEV). Within that framework, production requirements are only set for the ZEV portion of the regulation. The amendments establish an alternative compliance path to provide additional flexibility for manufacturers to meet the regulation with technologies that suit their strengths. Even within the two percent ZEV requirement, flexibility exists through the credit calculation process allowing manufacturers to build different types of vehicles depending on their particular ability and market interests.

There is no need to delay the introduction of PZEVs. The technology is now available and feasible as PZEVs have been certified for several years and more than 140,000 have been sold to date.

202. Comment: Delay the start of the phase-in of LDT2s in the ZEV baseline until MY 2012.

Agency Response: The Board reaffirmed through Resolution 03-4 that the phased addition of LDT2 vehicles to the vehicle base to which the percentage ZEV requirements are applied is necessary and appropriate. This is because while a large percentage of vehicles in the LDT2 category were traditionally used for work purposes, it is now common for the SUVs, minivans and pickup trucks in the LDT2 category to be

used primarily for personal transportation, i.e., as passenger cars. As such should be treated as equivalent to passenger cars for purposes of the ZEV regulation.

The ZEV regulation provides credit multipliers for early years of the program in order to establish a ramp up of production for different vehicle types. The ARB considered the combined effect of the phase out of these early introduction multipliers and the phase in of truck volumes when establishing the program's requirements and believes that the volume of vehicles necessary to comply with the regulation are feasible. Steady-paced progress towards the program's intended commercialization ramp of vehicle volumes including light duty trucks is important to realizing the intended goals of the program. The considerable flexibility and lead-time provided in the regulation make the regulation reasonable.

203. Comment: The ARB should amend the test procedure for the "zero evaporative" emission standard for PZEVs to adopt the procedures set forth in a Manufacturers' Advisory Correspondence now applicable to pre-MY2005 vehicles.

Agency Response: See the response to Comment 214.

204. Comment: The ARB should modify the definition of the vehicles qualifying as an AT PZEV to included any PZEV with start/stop technology and zero evaporative emissions. In addition, we oppose elements of the strawman proposal that allow a non-grid connected hybrid vehicle to qualify as an AT PZEV only if it has a "peak power ratio" of more than 13 percent for four reasons: (1) it regulates fuel economy and thus presents the same legal problems as the other AT PZEV provisions staff if proposing to eliminate, (2), it is arbitrary, (3) it interferes with the introduction of cost-effective hybrid technologies that would have broader market acceptance, and (4) there is no difference in the expected in-use emissions as long as the system uses engine-off-at-idle.

Agency Response: The advanced componentry credit is awarded to PZEVs that utilize technology that is supportive of ZEV commercialization not just reduce vehicle emissions. We considered and included several options for assignment of advanced componentry credit to AT PZEV HEVs. In the near term, all forms of electric drive combined with current technology vehicles should be considered "advanced," as many of these systems and vehicles are expected to evolve into more advanced HEVs, and subsequently, into ZEVs.

Peak power ratio is used as a measure to gauge the degree to which a vehicle relies upon electric drive, and thus is a useful indicator of the extent to which the componentry on the vehicle supports the commercialization of pure ZEV technologies. Increased use of electric drive, as measured by the peak power ratio, can provide benefits other than fuel economy, the main goal of the hybrids will be advances in horsepower and acceleration. The ISOR discusses the issue on fuel economy and peak power ratio on pages 13-14.

Vehicle emissions are not the only consideration for encouraging the development of AT PZEVs. In addition, to producing lower emitting vehicles, the AT PZEV category is intended to encourage the development of technologies that are supportive of ZEV commercialization.

205. Comment Qualify any PZEV that is a hybrid electric vehicle that carries an 8 year/100,000 mile warranty on the battery.

Agency Response: The amendments reduce the battery warranty requirement from 15 years/150,000 miles to 10 years/150,000 miles. This was done to recognize the current state of battery technology.

206. Comment: Allow fuel cell vehicles placed in section 177 states to earn ZEV credits in California.

Agency Response: See the response to Comment 96. The amendments allow the placement of Type III ZEVs in states that adopt the California's ZEV requirements (as per section 177 of the federal Clean Air Act) to count towards the pure ZEV obligation if the manufacturer elects to pursue the alternative path. The regulation sunsets this provision after MY 2011.

207. Comment Award credit against the ZEV requirement for activities that develop fuel cell technology in non-vehicle applications.

Agency Response: See the response to Comment 211.

208. Comment: We propose that the ARB eliminate the post-MY 2005 NEV credit usage cap and the NEV discount multiplier.

Agency Response: The ARB believes that the credits offered for MY 2004-2006 NEVs are appropriate because NEVs, as ZEVs, have the potential to contribute to emissions reductions to the extent that they replace internal combustion engine powered vehicles. But, in recognition of the limitations of NEVs, the ARB has developed a credit structure that appropriately ramps down in value.

209. Comment The Board must consider the emission impacts of the available alternatives. The proposal released on January 10, 2003 is not complete in this regard since it does not include our alternative proposal. Any of the full range of possible scenarios for the AIR proposal will achieve equal or greater emission control benefits compared to the January 10 proposal.

Agency Response: While we recognize that increased PZEV volumes would lead to further near-term emissions reductions, the Board has decided that it is more important to accelerate the development and manufacturability of advanced ZEV components in AT PZEVs, which will bring ZEVs to market faster.

In addition, ARB recognizes that the ZEV program has led to many technological advances that have a permanent positive impact on air quality in California. These advanced technologies have not only impacted battery EVs but have had positive impacts on conventional vehicles as well. The ZEV program rewards vehicles based on their air quality benefits. For example, the 2003 modifications encourage volume production of PZEVs and provide additional incentives for widespread deployment of AT PZEVs, recognizing the their contribution to the development of future pure ZEVs.

210. Comment The environmental impacts of creating the hydrogen infrastructure needed to support the deployment of fuel-cell vehicles have not been fully addressed.

Agency Response: See the response to Comment 23.

10. Other

211. Comment: We feel very strongly that stationary fuel cells are a vitally important path to accelerate development of fuel cell vehicles. GM is interested in pursuing credits under the current ARB rulemaking for stationary fuel cells. Under our proposal, the fuel cells used in stationary applications would be of the same type and size of those used in vehicle application. We propose that the units could be placed anywhere in the country, that the units receive half the ZEV credits given to fuel cell vehicles per 75 kW, and that a sunset provision of 2012 be used for this credit. (GM)

ZEV credit for fuel cells placed in stationary applications should be encouraged. ZEV credits for all EVs should be approved to offset stationary power sources. However, the credits should apply only for commercialized applications and not be lost in research and development programs. (ElectriCab)

Agency Response: Credits for stationary fuel cells present separate issues that are better addressed outside this rulemaking. During the April 2003 hearing the Board directed the staff, outside this rulemaking to investigate if providing ZEV credits for stationary applications of fuel cells could benefit the development of fuel cell vehicles. The staff presented its findings to the ARB on September 25, 2003 in an informational report titled Zero-Emission Vehicle Credits for Supplementary Activities: Stationary Fuel Cells Hydrogen Infrastructure Transportation System Credits.

212. Comment: I urge that the Board to not approve mobile to stationary crediting. (Henry Hugo, South Coast AQMD)

We oppose the suggestion that stationary fuel cells receive ZEV credit. (Sierra Club, BAAQMD)

Agency Response: See the response to Comment 211.

213. Comment: The ARB should stand up to the self-serving, very powerful and well-funded interests of the automotive companies who oppose the ZEV mandate. The profit

margin of the auto industry is not the responsibility of ARB, although with mass production and promotion would come profit. (Stein)

Agency Response: All of ARB's mobile source programs are required by statute to consider economic impacts, feasibility and risk. The objective of the ZEV program has been to push the boundaries of ZEV development, while taking into account the cost, performance, suitability for volume production and long-term prospects of the technologies at hand. When the Board amended the regulation in 2001, it did so with the understanding that the near-term compliance with the pure ZEV portion of the regulation would be expensive for automakers, but that continued vehicle and technology development would lead to less costly approaches.

Since that time, there have been no significant reductions in the cost of battery EVs. In addition, independent of cost issues, recent marketing experience indicates that although there is a base demand from regulated electric utilities and EV early adopters, the sustainable level of demand for battery EVs appears to be small at least in the near term.

The ZEV program has led to many technological advances that have a permanent positive impact on air quality in California. These advanced technologies have not only impacted electric vehicles but have had positive impacts on conventional vehicles as well. The ZEV program rewards vehicles based on their air quality benefits. The 2003 amendments, by encouraging volume production of PZEVs and providing additional incentives for widespread deployment of AT PZEVs, maintain the air quality benefits that would have been achieved by the 2001 amendments.

214. Comment: There is no well-defined and technically achievable method for demonstrating compliance with the zero-fuel evaporative emissions requirement for MY 2005 and later PZEVs. The technical infeasibility of the “zero-fuel” evaporative emission standard is a direct result of the historical development of the “zero” evaporative emission standard, including the initial attempts to achieve zero evaporative emissions and the increased technical understanding of evaporative emissions that resulted from the promulgation of the “zero-fuel” evaporative emission standard.

The entire technical basis for the “Zero Evap” requirement included in ARB’s regulations was an evaporative emissions control system based on a vacuum concept, but after the rulemaking it was discovered that the vacuum concept was flawed. An ad hoc industry group took on the task of developing a test procedure that could be used to implement the intent of the PZEV evaporative emissions standards. After lengthy discussion and debate, the ARB staff accepted the industry proposal and published it as Manufacturers Advisory Correspondence (MAC) 2001-03 on November 1, 2001. The MAC indicated that it only applied to MY 2003-2004 vehicles and that a more extensive demonstration would be needed for MY 2005 vehicles.

