ATTACHMENT C

ARB Staff Response to March 26, 2008 Comment Letter: "2008 Proposed Solutions to Potential Loopholes in the Amendments to the California Zero Emission Vehicle Program Regulation, Agenda Item 08-3-5"

Comment Submitted By: Natural Resources Defense Council, Union of Concerned Scientists, American Lung Association of California, Center for Energy Efficiency and Renewable Technologies, Coalition for Clean Air, Energy Independence Now, and Friends of the Earth

Resolution 08-24, adopted on March 27, 2008, directed the Executive Officer of the California Air Resources Board (ARB or the Board) to review and consider comments presented by members of the environmental community on March 26, 2008 in regards to the Zero Emission Vehicle (ZEV) program. ARB staff met with environmental stakeholders, Spencer Quong (Union of Concerned Scientists), Luke Tonachel (Natural Resources Defense Council), Jamie Knapp (ZEV Alliance), Dave Modisette (California Electric Transportation Coalition), and John Shears (Center for Energy Efficiency and Renewable Technologies), on Thursday, April 24, 2008 to discuss each loophole in further detail. Staff then had three subsequent meetings to discuss ARB direction and modifications on each of the loopholes including possible regulatory revisions on Thursday, June 19, Monday, July 7, and Thursday, July 10, 2008 before the release of these documents for public comment.

After reviewing each loophole, staff has modified some of the regulatory language originally proposed in the Initial Statement of Reasons (ISOR), released on February 8, 2008. The proposed modifications, along with other proposed changes, will be made available for a public comment period of at least 15 days.

Staff reviewed each loophole within the scope of the overall Board direction, and made decisions to modify or keep the originally proposed regulatory language. In some cases, staff recognized the issue highlighted by the loophole, but chose to approach the issue from a different direction than suggested in the March 26 comment letter. Some loopholes were dealt with during the March 27 hearing in the Board's direction to staff to modify regulatory language. Other loopholes staff concluded were not in fact loopholes, or reflect broader issues that are better dealt with in the redesign of the ZEV program over the next two years.

Staff chose to make modifications based on the following 3 loopholes:

Loophole # 1: "Limit hydrogen internal combustion engine vehicles to AT-PZEV (non-Enhanced) and PZEV credits due to their limited benefit and potential for gaming."[1]

- Loophole Explanation and Author Reasoning: At low vehicle volumes hydrogen internal combustion engine (HICE) vehicles are unlikely to significantly push hydrogen infrastructure development. These hydrogen fueled vehicles fail to drive ZEV technology because their drive trains are not electrified. Another concern was these vehicles present auto manufacturers with a low cost alternative to gain credits with minimal investment in ZEV vehicles. The authors proposed that HICE be limited to fulfill non-Enhanced advanced technology partial zero emission vehicle (AT-PZEV) or partial zero emission vehicle (PZEV) credits only, because these vehicles do not offer the same technology advancement benefits.

- Staff Response: Overall, staff does not view this so much as a loophole, but as a broader policy issue. The definition of an Enhanced AT PZEV as presented in staff's proposed regulatory language at the Board hearing in 1962.1(j)(6) states that an "'Enhanced AT PZEV'… makes use of a ZEV fuel" and the ISOR clearly defined a HICE vehicle as falling under that definition. Because the Board did not direct staff to make changes to this definition, staff does not believe the solution proposed by the environmental groups is appropriate. However, staff is proposing modifications to help ensure that HICE vehicles result in ZEV technology advancement.

- Staff Decision: Staff increased the requirements for the hydrogen storage system on HICE vehicles from 3600 to 5000 pounds per square inch to ensure that only the most advanced HICE vehicles are placed to meet ZEV requirements. This will promote the use of advanced hydrogen storage systems and further development and commercialization of hydrogen tanks.

