ATTACHMENT I

PROPOSED MODIFIED TEXT OF THE REGULATIONS TO CONTROL GREENHOUSE GAS EMISSIONS FROM MOTOR VEHICLES

The following text shows the Board-approved modifications to the originally proposed regulatory text for section 1961.1, title 13 of the California Code of Regulations (CCR) and to the "California Exhaust Emission Standards and Test Procedures for 2001 and subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." Unless otherwise indicated below, the text of the originally proposed amendments is shown in underline to indicate additions and ~~strikeout~~ to indicate deletions. The modified language now proposed by staff is shown in double underline to indicate additions and ~~double strikeout~~ to indicate deletions. Staff is proposing modifications to limited portions of the original proposal; for some portions where no modifications are proposed the text has been omitted and the omission indicated by "* * * *" or [No change]. The *italicized* commentaries provide explanations of the reasons for the suggested modifications to the original proposal and are not part of the actual regulations.

There are no additional suggested modifications to the originally proposed amendments to sections 1900 and 1961, title 13, CCR.

1. Amend section 1961.1, title 13, CCR as follows: (Note: the entire text of section 1961.1 set forth below is new language proposed to be added to the California Code of Regulations.)

§ 1961.1. Greenhouse Gas Exhaust Emission Standards and Test Procedures – 2009 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles.

(a) *Greenhouse Gas Emission Requirements.* The greenhouse gas emission levels from new 2009 and subsequent model year passenger cars, light-duty trucks, and medium-duty passenger vehicles shall not exceed the following requirements. Light-duty trucks from 3751 lbs. LVW – 8500 lbs. GVW that are certified to the ~~Optional~~ Option 1 LEV II NOx Standard in section 1961(a)(1) are exempt from these greenhouse gas emission requirements, however, passenger cars, light-duty trucks 0-3750 lbs. LVW, and medium-duty passenger vehicles are not eligible for this exemption.

Commentary: California Assembly Bill 1493 specifies that light-duty work trucks, i.e., those that certify to the Option 1 LEV II NOx Standard in section 1961(a)(1), shall be exempt from greenhouse gas requirements. This was the intent of the original proposal. However, Section 1961(a) contains both 50,000 and 120,000 mile Option 1 LEV II emission standards and Optional 150,000 mile emission standards. Therefore, it was not clear that the intent of the originally proposed language was to provide an exemption for work trucks. (Any light-duty vehicle can be certified to the Optionaal 150,000 mile emission standards.) This post-hearing modification clarifies the original intent of the proposal, which is to exempt light-duty work trucks from greenhouse gas emission requirements.

(1) *Fleet Average Greenhouse Gas Requirements for Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.*

(A) [No change]

(B) *Calculation of Fleet Average Greenhouse Gas Value.*

1. *Basic Calculation.*

a. [No change]

b. *A/C Direct Emissions Allowance*. A/C Direct Emissions Allowance. A manufacturer may use the following A/C Direct Emission Allowances, upon approval of the Executive Officer, if that manufacturer demonstrates that the ~~corresponding~~ following requirements are met. Such demonstration shall include specifications of the components used and an engineering evaluation that verifies the estimated lifetime emissions from the components and the system. A manufacturer shall also provide confirmation that the number of fittings and joints has been minimized and components have been optimized to minimize leakage. No A/C Direct Emissions Allowance is permitted if the following requirements are not met.

Commentary: These post-hearing modifications are for clarification purposes and do not change the substance of the regulation.

* * * *

c. *A/C Indirect Emissions Allowance.* A manufacturer may use the following A/C Indirect Emissions Allowances, upon approval of the Executive Officer, if the manufacturer demonstrates using data or an engineering evaluation that the air conditioning system meets the ~~corresponding~~ following requirements. A manufacturer may use the following A/C Indirect Emissions Allowances for other technologies, upon approval of the Executive Officer, if that manufacturer demonstrates that the air conditioning system achieves equal or greater CO_2-equivalent grams per mile emissions reductions.

i. ~~An allowance of 5.0 CO_2-equivalent grams per mile per 100ccs of compressor displacement shall be given for an air conditioning~~ An "A/C system with reduced indirect emissions" shall be defined as one that meets all of the following criteria:

A. Has managed outside and recirculated air balance to achieve comfort, demisting, and safety requirements, based on such factors as temperature, humidity, pressure, and level of fresh air in the passenger compartment to minimize compressor usage;~~,~~