Although the MY 2005 vehicles are being prepared for production there are still no evaporative emission test procedures or other guidance, such as a MAC, that are

applicable to those vehicles beyond the bare words of the regulation. According to the regulation, "vehicles demonstrating compliance with these evaporative emission standards shall also have zero (0.0) grams of fuel evaporative emissions per test for the three-day and two-day diurnal-plus-hot-soak tests." *See* 13 CCR § 1976(b)(1)(E). Industry has submitted best effort proposals to address the staff's inputs, but without resolution. An approved test procedure is necessary to perform the development and certification demonstrations required for certification. It is presently past the time required for MY 2005 products, and approaching the MY 2006 cutoff. I ask for your help in establishing the necessary priority to approve a procedure. (Harold Haskew & Associates)

Since the zero evaporative emissions standards for PZEVs are not currently feasible, the staff proposal needs to be modified before it could move forward in order to avoid conflicts with federal law. (Sierra Research)

Agency Response: The ARB will accept MY 2005 certification demonstrations using the procedure approved in the referenced MAC for MYs 2003-2004. The staff will continue to work with manufacturers and other interested parties with respect to demonstrations for subsequent model years.

The zero-fuel evaporative emissions standard for PZEVs in section 1976(b)(1)(E), title 13, CCR, consists of two elements: (1) "whole vehicle" evaporative emission standards that include emissions from paints, upholstery, tires and other vehicle sources, and (2) a "fuel only" standard of zero (0.0) grams. Compliance with the whole vehicle standards is determined using the three-day and two-day diurnal-plus-hot-soak tests that are also used to determine compliance with the ARB's primary evaporative emission standards for 1995 and subsequent model-year vehicles.

In comments during the supplemental 15-day comment period in the LEV II rulemaking, the Alliance of Automobile Manufacturers (Alliance) asked that the "fuel-only" requirement be clarified. As characterized in the LEV II FSOR, the Alliance recommended that the fuel-only "'test' be defined as the three-day and two-day diurnal-plus-hot-soak tests, and that the 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." (LEV II FSOR, p. 98, Comment 122) The staff concurred with this suggested clarification and the regulation text was modified accordingly in connection with the second 15-day notice. In addition, Part III Section G of the California Evaporative Emission Standards and Test Procedures for 2001 and Subsequent Model Motor Vehicles authorizes manufacturers to use an alternative set of test procedures to demonstrate compliance with the various evaporative emission standards with advance Executive Officer approval if the alternative procedure is demonstrated to yield test results more stringent than those resulting from the specified procedures.

The Executive Officer issued MAC 2001-03 in response to a request by the Alliance for advance Executive Officer approval of an alternative "fuel-only" evaporative emissions

test plan. It identified a test protocol that was approved for the 2003 and 2004 model years. The MAC expressly stated that manufacturers had the option of submitting for approval alternative test protocols to be used instead of the protocol specified in the MAC.

In April 2003, U.S. EPA granted ARB's request for a Clean Air Act section 209(b) waiver of federal preemption for the LEV II amendments, including the zero-fuel evaporative emissions standards. (68 F.R. 19811 (April 22, 2003).) There is no indication in the U.S. EPA notice that the agency had concerns that the waived standard in some way conflicted with federal law.

215. Comment: The City of Santa Monica would like to convey our strong interest in broadening the State's financial and related incentives in the Zero Emission Vehicle program. The City envisions the expansion of the incentive program to include NEVs, zero emission motorbikes and motor-scooters. The City respectfully requests that the Board consider the proposed expansion of the ZEV program to include incentives for these additional vehicles and vehicles uses. (McCarthy, City of Santa Monica)

Agency Response: In support of our clean air goals, the ARB has administered incentive programs for zero- and near zero-emission vehicles. The current incentive program allows for incentives for NEVs and three-wheeled zero emission motorcycles (ZEMs). The ARB limited incentives to ZEMs, as opposed to two-wheeled motorbikes and scooters, because ZEMs were believed to be well suited for many of the same transportation needs as full function electric vehicles (like commuting). The State Legislature has earmarked incentive funding in the past for both electric and alternative fuel vehicles.

216. Comment: It has come to my attention that the ZEV program will be scaled back to allow credits for NEVs as well as hybrid vehicles. Please do not allow the automakers to push bad and unhealthy policy on a State that must maintain clean air for the life of its citizens, those of us who drive and most importantly for those who do not. (CFRC)

Agency Response: Credits for NEVs and for certain hybrid electric vehicles were already allowed under the 2001 amendments. The 2003 amendments make minor adjustments in these areas (they relax some restrictions on the use of NEV credits and broaden the types of hybrid electric vehicles that can earn AT PZEV credit) but do not make any fundamental changes. NEVs are zero emission vehicles with air quality benefits. AT PZEVs are near-zero emitting vehicles that display use of ZEV enabling technology. Both of these vehicle types further the ZEV program.

217. Comment: CARB should insist that the automakers reveal the budget they've spent on researching, marketing, and advertising full-sized, freeway capable battery EVs, and make them offer concrete proof nobody wanted them. Toyota offered us 300 RAV4s in April, and they're all gone now, with very little advertising or marketing. Now they have cancelled the program, calling it "successful" at the same time as they say

that there is no demand. The truth is, they probably could not keep up with the demand. (Lakinsmith)

Agency Response: The objective of the ZEV program has been to push the boundaries of ZEV development, while taking into account the cost, performance, suitability for volume production and long-term prospects of the technologies at hand. Although battery electric vehicles manufactured to date have been successful, they were very heavily subsidized and automakers were losing money on every car. It is unrealistic to continue to force manufacturers to make battery EVs that would not lead to cost-effective commercial quantities. See the response to Comment 1 and Section II.B.1. for the ARB's position on near-term marketability of battery EVs.

218. Comment: The ARB should give stronger incentives to produce near ZEVs, such as battery electric vehicles and other hybrids. (Stanislaus County Hispanic Chamber of Commerce, Latino Political Action Committee)

Agency Response: See the response to Comment 1 and Section II.B.1..

219. Comment: Please consider extending and/or increasing incentives to fund lower-cost EVs for less wealthy Californians. (Christodora)

Agency Response: The State currently provides up to $5,000 per new EV sold or leased. This incentive program also includes incentives for lower-cost EVs such as NEVs in the amount of $1,500. However, because NEVs are a low cost option for meeting the ZEV mandate, manufacturers must choose between ZEV regulatory credit and the incentive money. Currently, all the manufacturers are taking the ZEV credit. There may be new smaller manufacturers in the future that will choose the incentive money. This program ends in June 2004 and with the current budget situation in California and the lack of available product, the ARB does not foresee additional incentives for ZEVs at this time. However an extension of the current program would definitely be encouraged.

220. Comment: Incentives should be arranged for companies that manufacture in California, to create jobs here. (Brandenburg)

Agency Response: Current incentive programs for clean vehicles already assist a manufacturer's business case for California, by effectively allowing manufacturers to sell or customers to purchase a product at significantly less than the retail cost. Assessment of the economic impact of the ZEV regulation on California business is a continual part of the process. Incentive programs directly targeted at job creation, however, are the purview of other governmental entities, not the ARB.

221. Comment: The ARB should require that auto makers continue to make new ZEVs available to meet the future demand for this type of vehicle by consumers and government agency fleet purchases. (Stanislaus County Hispanic Chamber of Commerce)

Agency Response: See the response to Comment 1 and Section II.B.1..

222. Comment: Join forces with CEC to encourage PV systems to capture free fuel on sunny days. (Brandenburg)

Agency Response: PV system incentives are beyond the scope of the ZEV regulation. However, the ARB continually participates with the CEC and other appropriate stakeholders in the evaluation of concepts that lead to improvements in air quality.

223. Comment: The ARB should join forces with other state bodies including the California Energy Commission, the Public Utilities Commission, and the legislature. This is about energy as well as air quality. Restore, strengthen, and unify California's commitment to pioneer the transformation to electric transportation. (AC Propulsion)

Agency Response: The ARB continually works with supporting agencies and appreciates the important connection between energy and air quality. The recent Assembly Bill 2076 process to reduce California's petroleum dependence was a joint effort between the CEC and ARB. With regard to California's commitment to electric drive, see the response to Comment 1 and Section II.B.1..

224. Comment: I would urge you to support any programs that effectively control the outrageous size and design efficiency of large SUV's to help with the smog and global warming issues as well as protect the reasonable people from big trucks. (Stalker)

Agency Response: The ARB is not authorized to regulate fuel efficiency, per the federal Energy Policy and Conservation Act of 1975. However, the ZEV program is designed to maintain pressure on the commercialization of ZEV technologies to achieve air quality goals while recognizing the current state of the technology and the cost implications related to their development.

Additionally, light-duty trucks with a loaded vehicle weight of 3750 pounds or more (the LDT2 class, which includes most sport utility vehicles) have been added to the current passenger car and LDT1 classes that form the baseline of vehicles against which the ZEV percentage requirements are applied. This additional element will be phased in during the 2007 through 2012 model years. As it is now very common for pick-up trucks and sport utility vehicles (SUVs) to be used primarily for personal transportation, i.e. as passenger cars, it is appropriate for LDT2 vehicles to ultimately trigger the same ZEV obligations as passenger cars. Additionally, they will be subject to the same emission standards under the LEV II program by MY 2008.

The State of California is also working to adopt regulations by 2005 that will be implemented by 2009 that address global climate change emissions under the auspices of Assembly Bill 1493.

225. Comment: The more practical way to go for the next 15 to 25 years would be to develop a less polluting diesel engine. We should be able to get 50 miles per gallon with a reasonable diesel engine and matching transmission in a car weighing 3,500 to 4,000 pounds. (Fisher)

Agency Response: Diesel engines have not demonstrated superior criteria or toxic emissions performance. The ARB does not regulate fuel economy. While the ARB has determined that ZEVs are a necessary component of any strategy to attain state and federal ambient air quality standards, we have not precluded other very clean technologies from contributing. The ARB recognizes that diesel engines operate more efficiently than gasoline engines but still have PM, NOx and toxicity issues. As diesel fuels become cleaner and diesel emission control technology improves, it is possible that diesel engines will play a greater role in addressing global climate change issues.