- Affected Regulatory Sections:
  - 1962.1(c)(4)(A)

Loophole # 2: "Extend Carry Forward Provision to Enhanced AT-PZEVs to ensure that banked credits do not create long "blackout" periods when none of these vehicles are produced."[1]

[1] March 26, 2008. Executive Summary. "Re: 2008 Proposed Solutions to Potential Loopholes in the Amendments to the California Zero Emission Vehicle Program Regulations, Agenda Item 08-3-5"

- Loophole Explanation and Author Reasoning: Without the carry forward limitation being applied to Enhanced AT PZEVs, manufacturers could bank credits and avoid production in later years. If a manufacturer chose to build low volumes of Enhanced AT PZEVs during Phase II when a 3 times multiplier is applicable or over comply in Phase III, the result could be few or no Enhanced AT PZEVs placed in Phase IV. The carry forward provision should be extended to Enhanced AT PZEVs through the end of 2017.

- Staff Response: Staff does not agree that the carry forward provision should apply to Enhanced AT PZEV credits. Large numbers of Enhanced AT PZEVs, namely plug-in electric vehicles (PHEV), are not expected to be produced in large numbers during the 2009 to 2011 timeframe. These vehicles have never been produced, and it is unlikely that a sudden ramp up of volumes would occur in such a limited timeframe. Additionally, if a manufacturer were to be successful in their early production of an Enhanced AT PZEV, it would be unlikely that the manufacturer would stop production during the 2012 to 2014 timeframe. However, staff does believe a multiplier applicable to PHEVs delivered for sale during the 2009 to 2011 timeframe would allow a manufacturer to earn 3 times the credit for each PHEV delivered for sale, which reduced the number of vehicles and increases the number of credits. This PHEV multiplier could create an artificial bank of credits that could be used to comply during the 2012 to 2014 timeframe.

  Staff believes that extending the carry forward provision to include Enhanced AT PZEVs would decrease the likelihood of vehicle demonstrations prior to 2012. It would penalize manufacturers deploying Enhanced AT PZEVs early by not allowing them to bank credits for more than three years. Instead, staff chose to address the overall credit discrepancy between PHEVs and pure ZEVs during the 2009 to 2011 timeframe.

- Staff Decision: Staff has proposed to decreased the value of the multiplier offered to plug-in hybrid electric vehicles (PHEV) delivered for sale or extended lease during the 2009 through 2011 from 3.0 to 1.25, which is the same value as the multiplier offered for ZEVs sold or leased for three years, with the option to lease for an additional two years. This would provide credit, though less than what would have been given in staff's original proposal, to plug-in electric vehicles produced and delivered for sale during the 2009 to 2011 timeframe while ensuring that pure ZEVs would not be put at a comparative disadvantage. Also, there will be

limited potential for an excessive number of banked credits which could result in a black out during the 2012 to 2014 timeframe.

- o Affected Regulatory Sections:
  - 1962.1(c)(7)(B), (d)(5)(D)

Loophole # 8: "Prevent product blackouts caused by NEV credits for the pure ZEV minimum requirement and early introduction of Enhanced AT-PZEVs. This can be accomplished by limiting the use of NEV credits earned before 2008 to the (non-Enhanced) AT-PZEV or PZEV categories after 2011 and restricting NEV credits earned after 2008 from the pure ZEV floor."[1]

- o Loophole Explanation and Author Reasoning: In the early 2000's auto manufacturers placed low cost, low technology neighborhood electric vehicles (NEV) in California for a short period of time only to fulfill their pure ZEV requirement. NEVs were then abandoned or removed with almost no benefit to air quality and technology advancement. Because of this, auto manufacturers have banked over 123,000 pure ZEV credits from NEVs. Because NEVs have been used as a pure ZEV credit loophole, the authors recommended limiting the use of the existing banked credits earned before 2008 to the (non-Enhanced) AT PZEV or PZEV categories after 2011. NEV credits earned after 2008 could be applied to all categories outside of pure ZEV floor.

- o Staff Response: Staff agrees the large number of banked NEV credits will slow the introduction of new, advanced technology ZEVs unless their use is restricted.

- o Staff Decision: Staff proposes to limit the use of NEV credits, both 2001-through-2005 credits as well as 2006 and subsequent model year NEV credits. With these modifications, 2001-through-2005-MY-NEV credits are not available to meet the portion of the obligation that must be met with ZEV in 2012 through 2014. Also, the 2001-through-2005-MY-NEV banked credits are capped at 50% usage within the obligation that may be fulfilled with Enhanced AT PZEVs or AT PZEVs for the 2012 to 2014 timeframe. These modifications limit the use of 2006 and beyond NEV credits within the minimum ZEV floor during the 2012 to 2014 timeframe while still allowing them to be fully used to meet requirements that may be met with Enhanced AT PZEVs, AT PZEVs, and PZEVs.