B. Is optimized for energy efficiency by utilizing state-of-the-art high efficiency evaporators, condensors, and other components;~~,~~ and

C. Has an externally controlled compressor (such as an externally controlled variable displacement or variable speed compressor or an externally controlled fully cycling fixed displacement compressor) that adjusts evaporative temperature to minimize the necessity of reheating cold air to satisfy occupant comfort.

ii. For an A/C system that meets all of the criteria for an "A/C system with reduced indirect emissions," the allowance shall be calculated using the following emission factors, up to a maximum allowance of 9.0 CO_2-equivalent grams per mile if the system has one evaporator and up to a maximum allowance of 11.0 CO_2-equivalent grams per mile if the system has two evaporators:

A. 5.0 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement for a system that does not use CO_2 as the refrigerant

B. 27.5 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement for a system that uses CO_2 as the refrigerant

iii. ~~An allowance of 0.2 CO_2-equivalent grams per mile per 100ccs of compressor displacement shall be given f~~ For an air conditioning system equipped with a refrigerant having a GWP of 150 or less, the allowance shall be calculated using the following emission factors, up to a maximum allowance of 0.5 CO_2-equivalent grams per mile:

A. 0.2 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for a system that does not use CO_2 as the refrigerant and

B. 1.1 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for a system that uses CO_2 as the refrigerant.

Commentary: These post-hearing modifications were prepared by staff in response to comments submitted by manufacturers. Besides formatting changes, the proposed revisions include a multiplier for calculating the allowances that apply to A/C systems equipped with CO_2 as the refrigerant. The proposed revisions also establish limits for the maximum allowances that will be awarded.

In general, the emission benefit from converting a conventional A/C system to an "A/C system with reduced indirect emissions" is greater for a system with a larger compressor displacement than for a system with a smaller compressor displacement. Consequently, in the methodology for allowance calculation, the allowance is proportional to compressor displacement.

However, manufacturers have expressed concern over an unintended consequence in calculation of the allowance. For cases in which significant compressor downsizing occurs, the calculated allowance will be significantly reduced. The proposed revisions eliminate the unintended penalty for compressor downsizing that occurs when changing to use of CO_2 as the refrigerant. Prototype vehicles for CO_2-based A/C systems are using compressors with displacements of 30 - 35 cc. This is significantly lower than displacements for vehicles not equipped with CO_2 as the refrigerant, by a factor of about 5.5 to 1.

A CO_2-based A/C system with a compressor displacement of 30 cc would only obtain an allowance of 1.5 CO_2-equivalent grams per mile under the previous language. Its counterpart, an A/C system that is not CO_2-based but which has a similar level of indirect emissions, would obtain an allowance ranging from 7.8 to 8.5 CO_2-equivalent grams per mile. The proposed multiplier of 5.5 would offset the unintended penalty for compressor downsizing that is associated with CO_2-based systems.

Significant compressor downsizing is only expected to occur for A/C systems with CO_2 as the refrigerant. Small changes made to compressor displacement will not have a significant impact on the calculated allowance because the emission factor of 5.0 CO_2-equivalent grams per mile applies only to every one hundred cc of compressor displacement. Consequently, a multiplier is appropriately applied only to CO_2-based systems.

After inclusion of the multiplier, it became prudent to establish maximum limits for the allowance (to preclude installation of an unnecessarily large compressor in order to gain credits). The limits for the allowance obtained from converting to an "A/C system with reduced indirect emissions" are 9.0 CO_2-equivalent grams per mile for an A/C system with one evaporator and 11.0 CO_2-equivalent grams per mile for an A/C system with two evaporators. These limits are derived by applying upper end compressor displacements of 180 cc and 220 cc, respectively, to the emission factor of 5.0 CO_2-equivalent grams per mile per 100 cc of compressor displacement. The limits for the allowance obtained from converting to a refrigerant with a GWP of 150 or less were established by using the same compressor displacements.

d. *Upstream Greenhouse Gas Emission Adjustment Factors for Alternative Fuel Vehicles.* A grams per mile average CO_2-equivalent value for each GHG vehicle test group certifying on a fuel other than conventional gasoline, including vehicles certified in accordance with section 1960.5 and vehicles certified in accordance with section 1961(a)(14), shall be calculated as follows:

$$(CO_2 + \text{A/C Indirect Emissions}) \times (\text{Fuel Adjustment Factor}) + 296 \times N_2O + 23 \times CH_4 + \text{A/C Direct Emissions}$$

where:

~~A/C Indirect Emissions = 9.0 CO_2-equivalent grams per mile per 100ccs of compressor displacement – A/C Indirect Emissions Allowance as calculated per section 1961.1(a)(1)(B)1.c.~~

A/C Indirect Emissions = A - B

where: "A" represents the indirect emissions associated with an A/C system that does not incorporate any of the A/C improvements described in section 1961.1(a)(1)(B)1.c. A is determined by the following emission factors, with a maximum value of 17.0 CO_2-equivalent grams per mile for a system that has one evaporator and a maximum value of 21.0 CO_2-equivalent grams per mile for a system that has two evaporators.