226. Comment: Why bother with hydrogen under pressure or electric batteries when compressed air can be used to store the energy? (Rowe)

Agency Response: Hydrogen-powered vehicles are a promising clean technology for light and heavy duty vehicles, and an important element in meeting California's air quality goals. Fuel cells have near zero smog-forming emissions, higher fuel economy, greater energy efficiency, and are an important component in achieving energy diversity. However, the ARB has remained "fuel neutral" in developing regulations. All regulations are based on emissions performance regardless of fuel used. Thus, manufacturers are free to use other emerging technologies such as compressed air to meet the requirements of the regulation if zero emissions performance can be demonstrated.

227. Comment: The ARB should require every vehicle manufacturer to either sell at least 10% of their vehicles as battery EVs or face a hefty pollution tax on each vehicle if they want to do business in California. (Stoneham)

Agency Response: See the response to Comment 1 and Section II.B.1..

228. Comment: Fine automakers that don't meet the ZEV mandate and use that money to ensure the availability of battery EVs and cleaner air in the years ahead. (Marc Geller, EV Driver)

Agency Response: See the response to Comment 1 and Section II.B.1..

229. Comment: We suggest that the regulations award gold credit for vehicles if testing shows all of the criteria pollutants in their exhaust are below ambient levels (or undetectable). (Stuart Energy)

Agency Response: The ZEV regulation already provides that very clean internal combustion engines can earn silver credit (AT PZEV), and on the alternative compliance path, the pure ZEV requirement is reduced by half from two percent to one

percent. However, it is necessary for us to maintain a pure ZEV component to sustain serious research and development efforts.

230. Comment: Consider working more closely with such niche companies as ATTI to encourage development of vehicles that will help ARB achieve its air quality goals. The capital markets are far more receptive to providing capital when there is support from government or its agencies. This support can range from development funds to purchase orders. (ATTI)

Agency Response: See the response to Comment 1 and Section II.B.1..

231. Comment: Fuel cells are an economic and infrastructure problem. Get rid of the PZEV system – it is hard to understand all the multipliers. Enable one dealer, not everybody, just one electric vehicle to come out during this blackout period. Sell the car to anybody who wants to buy it. Give us the free market. (Doug Korthoff, EV Driver)

Agency Response: A free market for automobile production already exists. To the extent that feasible and cost effective battery EV applications are available in the near term, such applications can be pursued by their proponents. The modified regulation provides significant incentives for battery EV production should a manufacturer decide to pursue that course.

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

1. Extended Service Credits and Timing

232. Comment: Make sure that section 1962(f) in the new ZEV requirements regarding vehicle extended service multipliers includes MYs 1997 to 2000. Otherwise you are unfairly penalizing manufacturers of MY 1997 to 2000 ZEVs. (Green, Kobb, Shwabe, Siebert, Harris, Dawson, Dunlap, Dowling, Stoneham, Paul, Pohorsky, Geller, Taylor, Toyota)

Agency Response: The ARB agrees that auto manufacturers should be encouraged to re-lease existing ZEVs through the use of extended service multiplier and to provide backward compatibility for the previous extended warranty credit. A modification has been made that makes the multiplier available to vehicles in MYs 1997 to 2003.

233. Comment: Ford recommends expanding the applicable model years eligible for the extended service multiplier to include MYs 1998 through 2000. Ford made good faith efforts to expand the use of electric vehicles and satisfy customer needs. (Ford)

Agency Response: The recommendation is essentially the same (except that model year 1997 is not included) as Comment 232 above. See the response to that comment.

234. Comment: The limitation of the extended service multiplier to MYs 2001-2004 model year vehicles means that the many battery electric vehicles placed before 2001 will receive no incentive to be re-leased and remain on the road. The extended service multiplier should apply to all ZEVs, except NEVs, that have been placed in service in California. We believe the first OEM ZEVs were placed in service beginning in December 1995. So, just to be prudent, this extended service multiplier should apply to 1995-2004 model year ZEVs. (Cal ETC)

Agency Response: See the response to Comment 232 above. In addition, only a handful of OEM battery EV prototypes were produced in MYs 1995 and 1996. Thus, the extended service multiplier was applied backwards to MY 1997.

235. Comment: I would suggest that in section 1962(f), the model year specifications should be amended to include MYs 1996 to 2000 ZEVs. (Webber)

Agency Response: See the responses to Comments 232 and 234 above.

236. Comment: We have recently encountered some concern about re-leasing past the fifth year. The extended service multiplier should be increased to 0.25 in the sixth year and beyond. (Cal ETC)

Agency Response: The extended service multipliers of 0.1 and 0.2 are appropriate values for each year after the third year of service. Increasing this credit further would delay the production of new vehicles and progress in the commercialization of ZEV technologies.

237. Comment: Cal ETC supports CARB staff and Board in creating a 1.25 multiplier for vehicles that are sold or leased with an option to buy, or leased with an option to release. However, the proposed regulation was silent on the minimum re-lease time period, which could lead to some gaming. We recommend that the regulation specify that in order to get this additional multiplier that the minimum re-lease term be two years. (Cal ETC)

Agency Response: The ARB concurs and has added language in section 1962(d)(5)(C) providing that in order to receive an additional one-time extended re-lease multiplier, the option to re-lease the vehicle at the end of the first term must be for two years or more.

238. Comment: The regulations should clarify that this extended service multiplier applies to the base path and the entire alternative path except for the “fresh credit” requirements. (Cal ETC)

Agency Response: ARB staff agrees and has modified the requirement per language in the second 15-day change package. The section of the ZEV regulation that contains the extended service multiplier language is now sufficiently clear in that it applies to the base path and the alternative path. Based on various Boardmembers’ support, and comments received to encourage the re-lease of existing Type I and Type II ZEVs, the

extended service multiplier can be applied to the alternative path 50% battery EV option.

239. Comment: The regulations should clarify that automakers receiving the additional 1.25 multiplier in section 1962 (d)(5)(C), "Multiplier for Certain Type I and II ZEVs" are not eligible for this re-lease credit until the sixth year and after. (Cal ETC)

Agency Response: The ARB's intent in establishing the additional 1.25 multiplier in section 1962(d)(5)(C) was to encourage auto manufacturers to make this option to purchase or re-lease when the ZEV is first being marketed. Thus, the credit multiplier would be received at the time of the offered option. This change in treatment of extended service greatly simplifies implementation.

240. Comment: My suggestion would be to radically simplify section (f) to state that non-NEV vehicle leases (or sales) beyond the initial 3 years of service for any model year ZEV should be given 0.1 times credit per vehicle per year for extended service prior to 2003 and 0.2 times the credit per vehicle per year in 2003 and beyond. (Hansen, Keller)

Agency Response: We have attempted to simplify the language in this section where possible, in a manner consistent with this comment.

241. Comment: I suggest that a 0.6 times credit be given for sale of a vehicle previously leased for 3 years or longer. (Keller)

Agency Response: The ARB believes that the established multiplier values of .1 and .2 are appropriate given the cost to auto manufacturers of keeping the vehicles on the road relative to the cost of generating other credits in the ZEV regulation.

242. Comment: I feel the extended service multiplier is too low. These cars should be given an extended life – they are the only thing going for ZEVs for a long time. (Siebert)

Agency Response: See the responses to Comments 239 and 241 above.

243. Comment: I would urge a doubling of the number of credits offered for re-lease of the older vehicles to 0.2 per re-lease. (Stoneham)

Agency Response: See the responses Comments 239 and 241 above.

244. Comment: Please give incentives for manufacturers who currently have ZEVs leased to make available a purchase option at the close of the lease term. (Keller)

Agency Response: Although an incentive for manufacturers who currently have ZEVs leased has not been added, beginning in MY 2004 there is a one-time multiplier of 1.25 which applies to city and full function ZEVs in MYs 2004-2011, if the vehicle is either sold or leased for three or more years with the option to purchase or re-lease for two

years or more. We have also added a multiplier to provide additional incentive for re-leasing existing ZEVs and some AT PZEVs to be kept on the road longer. For MYs 2001 through 2003 a multiplier of .2 may be applied for each year after three years of service beginning the fourth year of service.

245. Comment: In section 1962(d)(3)(C), I think you mean "…if it is either sold to a motorist or is leased for more than three years to a motorist…" This excludes 3 year leases from receiving the multiplier. (Talyor)

Agency Response: The regulatory language in section 1962(d)(3)(C) is as follows, "…if it is either sold to a motorist or is leased for three or more years to a motorist...". Thus, this multiplier applies to leases that are three years or more.

246. Comment: Section (f) does not make sense. A MY 2001 ZEV can not possibly be "re-leased" prior to 2001 after three years of service. (Taylor)

Agency Response: This discrepancy has been corrected in the text made available with the second 15-day notice.

247. Comment: Please make sure that all ZEV re-leases, lease extensions, and end of lease purchases earn credits as intended by the Board. (Taylor)

Agency Response: The amendments reflect the ARB's intent with regard to ZEV re-leases and the one-time multiplier for the option to purchase and lease to keep ZEVs on the road longer.

2. AT PZEVs

248. Comment: I propose as an alternative that the gold level ZEVs include those vehicles capable of being driven at least 20 miles on electricity alone. That is, give incentives for including "plug-in" hybrid vehicles being placed on the market. (Keller)

Agency Response: See the response to Comment 125.

249. Comment: Do not restrict the use of PZEV credits to comply with the percentage ZEV requirements under the alternative compliance path. Toyota recommends allowing flexibility of meeting the gold "shortfall" with either AT PZEV vehicles or PZEV vehicles. This flexibility may lead to greater air quality benefits since the impact of the PZEV option is greater than that of the AT PZEV option due to required volume under the proposed regulation. (Toyota)

Agency Response: While we recognize that increased PZEV volumes would lead to further near-term emissions reductions, have decided that it is more important to accelerate the development and manufacturability of advanced ZEV components in AT PZEVs, which will bring ZEVs to market faster.