The following tables will be placed into the regulatory language in section1962.1(g)(6)(A) as a modification:

(2001 through 2005 MY NEV credits)

Years	**ZEV Obligation that:**	**Percentage limit for NEVs allowed to meet each Obligation:**
2009 – 2011	Must be met with ZEVs	50%
2009	May be met with AT PZEVs but not PZEVs	75%
2010 – 2011		50%
2009 – 2011	May be met with PZEVs	No Limit
2012 – 2014	Must be met with ZEVs	0%
	May be met with Enhanced AT PZEVs and AT PZEVs	50%
	May be met with PZEVs	No Limit

(2006 and Subsequent MY NEV credits)

Years	**ZEV Obligation that:**	**Percentage Limit for NEVs allowed to meet each Obligation:**
2009 - 2011	May be met through compliance with Primary Requirements	No Limit
	May be met through compliance with Alternative Requirements, and must be met with ZEVs	0%
	May be met through compliance Alternative Requirements, and may be met with AT PZEVs or PZEVs	No Limit
2012 – 2014	Must be met with ZEVs	0%
	May be met with Enhanced AT PZEVs, AT PZEVs, or PZEVs	No Limit

Also, to ensure that only the highest performing NEVs receive credit, staff included additional requirements for 2010 MY NEVs. These requirements mirror the NEV America Standards, set forth in "NEV America: Neighborhood Electric Vehicles (NEV) Technical Specifications" (Revision 2)[2], including acceleration, top speed, and constant speed range specifications as well as battery and warranty requirements.

- o Affected Regulatory Sections:
  - 1962.1(d)(5)(F); (g)(6)

The Board made modifications to staff's proposal which consequently dealt with two of the loopholes presented.

Loophole # 4: "Raise performance requirement for Type IV ZEV to a level that is not already exceeded by the recent models of fuel cell vehicles on the road today. Also, ensure the new class does not result in a decrease of pure ZEVs required in Phase II."[1]

- o Loophole Explanation and Author Reasoning: Type IV ZEV is not a more advanced fuel cell vehicle and does not encourage technology development. The addition of the Type IV ZEV results in backsliding of the pure ZEV requirement. The authors proposed that staff adjust the credit system so there is no decrease in pure ZEV requirement in Phase II and also consider the following requirements:

  1) 300 mile range with no measurable decrease in other performance metrics (e.g. luggage, and passenger volume)
  2) Fast refueling capability
  3) Federal Motor Vehicle Safety and Standard certified
  4) Achieves a minimum number of FreedomCar and Fuel Technical Goals
  5) Available to the public for sale or a minimum three year lease

- o Board Direction: The Board proposed and approved a new gold category of ZEV, Type V, which earns 7 credits, and must have a 300 mile or more range and 15 minute fast refueling capability. This new category ZEV meets many of the suggestions described in the fore mentioned loophole.

[2] NEV America: Neighborhood Electric Vehicles (NEV) Technical Specifications (Revision 2), December 1, 2004:
http://www1.eere.energy.gov/vehiclesandfuels/avta/pdfs/nev/nev_tech_spec.pdf

In discussions with authors of the March 26 comment letter, staff received further comment that the new Type V vehicle satisfies some requests, but that they still wanted more stringent standards to be placed on Type IV ZEVs. Not all of the OEMs have successfully built a Type III ZEV, let alone a Type IV ZEV. Requiring more stringent standards on a new ZEV type could hinder development. Staff felt that the requirements for a Type IV ZEV were adequate and appropriate, and did not propose modifications to requirements for a Type IV ZEV.