A = 9.6 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for an A/C system that does not use CO_2 as the refrigerant or

A = 52.8 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for an A/C system that uses CO_2 as the refrigerant.

B = A/C Indirect Emissions Allowance as calculated per section 1961.1(a)(1)(B)1.c.

A/C Direct Emissions = 9 CO_2-equivalent grams per mile – A/C Direct Emissions Allowance as calculated per section 1961.1(a)(1)(B)1.b.

Commentary: One of the proposed revisions in this section is a correction to a minor discrepancy in the calculation of an indirect emission factor, variable "A." In reviewing the numerical calculation for variable "A", we noted that an adjustment in the modeling excercise was not carried through. To correct this oversight, variable "A" has been revised from 9.0 to 9.6 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement.

The remaining post-hearing modifications were prepared by staff in response to comments submitted by manufacturers. The proposed revisions are essentially a carryover from section 1961.1(a)(1)(B)1.c. A commentary within that section explains why a multiplier is being proposed in the determination of allowances for A/C systems that use CO_2 as the refrigerant. The proposed multiplier of 5.5 eliminates the unintended penalty for compressor downsizing that occurs when changing to use of CO_2 as the refrigerant. The commentary within section 1961.1(a)(1)(B)1.c also discusses the basis for establishing an upper limit for allowances. Essentially, the revisions made in that section need to be carried over to the indirect emission calculation in this section.

Consequently, the calculation of variable "A" includes a multiplier of 5.5 for CO_2-based A/C systems. For systems that do not use CO_2 as the refrigerant, variable "A" is 9.6 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement. For CO_2-based A/C systems, variable "A" is 52.8 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement.

Just as upper limits were applied to the allowances in section 1961.1(a)(1)(B)1.c., it is also appropriate to apply an upper limit to the value of variable "A". Consider that the value of variable "B", the allowance obtained from section 1961.1(a)(1)(B)1.c., is limited by an upper end maximum compressor displacement of 180 cc for a system with one evaporator, and a maximum compressor displacement of 220 cc for a system with two evaporators. The revisions in this section limit the value of variable "A" by applying the same compressor displacements to the emission factor of 9.6 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement. This results in a limit for variable "A" of 17 CO_2-equivalent grams per mile for a system with one evaporator, and 21 CO_2-equivalent grams per mile for a system with two evaporators.

* * * *

e. *Calculation of CO_2-Equivalent Emissions for Hydrogen Internal Combustion Engine Vehicles and for Electric and Hydrogen ZEVs.* The grams per mile average CO_2-equivalent value for each GHG vehicle test group certifying to ZEV standards, including vehicles certified in accordance with section 1960.5 and vehicles certified in accordance with section 1961(a)(14), shall be:

A/C Direct Emissions + Upstream Emissions Factor
~~A/C Direct Emissions + 130 CO_2-equivalent grams per mile for electric ZEVs, A/C Direct Emissions + 290 CO_2-equivalent grams per mile for hydrogen internal combustion engine vehicles, and~~
~~A/C Direct Emissions + 210 CO_2-equivalent grams per mile for hydrogen ZEVs.~~

where: A/C Direct Emissions = 9 CO_2-equivalent grams per mile – A/C Direct Emissions Allowance as calculated per section 1961.1(a)(1)(B)1.b.

The Upstream Emissions Factors are:

Vehicle Type	**Upstream Emissions Factor**[1] (CO_2-equivalent g/mi)
Electric ZEV	130
Hydrogen Internal Combustion Engine Vehicle	290
Hydrogen ZEV	210

[1]The Executive Officer may approve use of a lower upstream emissions factor if a manufacturer demonstrates the appropriateness of the lower value by providing information that includes, but is not limited to, the percentage of hydrogen fuel or the percentage of electricity produced for sale in California using a "renewable energy resource."