250. Comment: The AT PZEV allowances should not decrease in subsequent periods. As long as there is a need to force a given technology, there is no rationale for reducing the credits. This only serves to drive up AT PZEV volumes mandated in 2012 and beyond without a clear justification for doing so on technology forcing or other grounds. (Toyota)

Agency Response: We respectfully disagree with the assertion that HEV credits should remain constant as advanced technology components mature. If, however, we have misjudged the timeframe during which these components will reach maturity, the scheduled Independent Expert Review Panel may indicate that electric drives are still evolving. If so, the staff may recommend delay of the 2012 and later phase-down of HEV credits.

251. Comment: ARB should provide additional allowances for vehicles based on system voltage, motor power, and electric drive only capability. The following table summarizes Toyota's position on appropriate credits (in addition to the 0.2 PZEV baseline). (Toyota)

Characteristic	Value/Credit	Value/Credit	Value/Credit
System Voltage	<60V / 0.0	>60V / 0.2	
Motor Power	>4<10 / 0.1	>10<50 / 0.2	> 50 / 0.3
Electric Drive Only	No / 0.0	Yes / 0.2	

Agency Response: We considered several options for assignment of advanced componentry credit to AT PZEV HEVs, and have ended up using essentially the same criteria and initial credits that the commenter has proposed. We believe, however, that these credits should be scheduled for reduction in the MYs 2012-2015 timeframe as these technologies become more mature and commonplace. The proposed amendments provide substantially more credit for "electric drive only"- capable HEVs, provided they can achieve a minimum 10-mile range.

252. Comment: The 15-day notice introduces two hybrids that were not considered by the Board. We believe the best course of action would be to maintain the HEV classifications, as outlined in the March 5, 2003 staff proposal. While the 15-day notice commentary suggests that the new categories reflect concerns that the March 5, 2003 version "…did not account for all possible combinations of voltage and power," we disagree that all combinations *should* be encouraged. In short, low-voltage or low-power systems do not deserve advanced technology credits. (ALA, Cal ETC, CEERT, Coalition for Clean Air, Sierra Club, UCS, Steve and Michele Kirsch Foundation)

Agency Response: We recognize that although there are presently three highly advanced HEV models in the marketplace, their sales volume and overall market penetration are still quite small. In the near term, all forms of electric drive combined with current technology vehicles should be considered "advanced," as many of these systems and vehicles are expected to evolve into more advanced HEVs, and

subsequently, into ZEVs. Under the final amendments, AT PZEV credit for these low-voltage/low-power systems will no longer be provided after MY 2012.

We incorporated the Type B HEV category in order to fill the "gap" between low-voltage/ low-power (Type A) and high-voltage/ medium power (Type D) HEV drive systems. This was done because it is vitally important to encourage the design and incorporation of systems using high-voltage components (>60 volts) because these components will ultimately be necessary for pure ZEVs. Type B HEVs will only earn a modest 0.2 advanced componentry credit, and this will sunset in 2008, much earlier than the more desirable HEVs.

The Type C HEVs were needed because there are other features on a medium power but low-voltage HEV that can justify AT PZEV credit. In addition to its medium-power electric drive, the Type C HEVs must also incorporate advanced traction energy storage technology, for example, NiMH batteries. We believe that these features justify modest 0.2 advanced componentry credit that may be earned through 2011.

253. Comment: The 15-day Notice introduces two additional categories of HEVs. While there is no fundamental objection to these revisions, Nissan suggests that the higher capability HEVs which more accurately lead to advanced "zero technology" should be awarded increased credit values relative to the lower performing HEVs. (Nissan)

Agency Response: The final amendments allow 0.4 - 0.5 advanced componentry credit for higher capability HEVs (Types D and E) but no additional credit to the lowest performance HEV or "Type A." We agree that higher capability (power) HEVs do indeed lead more directly to pure ZEVs, which is why only Types D and E credit will remain in place after MY 2011.

254. Comment: Honda remains concerned that the number of AT PZEVs required under the alternative compliance path is unrealistically high. Honda believes that proposed volumes need to be founded on a critical assessment of the costs in developing and implementing AT PZEV technology and what the market will bear. The levels must be realistic and firmly rooted in real-world data on the pace of technological development, the growth of necessary infrastructure and consumer market acceptance. We respectfully submit that the currently proposed levels do not meet these standards. (Honda)

Agency Response: The amended regulation does not require AT PZEVs – they remain an option to production of ZEVs. We recognize that several technology options under the AT PZEV option do not require the deployment of an alternative public refueling infrastructure. For example, gasoline HEVs make use of existing fueling stations, and Honda's own efforts to develop home refueling for CNG vehicles would also mitigate the need for widespread investment in infrastructure. The Independent Expert Review Panel will provide review of technology status in a timeframe appropriate for the Board

to adjust the requirements if needed. Accurate prediction of the market acceptance and costs of high volume AT PZEV deployment is difficult at this time.

255. Comment: For purposes of calculating the "advanced componentry credit," the ARB should create two new categories above the 50 kW category. This will help produce motors that will benefit ZEVs and plug-in HEVs, as both full size battery EVs and fuel cell EVs need motors in the 50-150 kW category according to ARB staff and many other experts. Microcars such as City EVs, which need 30 kW motors, will benefit from vehicles such as the next generation 2004 Prius which has a 20 kW motor and a second 30 kW motor. Specifically, Cal ETC is requesting two new categories:

1) Type F is the same as Type E except the electric drive system peak power output is 70 kW. Type F HEVs would earn a 0.6 advanced componentry credit that would eventually decrease to 0.55 and then 0.45 in 2015 and thereafter.
2) Type G is the same as Type E except the electric drive system peak power output is 90 kW. Type G HEVs would earn a 0.7 advanced componentry credit that would eventually decrease to 0.65 and then 0.55 in 2015 and thereafter. (Cal ETC)

Agency Response: We recognize that higher power electric drives in near-term HEVs are not necessarily directly applicable to pure ZEVs because power ratings change as a function of duty cycle. At this point, it seems prudent to encourage improvements in performance and manufacturability of electric drives at all power levels, but not to over-reward these higher peak-power systems and end up with fewer near-term HEVs. The Board will reconsider credit for higher capability HEVs in MY 2012 and beyond if the upcoming Independent Expert Review Panel finds that there would be continuing challenges or benefit with particular higher power HEVs.

256. Comment: Please clarify the term "electric drive system peak power output." In talking to staff it appears the intent is to be able to add the multiple motors and generators together to get the total "electric drive system peak power output." But, this would not include the battery's peak power output, and an electric motor's peak power output would be for 2 minutes. Cal ETC can support this in the near term. However, it is also important to remember that battery EVs and fuel cell vehicles only use a single large motor. This is another reason for 2 additional categories above 50 kW, as it is important to reward as large a motor as possible. (Cal ETC)

Agency Response: Peripheral electrical devices, such as APU generators that do not provide torque, should be not added to the HEV system power output rating because these are mechanical input (not output) devices. See the response to Comment 255 regarding greater credit for higher power HEVs.

257. Comment: The 2001 ZEV regulations provided that vehicles with zero-emissions of one regulated pollutant and not another qualify for a zero-emission VMT allowance of one half that of a vehicle with zero-emissions of all regulated pollutants. The maximum ZEV VMT allowance for vehicles with zero-emissions of all regulated pollutants was 2.0. On January 10, 2003 staff proposed to increase this maximum value to 2.25. Under this

structure, vehicles meeting the maximum range requirements that had zero-emissions of one regulated pollutant would receive a maximum ZEV VMT credit of 1.12 (but it could have been as low as 0.5 depending upon range).

On March 5, 2003, staff proposed deleting the language specifying that vehicles with ZEV VMT of one regulated pollutant would get one half of the credit of vehicles with zero emissions of all regulated pollutants, noting that "vehicles that qualify for this alternative procedure are likely to reach the maximum range specified in the regulation". But instead of setting the credit level at the one-half level, which would have been 1.12, staff increased credit levels for these vehicles to 1.5 without explanation. This is a minimum 50 percent increase in credit level for these vehicles from the 2001 adopted ZEV regulations for no apparent reason, and in a manner that is inconsistent with the policy direction from those regulations.

The impact of this change is to dramatically change the relative credit values of hydrogen internal combustion engine vehicles and indirect methanol fuel cell vehicles relative to other vehicles in the AT PZEV category. We recommend that the Board reduce the credit value under to 1.12, which is the correct "one-half" value as specified in the 2001 regulations and the January 10, 2003 staff proposal. (Cal ETC)

The January 10, 2003 staff proposed amendments proposed doubling (from 0.1 to 0.2) advanced componentry credits for dedicated-hydrogen ICE vehicles in order to "recognize the value of development of this technology to ZEV commercialization and the additional costs and challenges associated with on-board hydrogen storage. Additionally it recognizes the importance of deployment of hydrogen infrastructure to support these vehicles."

On March 5, 2003 staff proposed to increase this credit again to 0.3, with the rationale that "staff also recognizes the considerable technical challenges associated with on-vehicle storage of gaseous and hydrogen fuels". Further, staff proposed changing the eligibility of vehicles for this higher credit level from dedicated hydrogen vehicles to vehicles *capable* of operating on 100 percent hydrogen.

These two changes produced a tripling of credit levels from the 2001 regulations for hydrogen storage systems in AT PZEV vehicles, without an increase in air quality or other benefits. The staff proposal has significantly revised credit levels from the 2001 adopted ZEV regulations. Credit levels for plug-in hybrids have been decreased from the 2001 adopted regulations, while credits for Hydrogen ICE vehicles and Indirect Methanol FCV vehicles have been significantly increased. Rationale for this change in relative credit levels is vague, and not justified by technical studies that demonstrate superior benefits in terms of reductions in air pollutants from the plug-in hybrid vehicles.