- o Affected Regulatory Sections:
  - 1962.1(d)(5)(A), (d)(5)(B), (d)(5)(C), (d)(5)(D), (d)(5)(E), (j)(11)

Loophole # 9: "Modify six year extension of Intermediate Volume Manufacturer (IVM) timeline as this increases the time these manufacturers have to comply with the program to twelve years."[1]

- o Loophole Explanation and Author Reasoning: Staff proposed to lengthen the intermediate volume manufacturer (IVM) transition period by six years. This means that an IVM does not have to produce any fuel cell vehicles or battery electric vehicles, and must produce only a fraction of their AT PZEV requirement, for twelve years after exceeding large volume manufacturer (LVM) threshold. Because of the importance of advancing pure ZEV technologies, supplier base, and infrastructure among all large manufacturers, the authors opposed the six year extension of timeline for transition from IVM to LVM.

- o Board Direction: The Board did not adopt staff's proposed modifications to the regulation to allow the IVMs a 12 year transition period into LVM requirements. IVMs will still be subject to LVM requirements at the start of the sixth model year following the start of the transition.

- o Affected Regulatory Sections:

  - 1962.1(b)(7)(A)

ARB staff reviewed and took into consideration the other four loopholes, and concluded it was unnecessary to modify the regulation. Discussions held with all stakeholders lead staff to believe that these were in fact, not loopholes to the regulation and did not pose a threat to the purposes or overall goals of the ZEV program, or that they would be better dealt in the context of a larger public process during the redesign of the ZEV program.

Loophole # 3: "Limit travel provision for Type III and IV ZEV to 2014 because increased volumes in the pre-commercialization phases after 2015 are necessary to encourage expansion and cost reduction in component and infrastructure suppliers."[1]

- Loophole Explanation and Author Reasoning: The end of the travel provision means that the auto companies must meet the ZEV regulations in California and ten other states that have adopted the ZEV regulations. This doubles the number of ZEVs the auto companies have to produce nationwide. The current regulation requirements in addition to eliminating the travel provision means the auto manufacturers have to produce 100,000 vehicles nationally. Extending the travel provision to 2017 hinders the Board's ability to remove the provision during Phase IV if the Board finds that nationwide commercialization of pure ZEVs is feasible. Because of the need to support future growth of pure-ZEV technologies, suppliers, and infrastructure, plus the advantage of future flexibility in the regulations, the authors proposed limiting the extension of the Travel Provision to 2014.

- Staff Response: This is not a loophole; it is a policy decision. Staff proposed that the travel provision be extended to 2017 during the March 27 hearing, and the Board approved this provision. The principle involved is vehicle types that are pre-commercial in volume and require new fueling infrastructure are considered to be in a demonstration phase and the benefit of requiring demonstrations from 10 other states is weakened by the high cost and lack of new information obtained. Staff believes that PHEVs will jump directly to commercial volumes, and no new infrastructure is required. Thus it did not recommend a travel provision for this technology. Fuel cells, on the other hand, are likely to undergo several more demonstration phases to validate durability and lower cost designs for new fueling infrastructure (several million dollars per station). Thus, staff believes travel through 2017 model year is appropriate so that demonstrations are limited to only a few areas. Likewise, battery electric vehicles may need future demonstrations to establish customer acceptance. Based on this assessment, staff believes the travel provision for Type III, Type IV, and Type V ZEVs through 2017 is appropriate.

  Staff does not think that the provision will compromise its ability to redesign the ZEV program. The redesign will begin with a clean sheet of paper, and all provisions of the current ZEV program will be up for reconsideration.

- o Staff Decision: Staff did not make modifications to the regulatory text in response to this loophole.

Loophole # 5: "Eliminate extension of Type C hybrid electric vehicle (HEV) because it is an off-the-shelf technology that offers limited benefit to advancing technology."[1]

- o Loophole Explanation and Author Reasoning: Type C hybrid electric vehicles (HEV) do not contribute to technology advancement and the auto companies have a financial incentive to use the technology as a loophole to meet their AT-PZEV requirement. The authors recommended not extending the credits for Type C HEV unless they use lithium ion batteries or other advanced energy storage systems not currently in commercial production.