Commentary: These modifications were prepared at the direction of the Board at the September 23-24, 2004 hearing to allow manufacturers to use lower upstream emission factors for hydrogen and electric vehicles if the goal of increased use of renewable

resources for the production of hydrogen and electricity is achieved. It is reasonable to assume that this goal will be achieved for two primary reasons. First, Executive Order S-7-04, initiating California's hydrogen highway effort, specifically calls for a significant and increasing use of renewables in the production of hydrogen. And second, California's Renewable Portfolio Standard (RPS) requires retail sellers of electricity in California to ensure that 20 percent of the electricity they sell in State comes from renewable resources. The RPS currently indicates that the 20 percent requirement must be met by 2017. However, the California Energy Commission, the Public Utilities Commission, and the California Power Authority have developed and adopted the Energy Action Plan committing the state to achieve the 20 percent requirement by 2010. Public Resources Code section 25741(a), which is the basis for determining whether a facility qualifies as a "renewable energy resource" per 1961.1(e), identifies criteria for qualifying facilities (i.e., the facility creates energy through the use of biomass, solar thermal, photovoltaic, wind, etc.).

2. *Calculation of Greenhouse Gas Values for Bi-Fuel Vehicles, Fuel-Flexible Vehicles, Dual-Fuel Vehicles, and Grid-connected Hybrid Electric Vehicles.* For bi-fuel, fuel-flexible, dual-fuel, and grid-connected hybrid electric vehicles, a manufacturer shall calculate a grams per mile average CO_2-equivalent value for each GHG vehicle test group, in accordance with section 1961.1(a)(1)(B)1., based on exhaust mass emission tests when the vehicle is operating on gasoline.

a. *Optional Alternative Compliance Mechanisms.* Beginning with the 2010 model year, a manufacturer that demonstrates that a bi-fuel, fuel-flexible, dual-fuel, or grid-connected hybrid electric GHG vehicle test group will be operated in use in California on the alternative fuel ~~may~~ shall be eligible to certify those vehicles using this optional alternative compliance procedure, upon approval of the Executive Officer.

Commentary: This is an editorial correction and does not change the substance of the regulation.

i. [No change]

ii. For each GHG vehicle test group that receives approval by the Executive Officer under section 1961(a)(1)(B)2.a.i., a grams per mile CO_2-equivalent value shall be calculated as follows:

$$CO_2\text{-equivalent value} = \lfloor A \times E \times B \times C \rfloor + \lfloor (1 - (A \times E \times B)) \times D \rfloor$$

where: A = the percentage of previous model year vehicles within a GHG vehicle test group that were operated in use in California on the alternative fuel during the previous calendar year;

B = the percentage of miles traveled by "A" during the previous calendar year ;

C = the CO_2-equivalent value for the GHG vehicle test group, as calculated in section 1961.1(a)(1)(B)1, when tested using the alternative fuel; ~~and~~

D = the CO_2-equivalent value for the GHG vehicle test group, as calculated in section 1961.1(a)(1)(B)1, when tested using gasoline; and~~.~~

E = 0.9 for grid-connected hybrid electric vehicles or

E = 1 for bi-fuel, fuel-flexible, and dual-fuel vehicles.

The Executive Officer may approve use of a higher value for "E" for a grid-connected hybrid electric vehicle GHG vehicle test group if a manufacturer demonstrates that the vehicles can reasonably be expected to maintain more than 90 percent of their original battery capacity over a 200,000 mile vehicle lifetime. The manufacturer may demonstrate the appropriateness of a higher value either by providing data from real world vehicle operation; or by showing that these vehicles are equipped with batteries that do not lose energy storage capacity until after 100,000 miles; or by offering 10 year/150,000 mile warranties on the batteries.

Commentary: This modification was prepared in response to concern that as a grid-connected hybrid electric vehicle ages it will not be able to maintain the all electric range it had when it was new due to deterioration of the battery. To address this concern, and not "over credit" the lifetime greenhouse gas emission benefits of a grid-connected hybrid electric vehicle, staff used the best available information currently available, provided by Dr. Andy Frank, with the University of California at Davis, Institute for Transportation Studies. Dr. Frank estimates that there will be no loss of all-electric range for the first 100,000 miles of the vehicle's life. At that point, there is expected to be linear deterioration of the battery to 80 percent capacity at 150,000 miles. This corresponds to a 20 percent loss in all-electric range. Assuming that linear deterioration of the battery continues to occur between 150,000 and 200,000 miles, it is expected that the all-electric range of the vehicle will be reduced to 60 percent of its original range at 200,000 miles. A discount factor of 10 percent has been applied within the above equation to take into account this loss of all-electric range over the life of the vehicle.