We recommend that the Board return to the credit values from the 2001 adopted ZEV regulations. If this is not acceptable, the maximum value for vehicles capable of operating on hydrogen should be no greater than 0.2, which is a doubling of credit values. (Cal ETC)

Agency Response: We believe that it is important to not favor particular ZEV technologies but rather remain open and receptive to alternative possibilities. For example, hydrogen is an enormously attractive energy carrier because it can be used in both near-term non-electric PZEVs and long-term electric ZEVs. Additional encouragement to fuels such as hydrogen is very much consistent with the objectives of the advanced technology portion of the ZEV regulation and the policy direction of the State of California. Hydrogen ICE vehicles face considerable challenges. Two out of three of these major challenges (hydrogen handling, storage and fueling infrastructure) are shared with hydrogen fuel cell ZEVs. Deployment of near-term hydrogen ICE vehicles would greatly assist eventual deployment of hydrogen ZEVs. The regulation options should accordingly remain open to both electric and non-electric technologies.

258. Comment: It is not clear if the credit values in Section 1962 (c), (6), B, 2 are meant to include the "*Introduction Phase-In Multiplier for PZEVs That Earn a Zero-Emission VMT Allowance*" in section 1962 (c), (7), (B). If this multiplier is included, then it is contrary to what the Staff presented to the Board and what the Board adopted on April 24, 2003, and contrary to the intent of the Board to provide additional incentives for plug-in hybrid vehicles and other advanced technology vehicles with ZEV VMT. Indeed, several times during the April 24, 2003 Board hearing both staff and Boardmembers referenced these credit levels as necessary and desirable to encourage automakers to bring plug-in hybrid vehicles and other advanced technology vehicles that earn a ZEV VMT allowance to market.

We want to emphasize that the proposed cap only affects the 2009 to 2011 time period. Both before and after this time period there is no effect. But it is exactly during this time period when automakers would be capable and likely to bring these new vehicles with ZEV VMT to market, providing that there are sufficient regulatory incentives. So it is critically important that full credit incentive levels remain in effect during this time period. To resolve this issue, we recommend any of the following:

a) Clarify that the proposed cap does not include the "*Introduction Phase-In Multiplier for PZEVs That Earn a Zero-Emission VMT Allowance*" in section 1962 (c), (7), (B).
b) Increase credits for Type III ZEVs in 2009-2011 to 8, and increase credits for Type I and II ZEVs during this time period proportionally. This has the impact of raising the cap.
c) Clarify that the proposed cap only applies to vehicles that are being use to meet a manufacturer's remaining "gold" obligation (after fulfillment of the fresh credit ZEV obligation) in the alternative path. Vehicles being used to meet an automaker's silver or bronze obligation, in the alternative or base path, would not be subject to the cap.
d) Delete the new proposed cap altogether; thus retaining the "*Cap for 2012 and Subsequent Model-Year Vehicles*" in section 1962 (c), (6), B, 1. (Cal ETC)

Agency Response: Section 1962(c)(6)(B)(2) regarding caps on AT PZEVs is part of section 1962(c)(6),"Combined ZEV Allowance." Section 1962(c)(6)(A) clearly states that the combined PZE allowance is the sum of the PZEV allowances "multiplied by any PZEV introduction phase-in multiplier." Thus the cap includes any phase-in multiplier. We believe that the proposed, capped credit for plug-in HEVs is still both generous and adequate to encourage their attractiveness to an automaker. Since the alternative path credits from an AT PZEV are interchangeable with "gold" credits, it is inappropriate for technologies with direct emissions to earn greater credit than the highest scoring ZEVs.

3. Re-Leased Vehicles in Alternative Compliance Plan

259. Comment: It is simply not clear why the allowance to use re-leased battery electric vehicles in the alternative compliance path was omitted. Nissan suggests developing the regulatory language necessary to reflect the written material approved by the Board. (Nissan)

Ford asks ARB to resolve the legality issue surrounding the unauthorized omission of the adopted resolution to allow re-leased vehicles in the alternative compliance path. (Ford)

Toyota sees no valid rationale for removing the proposed credit for vehicle re-lease in the alternative compliance path and strongly recommends including the credit at the proposed 33 to 1 ratio. (Toyota)

Agency Response: Several commenters urged that it had been the Board's intent to encourage re-leasing of battery electric vehicles, and the potential to earn extended service credits should be included in the alternative compliance path. In consideration of these comments, regulatory text made available by the Second 15-Day Notice includes this element and uses a ratio of 33 to 1. The procedure for determining extended service credits can be found in section 1962(f).

4. Credit Carry-Over in Alternative Compliance Plan

260. Comment: We support ARB's concept of allowing carry-over of credits in the alternative path. However, these credits should be based on the model year earned, rather than on the model year used. ARB is better served by allowing this more natural implementation than by establishing a depreciating alternative compliance path credit scheme that may, in fact, delay vehicle introductions. (Nissan, Toyota, Ford)

Agency Response: The credit values for Type III vehicles are based on a number of factors including current estimated cost of vehicles, appropriate volumes for demonstrations of technology, projections from manufacturers of their production capabilities in the near term, and on the principle that early production for new types of vehicles proceeds in stages in which volumes typically grow from tens to hundreds to thousands. The credit value for each Type III vehicle produced decreases per time period reflecting expected technology development and the progress needed to attain

California's continued goal of a vehicle fleet containing significant numbers of ZEVs. While we believe it is appropriate to provide incentives to a manufacturer to produce more fresh ZEV credits than are needed, the value of these credits should not create a situation where early credits significantly reduce the number of vehicles produced in later stages. In addition, automakers with excess Type III ZEV credits may also consider selling these credits to other automakers to help defray costs.

5. Alternative Compliance Path

261. Comment: Toyota maintains that the use of a manufacturer's sales volume to determine fuel cell vehicle production requirements has no bearing on the number of prototype vehicles necessary for any manufacturer to develop such new technology. This method only serves to burden larger manufacturers with unnecessary volume requirements and attendant costs. (Toyota)

Agency Response: The market share approach is appropriate for determining a manufacturer's fuel cell vehicle obligation because it is consistent with the structure of the regulations as a whole. The market share approach follows how the regulation has been structured in the past and seeks to establish a level playing field for all manufacturers based on a manufacturer's size and resources.

262. Comment: Ford is concerned with the substantial drop in fuel cell credit in MY 2009 and supports re-evaluating the credit structure based on the results of the Panel review and the cost of the fuel cell technology. (Ford)

Agency Response: The estimated credit value for Type III ZEVs is based on a number of factors including current estimated cost of vehicles, appropriate volumes for demonstrations of technology and projections from manufacturers of their production capabilities in the near term, and on the principle that early production for new types of vehicles proceeds in stages in which volumes typically grow from tens to hundreds to thousands. The credit value for each Type III ZEV produced decreases per time period reflecting expected technology development and California's goal of attaining a vehicle fleet containing significant numbers of ZEVs. However, given the uncertainty in technology development, the findings of the Independent Expert Review Panel will be used to assess the state of ZEV technology and may result in subsequent modifications.

263. Comment: Cal ETC continues to request a prohibition on switching between the base path and the alternative path. Specifically, once declared on the alternative path, a large manufacturer should not be allowed to return to the base path. At minimum if allowed to return to the base path, an OEM should pay a "switching fee." In five major ways, the 15-day regulations make the base path more attractive which makes the credit glut scenario discussed above more likely. A "switching fee" or "divider" which reduces the value of banked credits would help in reducing a 2009-2011 ZEV blackout. (Cal ETC)

Agency Response: To offer greater flexibility, the proposed regulation allows manufacturers to meet the percentage ZEV requirements using either the base line or alternative compliance option depending on their compliance strategy. While the regulation allows switching from year to year a manufacturer must be fully compliant for the specified model year and the switch must be requested in writing prior to the start of the model year in question. If a manufacturer had selected the baseline path, the option of switching to the alternative compliance path during a model year is available. However, the manufacturer is then obligated to meet the requirements for the complete multiyear period. This requirement makes switching paths relatively unattractive.

6. Public Availability of Automaker Compliance

264. Comment: Compliance with California's ZEV requirements is of critical importance to the health of all Californians. The public has an interest and a right to know whether and how an automaker is complying with the ZEV requirements. To do this the information in the reports should be made available to the public. The Board should add language indicating that the Executive Officer shall make these reports public following a determination that the reports are complete and that all data reporting requirements have been complied with. (Cal ETC)

Agency Response: Any release of information contained in the reports required by the ZEV amendments will be consistent with ARB procedures for the handling of information designated as confidential. See sections 91000-91022, title 13, CCR. Thus, automotive manufacturers may have the right to request that the ARB treat as confidential information that, if released, could either impact the ability of that company to be competitive or reveal its business plans. We will respect requests to treat information as confidential, but recognize the right of the public to challenge the confidentiality designation. Finally, the ARB is committed to ensuring that manufacturers are in compliance with the requirements of the ZEV regulation, and expect to make available information associated with compliance determinations, but not necessarily over-compliance.

7. Credits for Transportation Systems

265. Comment: The regulation extends credits for transportation systems to 2011, four more years than originally proposed (2007). ZEVs, PZEVs and AT PZEVs are all eligible for credits ranging from 1 to 9 depending on the type of vehicle, technology and linkage to transit. It appears that both new and released vehicles are eligible. The generous terms of these credits particularly applied to sliver and bronze vehicle categories will only add to the credit glut.

To illustrate in 2009 to 2011, an engine dominant, power-assist HEV in a shared use station car application can earn much more credit (6.7) than a fuel cell vehicle (4), full size EV (3), or City EV (2). To further illustrate, the large manufacturers (in total) in 2009 (if all were on the Alt path) would have make to comply with the silver and

"remaining" gold only 11,141 shared use station car power assist HEVs, versus 36,766 city EVs or 24,511 full size EVs.