- o Staff Response: In the regulation, a Type C HEV is a vehicle with an electric motor with greater than or equal to 10 kW of power output and less than 60 volts for its traction drive system voltage. Type C HEVs are also required to be equipped with an advanced traction energy storage system, such as lithium ion batteries, nickel metal-hydride batteries, or ultracapacitors. Staff believes that Type C hybrids still provide environmental benefits and should be an option for a manufacturer. Manufacturers need as much flexibility as possible to design vehicles for a variety of applications. Additionally, Type C requires a manufacturer to utilize advanced batteries, which are not "off the shelf". Not all LVMs have deployed hybrids, so to limit them could be fateful for further hybrid deployment. Additionally, an LVM who makes a larger vehicle as a mild hybrid provides greater greenhouse benefit to California than a small mild hybrid.

- o Staff Decision: Staff did not make modifications to the regulatory text in response to this loophole.

Loophole # 6: "Place 50% cap on the use of Type I and Type I.5 ZEV that do not use advanced batteries and limit their Travel Provision to 2011 [rather than 2014] because they have limited long-term benefits and open a program loophole."[1]

- o Loophole Explanation and Author Reasoning: ARB has introduced a new Type I.5 ZEV and removed the cap on Type I and I.5 ZEV. This means that an automaker can meet its entire pure ZEV floor requirement with Type I.5. The authors saw the advantages of early introduction of Type I.5s as a low cost loophole to fulfill the pure ZEV floor requirement with limited long-

term benefits to the program. The authors proposed keeping the 50% cap on Type I and I.5 ZEV and limiting their Travel Provision to 2011, if they do not use advanced batteries.

- o Staff Response: Type I ZEVs are vehicles with an all electric UDDS range between 50 and 75 miles. Type I.5 ZEVs are vehicles with an all electric range between 75 and 100 miles. Many consider Type I.5 ZEVs to be city electric vehicles. Staff does not see this so much as a loophole but as a broader policy issue. Staff received direction in the Board's Resolution 07-18 after its May 24, 2007 Board Hearing to provide more even treatment of battery electric vehicles. The original proposal to remove the limits placed on Type I and I.5 ZEVs presented to the Board on March 27 reflects this overall Board direction. At this time, staff does not believe it is necessary to cap these vehicles, because they do require an advanced battery and trade transparency should limit manufacturers in their production or trades of "cheaply produced" vehicles.

  Staff believes Type I, I.5, and IIs still will be produced in demonstration–like quantities in the 2012 to 2014 timeframe and that duplicate demonstrations in many other states is not needed. Thus, staff believes the travel provision is appropriate for these vehicles.

- o Staff Decision: Staff did not make modifications to the regulatory text in response to this loophole.

Loophole # 7: "Quantitatively define the term 'advanced battery' to reward production of truly new technologies as opposed to high power nickel-metal hydride batteries available in today's mass market hybrids."[1]

- o Loophole Explanation and Author Reasoning: The ZEV regulations use the term 'advanced batteries' to define a Type C AT-PZEV. 'Advanced battery' is a term that is both vague and changing, depending on the development of the technology. High powered nickel metal-hydride batteries are being mass produced for use in hybrid vehicles on the road today and do not represent the advanced batteries needed for the pure ZEV and Enhanced AT-PZEV requirements. 'Advanced batteries' should more appropriately refer to the deep cycle nickel metal-hydride and lithium batteries not currently in widespread use. The authors requested that ARB define term using a quantitative metric that acknowledges commercialization status in vehicles.

- Staff Response: Staff does not view this as a potential loophole to compliance with the ZEV program. Staff believes that the current examples provided in 1962.1(c)(4)(B)4. for an advanced energy storage system are adequate for the purposes of the regulation. The Board supports technology neutrality, as evidenced in its Resolution 07-18 following the May 7, 2007 Board Hearing. Staff does not agree that defining advanced battery supports this neutrality. Staff believes that nickel metal-hydride batteries are advanced batteries and demonstrate innovative technology. These batteries are long lasting and have been very successful in hybrids currently available.

  Additionally, as the scoping process begins for the revision of the ZEV program, staff believes it is important to promote nickel metal-hydride batteries on the road to commercialization in the marketplace. The more commercially successful these batteries are, the easier it will be for the greenhouse gas program to rely on hybrid electric vehicle technology for setting the greenhouse gas fleet standards.

- Staff Decision: Staff did not make modifications to the regulatory text in response to this loophole.