Staff also considered a further discount factor to account for the possibility that over time, some vehicles may not be plugged in regularly due to change of ownership or infrastructure issues. Staff did not include such a factor because electricity is widely available, which greatly reduces the concern that a vehicle owner will need to operate the vehicle using its conventional engine. In addition, since it is expected that it will be less expensive to operate the vehicle using electricity rather than the conventional engine, the

vehicle owner will have a financial incentive to charge the vehicle as needed to maintain the maximum possible all electric range.

iii. For the first model year in which a grid-connected hybrid electric vehicle model is certified for sale in California, the manufacturer may estimate the sales and percentage of total vehicle miles traveled information requested in section 1961.1(a)(1)(B)2.a.i. in lieu of providing actual data, and provide final sales data and data demonstrating the percentage of total vehicle miles traveled using electricity by no later than March 1 of the calendar year following the close of the model year.

Commentary: This modification was prepared at the direction of the Board at the September 23-24, 2004 hearing. Under the original staff proposal, grid-connected hybrid vehicles could not earn additional credit for all-electric operation in their first year of introduction. Rather, data from the first year would be used to establish the appropriate credit for vehicles introduced in the second year. The Board directed this change in response to testimony, which indicated that precluding grid connect hybrid vehicles from earning credit in their initial year of introduction would discourage manufacturers from pursuing this promising technology.

* * * *

(b) *Calculation of Greenhouse Credits/Debits.*

(1) [No change]

(2) [No change]

(3) *Procedure for Offsetting Greenhouse Gas Debits.*

(A) A manufacturer shall equalize Greenhouse Gas emission debits by earning g/mi Greenhouse Gas emission credits in an amount equal to the g/mi Greenhouse Gas debits, or by submitting a commensurate amount of g/mi Greenhouse Gas credits to the Executive Officer that were earned previously or acquired from another manufacturer. ~~For 2012 and for 2016 and subsequent model years, manufacturers shall equalize emission debits by the end of the following model year. For the 2009, 2010 and 2011 model years, a manufacturer shall equalize Greenhouse Gas debits for PCs, LDTs, and MDPVs within four model years and prior to the end of the 2013 model year. For the 2013, 2014 and 2015 model years, a~~ A manufacturer shall equalize Greenhouse Gas debits for PCs, LDTs, and MDPVs within ~~four~~ five model years after they are earned ~~and prior to the end of the 2017 model year~~. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the emission debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code section 43211, the

number of passenger cars and LDT1s not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year by the g/mi Greenhouse Gas fleet average requirement for PCs and LDTs 0-3750 lbs. LVW applicable for the model year in which the debits were first incurred. For the purposes of Health and Safety Code section 43211, the number of LDT2s and MDPVs not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year by the g/mi Greenhouse Gas fleet average requirement for LDTs 3751 lbs. LVW – 8500 lbs. GVW and MDPVs applicable for the model year in which the debits were first incurred.

(B) Greenhouse Gas emission credits earned in the 2000 through 2008 ~~2011~~ model years shall be treated as if they were earned in the 2011 model year and shall retain full value through the 2012 model year. Greenhouse Gas emission credits earned in the ~~2012 through 2015 model years shall be treated as if they were earned in the 2015 model year and shall retain full value through the 2016 model year. Greenhouse Gas emission credits earned in the 2016 and subsequent model years~~ 2009 and subsequent model years shall retain full value through the ~~subsequent~~ fifth model year after they are earned. The value of any credits earned in the 2000 through 2008 ~~2011~~ model years that are not used to equalize debits accrued in the 2009 through 2012 model years shall be discounted by 50% at the beginning of the ~~2014~~ 2013 model year, shall be discounted to 25% of its original value if not used by the beginning of the ~~2015~~ 2014 model year, and will have no value if not used by the beginning of the ~~2016~~ 2015 model year. ~~The value of any credits earned in the 2012 through 2015 model years that are not used to equalize debits accrued in the 2012 through 2016 model years shall be discounted by 50% at the beginning of the 2018 model year, shall be discounted to 25% of its original value if not used by the beginning of the 2019 model year, and will have no value if not used by the beginning of the 2020 model year.~~ Any credits earned in the 2009 ~~2016~~ and subsequent model years that are not used ~~to equalize the previous model year's debit~~ by the end of the fifth model year after they are accrued shall be discounted by 50% at the beginning of the ~~second~~ sixth model year after being earned, shall be discounted to 25% of its original value if not used by the beginning of the ~~third~~ seventh model year after being earned, and will have no value if not used by the beginning of the ~~fourth~~ eighth model year after being earned.