Cal ETC in 2000 argued that this credit should be a temporary credit, and asked for a sunset date of 2007. While a case can be made that a two-year delay in the ZEV program should push this back 2 years, we are concerned of the huge unintended consequences of a 4 year extension of this very large credit. As a compromise, instead of recommending a 2007 or 2009 sunset date, we recommend the last three years of these transportation system credits (2009-2011) be only allowed for ZEVs, and that the transportation system credits for AT PZEVs and PZEVs be sunsetted (after a one year extension) in 2008. (Cal ETC)

Agency Response: The final amendments extend credits for all ZEV program vehicles in transportation systems to MY 2011, the end of the next 3 year period of the program. There were no evident benefits to differentiating among technology types for this extension: rather, we believe that a mix of vehicle types offers the best chance for success of transportation projects. Allowing participants to select a vehicle most suitable for their needs encourages greater use of these programs, as participants are not restricted by limitations inherent in some battery EVs. At present, proponents of transportation system programs are generally unable to procure pure ZEVs for station car or shared car use. This is due to the major manufacturers' discontinuation of battery EV production.

266. Comment: The Board directed staff to study the appropriate means for incentivizing station car projects and integrating such efforts with related transportation management programs. DC believes that the report should include a recommendation that NEVs be eligible for transportation system credits. (DaimlerChrysler)

Agency Response: See the response to Comments 142 and 143.

8. Use of Banked Credits

267. Comment: In the 2001 ZEV amendments, CARB recognized the need to avoid a gap between the production of MOA vehicles and the implementation of the mandate in 2003. As a result CARB created an advanced placement credit structure that encouraged the early placement of battery EVs including, full size EVs, City EVs and NEVs. Unfortunately, the generous credits worked all too well as automakers took full advantage of the opportunities to generate multiple credits per vehicle. Some OEMs designed programs that met the letter of the law of the ZEV regulation, but clearly did not meet its intent. As a result, there are somewhere around 110,000 banked credits available among the big 6 automakers.

Given the new ZEV structure in the CARB resolution and 15-day comment regulation language, where will the 110,000 to 140,000 credits go? A distinct possibility is that OEMs will switch back to the base path in 2009-2011 where they can use banked

credits and produce no fuel cells or battery EVs – creating a fuel cell vehicle black-out for several years, and extending the battery EV blackout.

To resolve this issue, we recommend that the Board allow the use of ZEV banked credits in the silver or bronze categories as proposed by CARB staff and encourage their use by providing a small multiplier incentive through 2011. Specifically, 1.05 multiplier for NEV credits (MY 2002), and 1.1 multiplier for ZEV credits (MY 2002 and earlier) if used in the silver or bronze categories prior to MY 2012. (Cal ETC)

Agency Response: There is nothing in the adopted regulation that prevents automakers from using banked "gold" credits in the silver and bronze categories - for example in lieu of manufacturing AT PZEVs. We expect that manufacturers will use the credits without the need to give additional incentives or value to their existing credits.

9. Neighborhood Electric Vehicles

268. Comment: We recommend that the Board change the NEV credit phase-down to encourage sales of NEVs instead of “placed in service,” and to reduce its value. Because the model year 2003 to 2005 is proposed to end in June 30 of the following year (six months later than expected), Cal ETC is concerned about very generous NEV credits (1.25, 0.625, 0.625) for the next three model years.

An alternative would be to not change the NEV credit structure, but to instead require that NEVs (MY 2003 and beyond) must be sold or leased for three years in order to obtain the NEV credit. The concern is that NEV manufacturers that make an honest effort and sell NEVs or lease them for 3 or more years must compete with NEV manufacturers who get the same credit for placing a NEV for only one year before it is returned. In theory this could also occur with Type 0, I and II ZEVs as well. (Cal ETC)

Agency Response: The credits offered for MY 2004-2006 NEVs are appropriate because NEVs, as ZEVs, have the potential to contribute to emissions reductions to the extent that they replace internal combustion engine powered vehicles. But, in recognition of the limitations of NEVs, the ARB has developed a credit structure that appropriately ramps down in value.

Regarding the requirement that NEVs be sold or leased for three years in order to earn credit, we do not believe that the regulation places NEV manufacturers that “make an honest effort” at a disadvantage. The cost to the manufacturer to produce the vehicle is the same no matter how the transaction is structured. If anything, a manufacturer that leases the vehicle for only one year is at a disadvantage due to the reduced income from lease payments.

269. Comment: DC believes that the staff needs to reconsider the ZEV credits allotted to NEVs. Staff has said that the 0.15 ZEV credit for NEVs is a placeholder and that the credit would be reviewed when more data is available. With approximately 15,000 NEVs now in use in California, we believe that data supporting a higher ZEV

value is available. With the 2006 model year now only two years away, DC believes that the staff should recommend to the Board at the scheduled September hearing that the value of a NEV be reconsidered during the next ZEV rulemaking. (DaimlerChrysler)

Agency Response: See the responses to Comments 142 and 143.

10. Independent Expert Review Panel

270. Comment: The high volume of HEVs required of a manufacturer, especially in the later years of the mandate as LDT2s are phased in, is a substantial technology and market challenge. The marketplace performance of HEVs must be a focus of the Independent Expert Review Panel. (DaimlerChrysler)

Agency Response: See the response to Comment 120. In addition, choosing the AT PZEV option commits the manufacturer to the production of significant numbers of vehicles, we appreciate the commenter's suggestion that the marketplace performance of HEVs be a focus of the Independent Expert Review Panel. Board Resolution 03-4 reflects this when it states that the Independent Expert Review Panel is to report to the Board on the status of ZEV technologies and the readiness of various technologies for market and consumer acceptance. The Board will consider this report and other information in determining the appropriate regulatory approach for the period beginning with the 2009 model year.

271. Comment: Since there are major breakthroughs required in fuel cell vehicle technology and cost, establishing minimum requirements for fuel cell vehicles in 2009 and beyond is premature and at best arbitrary. If the number needs to be lowered in the future because technology development is delayed, costs remain high or the infrastructure is insufficient, the perception that fuel cell technology is a failure would set back fuel cell vehicle deployment and public adoption. These issues must be fully explored by the Independent Expert Review Panel. (DaimlerChrysler)

Agency Response: See the responses to Comments 88 and 95 for a discussion of the establishment of minimum requirements for fuel cell vehicles in 2009 and beyond. With respect to the Independent Expert Review Panel, we appreciate the commenter's suggestion that the Panel explore the issues of fuel cell vehicle technology development, cost, and infrastructure. Resolution 03-4 clearly indicates that the Independent Expert Review Panel is to review the first two issues. There will be an adequate opportunity for the Board to determine whether to ask the Panel to explore the issue of infrastructure.

272. Comment: Timing of the second phase of the mandate is flawed. If the Independent Expert Review Panel waits until sufficient data exists to make an assessment, it will not afford enough lead-time for manufacturers to respond to any changes. Conversely, if the panel timing is accelerated, they will be doing little more than guessing. Ford recommends that the Panel convene in 2006. (Ford)

Agency Response: We agree that there should be sufficient lead time between any Board action incorporating Independent Expert Review Panel information and the second phase of the ZEV Regulation requirements. Consistent with Resolution 03-4, 2006 may be the appropriate timeframe to convene the Expert Panel.

11. Comments Related to Program Specifics

273. Comment: Electricab recommends the following items be incorporated to the April 2003 amendments.

- Adopt the proposed additional floor requirement of Type III ZEVs requiring 500 equivalent Fuel Cell vehicles placed in service by 2008. Alternative path compliance should start with zero banked credits.

Agency Response: Due to the significant financial investment required to produce current state of the art fuel cell vehicles, 250 vehicles represents a fair and reasonable number. Given the extremely limited number of Type III ZEVs that have been produced in 2001 and in subsequent years, and their high cost, it is appropriate for them to be counted towards compliance with the first "floor" requirement.

- Allow Type II battery electric vehicles to count toward the floor requirement. Battery EV substitution for fuel cell vehicles should be at a ratio of 2:1, but not more than 5:1, as opposed to the 10:1 as proposed in the revised staff report. At 10:1, the battery EV costs will exceed that of fuel cells, making the likelihood of substitution nil.

Agency Response: Type II battery EVs do count towards the floor, up to 50 percent of the alternative path floor requirement can be met with battery EVs. The ratios 20:1 for Type I ZEVs and 10:1 for Type II ZEVs reflect the relative cost of each technology and thus provide equal incentives for each technology.

- Assign 20 ZEV credits to each type II battery EV through the 2008 timeframe, and allow two type II battery EVs to count toward one fuel cell equivalent requirement during that period.

Agency Response: It is appropriate to allow both Type II and Type III ZEVs to coexist and to compete on an equal basis. Our goal is to be technology-neutral and not favor one technology over another. The credit mechanism is based on estimates of the current and anticipated cost of each respective technology and its expected rate of commercialization. We have accordingly concluded that the initial Type II to Type III credit ratios up to the year 2008 should be 20:1 and 10:1 compared to Type III vehicles.

- Prevent vehicles placed outside the state to count for credits in California, even if other states adopt California's ZEV policy.

Agency Response: See the response to Comment 97.

- Adopt the Cal ETC proposal for 2009 and beyond.

Agency Response: See response to Comment 88.

- Start the ZEV requirements in 2003. By not starting in 2003, many existing businesses that are currently developing ZEV technologies and products would be lost.

Agency Response: See the response to Comment 21.

- Officially establish the ZEV bank as proposed by staff in December 2002.

Agency Response: Implementation of the ZEV regulation will include a compliance tracking system, referred to as a Credit Bank. Work on this system will begin as soon as the regulation is final.

- Provide additional ZEV credit trading assistance to small manufacturers, transportation systems managers, or other credit generating businesses that produce marketable ZEV credits.

Agency Response: Staff are available for assistance with implementation as needed.

- Do not award gold standard credits to AT PZEVs. AT PZEVs do not significantly contribute to development or cost reduction of pure ZEV technology.

Agency Response: AT PZEVs may be used to offset a portion of the gold obligation in the Alternative Compliance Path only. Experience gained from developing and commercializing AT PZEV technology contributes to development and cost reduction of future ZEV technology. Hybrid electrical vehicles and pure ZEV technologies share many of the same electric drive components, especially traction motors and motor controllers.

- Do not award AT PZEV status to early introduction PZEVs.

Agency Response: Significant early compliance with PZEVs is valuable for air quality. Restart of the program in MY2005 meant potentially losing that benefit. Incentives are needed to obtain these vehicles early.

- Do not award ZEV credits to implementation of hydrogen fueling infrastructure or projects related thereto.

Agency Response: The regulation as ammended does not include allowing ZEV credits for hydrogen fueling infrastructure.

- Set the full-function electric vehicle threshold for credit at 75 miles range per charge, as 90 percent or more of all trips in full size vehicles are less than 75 miles in range.

Agency Response: The range and performance goal of a full function EV should be as comparable as possible to the range and performance of an average conventional gas powered vehicle. This would provide the vehicle owner sufficient reserve range and flexibility for the longer trips required of a full function vehicle. Anything less than a 100 mile range should rightfully place the vehicle in the lower range commuter on City EV classification.

- Include numerous stakeholders, including battery EV technologies (such as AC Propulsion, Phoenix Motorcars, Inc.), transportation systems design/developers and other industry experts. (Electricab)

Agency Response: The ARB's rulemaking processes have always been and will continue to be open. All parties regardless of viewpoint are welcome to testify, participate in workshops, working groups, and one-on-one meetings to discuss issues and suggestions during development and consideration of staff's proposals.

12. Requirements for Post 2008

274. Comment: The July revisions to the amendments depart from the approach of determining future fuel cell requirements based on the findings of the Independent Expert Review Panel. To participate in the proposed alternative compliance path, manufacturers would be forced to ramp up fuel cell vehicle production by a hundredfold from the 2005-2008 period to the 2012-2014 period, then double over the next three model years. These numbers do not appear to reflect any appropriate consideration of current or expected market conditions, total manufacturer costs, cost effectiveness compared with expected emission reductions, or a critical assessment of expected real-world fuel cell vehicle technology development.

We urge the Board to adopt Staff's March 2003 recommendation to delay setting fuel cell requirements for model year 2009 and beyond until a future regulatory hearing, when the Board has the advantage of reviewing real-world data to properly calibrate any such requirements. (Honda, Toyota)

Agency Response: The Board believes that volume targets are critical to providing the necessary regulatory certainty for technology investment. The estimated number of Type III ZEVs is based on a number of factors including current estimated cost of vehicles, appropriate volumes for demonstrations of technology, projections from manufacturers of their production capabilities in the near term, and on the principle that early production for new types of vehicles proceeds in stages in which volumes typically grow from tens to hundreds to thousands. The number of Type III ZEVs required increases per time period reflecting expected technology development and California's goal of attaining a vehicle fleet containing significant numbers of ZEVs. However, given the uncertainty in technology development, the findings of the Independent Expert

Review Panel will be used to reassess the state of ZEV technology and may result in subsequent modifications, and perhaps increases, to the pure ZEV requirements.

275. Comment: The current requirements should be mitigated by creating mechanism for their timely review and revision, and by giving manufacturers adequate lead time to come into compliance with any revised regulations. Such regulatory review must take place in a timeframe that gives manufacturers adequate lead-time to meet any requirements different from those in place for model year 2008. Honda urges the Board to adopt further amendments mandating that the ZEV regulations be reviewed and future requirements for model year 2009 and beyond be established only after manufacturers are provided with adequate lead time to conform to any new requirement. (Honda)

Agency Response: We agree that significant uncertainty remains regarding the rate of commercialization of pure ZEVs. Therefore, Resolution 03-4 contained the directive that information from the Independent Expert Review Panel be available in time to allow the Board to determine the appropriate regulatory approach on the commercialization of pure ZEVs for MY 2009 and beyond. The Panel's report will be used to reassess the state of ZEV technology and may result in subsequent modifications.

276. Comment: Volkswagen remains concerned about the volume requirements post-2008 for both ZEV and AT PZEV vehicles. The combination of increased volume requirements coupled with ever decreasing credits for various vehicle technologies will make the required number of vehicles demanded in the rule unsustainable after 2008. Coupled to this is the cost of these vehicles versus their contribution to air quality in California. (VW)

Agency Response: See the response to Comment 274. Specifically, the Independent Expert Review Panel will examine the state of AT PZEV components and depending on these results, the ARB may reconsider HEV credit assignments, including the MY 2011-2014 credit phase-down.

In addition, staff recognizes that the ZEV program has led to many technological advances that have a permanent positive impact on air quality in California. These advanced technologies have not only impacted battery EVs but have had positive impacts on conventional vehicles as well. The ZEV program rewards vehicles based on their air quality benefits. For example, the 2003 amendments encourage volume production of PZEVs and provide additional incentives for widespread deployment of AT PZEVs, recognizing their contribution to the development of future pure ZEVs.

13. Comments Related to Performance Based Requirements

277. Comment: Honda believes it may make sense for the Board to revise the stratified credit structure of the current regulations into a performance-based system, awarding PZEV credits based on overall emissions performance rather than the baseline plus allowance system currently in place. Doing so would properly reward

vehicles that provide emissions performance approaching ZEVs while incentivizing future development of a range of ZEVs, AT PZEVs and PZEVs based directly on emissions performance, and not on imperfect surrogates for technology or performance such as power output and traction drive system voltage. (Honda)

Ford proposes increased flexibility for obtaining the ZEV mandate's aggressive goals. If ARB has to provide an additional impetus to the process, establish a performance-based target by gradually reducing the fleet average NMOG exhaust requirement for these vehicles. (Ford)

Agency Response: The ZEV program as amended in this rulemaking establishes performance-based emission standards for several categories of vehicles (PZEV, AT PZEV and ZEV). Within that framework, production requirements are only set for the ZEV element of the regulation. The amendments establish an alternative compliance path to provide additional flexibility for manufacturers to meet the regulation with technologies that suit their strengths. Even within the two percent ZEV requirement, flexibility exists through the credit calculation process allowing manufacturers to build different types of vehicles depending on their particular ability and market interests.

From a policy standpoint, the Board has clearly articulated the need to maintain a core zero-emission requirement to provide an incentive for further development. The tremendous progress that has been seen to date can at least in part be attributed to the existence of the ZEV requirement, and maintaining this requirement will accelerate the pace at which true zero technologies are commercialized. At the same time, given the wide-open nature of ongoing technical advances, the amendments provide increased flexibility for automakers to pursue specific strategies that in their view offer long-term promise.

14. Transition for Large Manufacturer Status

278. Comment: VW continues to believe it is being treated unfairly during the 2005-2008 period of the rule. VW is in the unique position of being the first manufacturer to transition from an intermediate manufacturer to a large manufacturer in the history of the ZEV mandate. VW's first model year to be legally required to provide ZEVs and AT PZEVs is in 2008, the last year of the first period of the rule. The rule requires that a manufacturer entering the alternative fuel cell pathway during any time of one the specified periods must provide the entire number of fuel cell vehicles required for that period. As written, this alternative pulls ahead VW's pure ZEV obligation by three model years. We believe the language is intended to prevent existing manufacturers from jumping in an out of the alternative pathway in an effort to reduce the number of vehicles they must build, not to penalize a manufacturer entering the rule for the first time. We ask that that our 2005-2008 volume for the alternative fuel cell pathway be pro-rated. (VW)

Agency Response: See the response to Comment 115.

15. Other

279. Comment: The bronze standard should be 80 percent of all vehicles, not just 6 percent. It should be a privilege to sell cars in this state, we need clean vehicles now. (Dunlap)

Agency Response: The credits for bronze vehicles are fractional, since they are not pure ZEVs. Therefore, the actual requirement is 6 percent divided by .2 credits per vehicle, which amounts to 30% of the market share for each manufacturer. This is the largest reasonable number to require at this time without imposing excessive demands on manufacturers to convert their entire production. PZEVs and AT PZEVs are in showrooms today and are having an immediate impact on air quality.

280. Comment: The last sentence of section 1962 (f), stating that a manufacturer warranty is not required, has been stricken. However, the commentary following indicates that the intent is indeed not to require a warranty. If this is the case, it would seem that the last sentence should not have been stricken. (Dowling)

Agency Response: The commenter is referring to section 1962(f), which as amended establishes the extended service multiplier for MY 1997-2003 ZEVs. This unfortunately is a very complicated provision, although we have sought to make it simpler. The second-to-last sentence in the preexisting regulation provided a particular treatment for "ZEVs, other than NEVs, re-leased prioor to January 25, 2001 for a period beyond three years of service." The last sentence provided that these particular vehicles were not required to be covered under the original warranty. Since the second-to-last sentence has been deleted, the last sentence needs to be deleted as well since it referred only to the second-to-last sentence. But this has no impact on the fact that amended section 1962(f) no longer requires an extended warranty under any circumstances for qualification.

281. Comment: I believe that there has been significant positive experience with this battery technology that has occurred over the last 2 to 3 years, and which has not been adequately acknowledged and documented as part of the rulemaking for the 2003 amendments. I hereby request that staff ask General Motors to provide performance information on the Panasonic EV1 fleet so that it can be adequately entered into the rulemaking file for the 2003 amendments. (Mason)

Agency Response: Staff has no legal authority to force a manufacturer to reveal the requested information. However, Panasonic and GM were among the firms surveyed in Dr. Anderman's assessment of battery technology. We believe that the current state of battery technology, including the Panasonic EV1, is accurately reflected in the adopted amendments.

282. Comment: We recommend focusing on cost effective methods to generate electricity and hydrogen from clean, renewable sources prior to pushing for

commercialization of battery EV and fuel cell vehicles. Using grid electricity provides no better air quality benefits than a PZEV. (Ford)

Agency Response: Battery and hydrogen ZEVs, which use electricity directly and indirectly, provide significant alternative fuel benefits and can be produced from a variety of non-petroleum energy sources. The fact that PZEVs pollute as little as the indirect emissions from battery and hydrogen ZEVs is a good thing. Consideration of indirect emissions have been part of staff's analysis, and continue to be important in policy decisions. As direct emissions decrease, indirect emissions represent a larger share of the total emissions that are attributed to vehicle operations. Additionally, it is not appropriate to put a hold on advancement of vehicle technologies that give us vehicles with zero tailpipe emissions and replace vehicles polluting far more than PZEVs. Comparing PZEV tailpipe emissions to battery EV upstream emissions neglects PZEV upstream emissions that are significant. It is very important that the ARB continue to emphasize vehicles with zero direct emissions.

283. Comment: The ZEV requirements are inconsistent with California Law. The program does not meet the minimum requirements for cost-effectiveness and being necessary. (Ford)

Agency Response: Cost-effectiveness and necessity findings are contained in Resolution 03-4 and Executive Order G-03-069.

284. Comment: Financial strength and vehicle development capability of a manufacturer should be measured on a worldwide production basis, not on a per-state basis. If BMW's sales in California were comparable to other manufacturers, BMW would be entitled to more time to transition to large volume manufacturer status. To address this problem, the ARB could revise the definition of intermediate to include those manufacturers with worldwide sales of no greater than 2 million vehicles, taking into account any vehicles sold by another manufacturer with a majority interest.

Or, CARB could further expand the credits awarded for PZEVs to provide greater flexibility to intermediate manufacturers transitioning to large volume manufacturers with less than 2 million vehicles worldwide and no ties with another large manufacturer. The Board could expand this concept to allow newly-classified large volume manufacturers to use excess PZEV credits to count as AT PZEV credits and/or as ZEV credits in the first few model years as a large volume manufacturer.

Finally, allowing newly-classified large volume manufacturers to use AT PZEV credits to satisfy pure ZEV requirements would be another approach which could assist in the transition of an intermediate volume manufacturer to a large volume manufacturer. (BMW)

Agency Response: California sales represent a significant fraction of most OEMs market. The relative sales in California represent a fair basis for determining

requirements and size. Most importantly, those automakers with the greatest impact on California emissions have the greatest burden for compliance.

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

1. Credits of Re-Leased Vehicles

285. Comment: We believe that vehicles that were re-leased before April 24, 2003 should get the same Extended Service Multiplier as vehicles re-leased after this date, that is 0.2 multiplier. During the numerous workshops and hearings, it was very apparent that more incentives were needed to keep battery electric vehicles on the road. Manufacturers that acted in good faith to re-lease vehicles before April 24, 2003 should not be penalized for keeping their vehicles on the road versus manufacturers that acted after this date. (Ford)

Agency Response: The ARB is not penalizing those manufacturers that in good faith have re-leased vehicles before April 24, 2003. The Board at the April 24, 2003 hearing wanted to increase the incentives to manufacturers to re-lease battery EVs that are on the road. Thus the existing 0.1 extended service multiplier was doubled to 0.2. The regulatory language makes the change effective as of April 24, 2003 to reflect the date of Board's action. The April 24, 2003 date reflects the intent to influence post-hearing decisions to keep battery EVs in service. Grandfathering battery EVs re-leased prior to this date would be rewarding an OEM for actions already taken.

2. AT PZEVs

286. Comment: With regards to sunsetting the advanced componentry allowance given to Type C hybrids in 2011, Volkswagen strongly disagrees with this proposal and is puzzled by this action. Volkswagen believes that any hybrid system that adds volume to advanced electric drive technology will still have value beyond the 2011 time frame. We strongly urge CARB to reconsider this proposal and allow the advanced componentry credit for the Type C hybrid beyond 2011 as proposed in the first 15-day notice. We view this credit as an important tool in promoting volume and reducing the cost of energy storage systems in the later years of the ZEV regulation. (Volkswagen)

Agency Response: We agree that the Type C HEV's attractiveness as an advanced technology vehicle should extend beyond the timeframe of the Type A and B HEVs, but do not believe that this attractiveness should extend indefinitely. However, Type C HEV features and the credit they receive may be revised or adjusted after the Independent Expert Review Panel re-examines the challenges facing ZEVs in MY 2012 and beyond.

287. Comment: The high volume of hybrids required, especially in the latter years of the mandate is a substantial technology and market challenge. To ensure that the performance of hybrids match the regulatory requirements, we recommend that the

Independent Expert Review Panel include a market review of hybrids in its report to the Board. (DaimlerChrysler)

Agency Response: We agree that significant uncertainty remains regarding the rate of commercialization of ZEVs. Therefore, Resolution 03-4 contained the directive that information from the Independent Expert Review Panel be available in time to allow the Board to determine the appropriate regulatory approach on the commercialization of ZEVs, including AT PZEVs, for MY 2009 and beyond. The Panel's report will be used to reassess the state of ZEV technology and may result in subsequent modifications.

3. Alternative Compliance Plan

288. Comment: The 2003 ZEV proposal should be modified so that early ZEV credits are not devalued under the alternative compliance path. CARB should not limit the Type I or Type II ZEV credits that could be used to satisfy a portion of the alternative plan fuel cell obligation. There is already a tremendous discount factor (i.e. 20 for Type I and 10 for Type II) applied when using these credits to satisfy the fuel cell obligation and there is also a limit that only half of the fuel cell obligation may be met with these credits. Therefore, no other restrictions are needed. (Ford)

Agency Response: One of the objectives of the alternative compliance path is to encourage the continued development of ZEV technology. Therefore newly produced vehicles are given greater value. A manufacturer wishing to use existing credits to reach compliance with the regulation could choose to use the base path for compliance.

289. Comment: CARB should prorate the alternative compliance path fuel cell requirement so that a manufacturer can elect to be subject to the alternative plan for a portion of the three or four year period without having to devalue the ZEV credits earned under the base plan or 2001 ZEV rules. (Ford)

Agency Response: A manufacturer can elect to comply either through the alternative compliance path or base path. The alternative compliance path allows the use of ZEV credits earned previously. See the response to comment 288.

290. Comment: The October 2003 changes do not remedy the unrealistic numbers of fuel cell vehicles and AT PZEVs required for automakers to qualify for the alternative compliance path starting in 2009. We request that the Board postpone setting hard fuel cell vehicle requirements for 2009 and beyond and instead leave such requirements for an Independent Expert Review Panel. (Honda)

Agency Response: The number of vehicles required to comply with the alternative compliance plan during the time periods following MY 2008 will be reviewed. Given the uncertainty in technology development, the findings of the Independent Expert Review Panel will be used to reassess the state of ZEV technology and may result in subsequent modifications, and perhaps increases, to the pure ZEV requirements.

4. Neighborhood Electric Vehicles

291. Comment: Though not being considered for regulatory change at this time, DC believes that ZEV credits allotted to NEVs should more accurately reflect the value NEVs provide in reducing emissions and contributing to congestion mitigation in relation to ZEV credits earned by other battery electric vehicles. (DaimlerChysler)

Agency Response: The ARB recognizes that there are wide ranges of potential applications that are well suited to NEVs. To the extend the NEVs are used to make zero emission trips, they benefit air quality and are an appropriate participant in the ZEV program. However, the ZEV regulation encourages a variety of ZEVs. The number of NEVs produced could affect the number of other types of ZEVs produced. Given this, the credits earned by the various ZEV products are designed to encourage manufacturers to produce a variety of vehicle types, rather than all NEVs.

5. Request for Performance Based Standards

292. Comment: Honda renews its request that ARB abandon flat production and credit requirements and amend the ZEV regulations to set such requirements based on relative emissions performance of all types of ultra low, super ultra low, near-zero and zero-emission vehicles. Widespread placement of today's extremely low and near-zero emissions vehicles can result in greater emission reductions than attempting to mandate unrealistically high levels of ZEVs. (Honda)

Agency Response: See the response to Comment 277.

IDENTIFICATION OF NONSUBSTANTIVE CORRECTIONS MADE TO THE 2003 AMENDMENTS TO THE ZEV REGULATION AND TEST PROCEDURES DOCUMENT AFTER THE SECOND 15-DAY COMMENT PERIOD

December 19, 2003

I. Corrections to the Final Regulation Order

In section 1962(b)(2)(B)1.e., title 13, California Code of Regulations, the subsection heading "*Calculation of a Manufacturer's Alternative Path Percentage*" was added, the heading of the table was italicized, and "*(MYs)*" was inserted in the heading of the first column of the table.

In section 1962(b)(2)(B)2., "the" was inserted before "2005 through 2008 model years" in the first sentence and "advanced technology" was changed to "AT" in the second to last line.

In section 1962(b)(3), "partial ZEV allowance vehicles" was changed to "~~partial~~ PZEVs ~~allowance vehicles~~.

In section 1962(b)(6), the term "*ZEV*" in the heading was corrected to "*PZEV*".

In section 1962(j), "'HFEDS' means highway fuel economy driving cycle." was shown in strikeout.

The authority and reference note for the amendments to section 1900 was modified to accurately reflect the existing note in Barclays California Code of Regulations and then to show the reference to Health and Safety Code section 43013 in underline and the reference to section 43103 in strike-out.

In addition, a few corrections to reflect the existing text of Barclays California Code of Regulations.

II. Corrections to the "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"

Corrections parallel to those in the Final Regulation have been made except for showing "'HFEDS' means highway fuel economy driving cycle." in strikeout.

The headings of tables were consistently shown in italics without bold.

In Section C.7.6., "g/mi" was inserted before "ZEVs" to be parallel with section 1962(g)(6).