Commentary: In comments submitted by the Alliance of Automobile Manufacturers a request was made to allow credits to retain their full value for five years and for debits to be equalized within five years instead of one year. The Alliance reasoned that short term shifts in consumer preference may occur and that, while manufacturers may be able to adjust to such shifts in the long term, in the short term they may need to restrict product offering.

Staff does not agree with the Alliance comments that the greenhouse gases requirements are unlike criteria emission requirements and that consumer choice determines fleet average greenhouse gas emissions. In addition, while consumer choice may shift from larger to smaller vehicles or from smaller to larger vehicles for many reasons, manufacturers can change their product production schedules to adapt to such shifts without restricting product offering.

Nonetheless, while a long leadtime is provided for full implementation of the regulation, staff recognizes that unforeseen circumstances may arise whereby a manufacturer may experience difficulties in complying with the requirements. It is for this reason that the concept of credits and debits was included in the Low-Emission Vehicle program and has worked successfully for the manufacturers. Since the fleet average greenhouse gas requirement declines every year, debits cannot be equalized one for one by credits earned later. Therefore, it would not be in the best interest for any manufacturer to accrue unreasonable amounts of debits. Accordingly, staff believes that extending the full value of credits to five years and allowing equalization of debits within five years would not adversely impact the effectiveness of the regulations and would provide additional compliance flexibility to the manufacturers.

(c) *Test Procedures.* [No change]

(d) *Abbreviations.* The following abbreviations are used in this section 1961.1:

"cc~~s~~" mean cubic centimeters.

Commentary: This is an editorial correction.

* * * *

(e) *Definitions Specific to this Section.* The following definitions apply to this section 1961.1:

* * * *

(9) "Renewable Energy Resource" means a facility that meets all of the criteria set forth in Public Resources Code section 25741(a), except that the facility is not required to be located in California or near the border of California.

(~~9~~10) "Variable Displacement Compressor" means a compressor in which the mass flow rate of refrigerant is adjusted independently of compressor speed by the control system in response to cooling load demand.

(~~10~~11) "Variable Speed Compressor" means a compressor in which the mass flow rate of refrigerant can be adjusted by control of the compressor input shaft speed, independent of vehicle engine speed. For example, a variable speed compressor can have electric drive, hydraulic drive, or mechanical drive through a variable speed transmission.

(~~11~~12) "Worst-Case" means the vehicle configuration within each test group that is expected to have the highest CO_2-equivalent value, as calculated in section 1961.1(a)(1)(B)1.

* * * *

(g) *Effective Date of this Section.* The requirements of this section 1961.1 shall become effective on January 1, 2006.

Commentary: Health and Safety Code section 43018.5(b)(1) provides that these regulations may not take effect before January 1, 2006, to provide time for Legislative review. The Proposed Regulation Order did not contain text indicating an effective date, which someone could consider to be either upon approval by the Office of Administrative Law and submittal to the Secretary of State or 30 days after that approval and submittal. This modification ensures that the effective date does not occur before January 1, 2006.

Note: Authority cited: Sections 39500, 39600, 39601, 43013, 43018, 43018.5, 43101, 43104 and 43105, Health and Safety Code. Reference: Sections 39002, 39003, 39667, 43000, 43009.5, 43013, 43018, 43018.5, 43100, 43101, 43101.5, 43102, 43104, 43105, 43106, 43204, 43205, and 43211, Health and Safety Code.

2. Amend the "California Exhaust Emission Standards and Test Procedures for 2001 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles" as follows:

PART I: GENERAL PROVISIONS FOR CERTIFICATION AND IN-USE VERIFICATION OF EMISSIONS

* * * *

B. Definitions, Acronyms and Abbreviations

1. §86.1803 Definitions. [No change]

2. California Definitions.

* * * *

"Renewable Energy Resource" means a facility that meets all of the criteria set forth in Public Resources Code section 25741(a), except that the facility is not required to be located in California or near the border of California.

* * * *

3. §86.1804 Acronyms and Abbreviations.

3.1 §86.1804.01 October 6, 2000. [No change]

3.2 California Acronyms and Abbreviations.

* * * *

"cc~~s~~" means cubic centimeters.

Commentary: This is an editorial correction.

* * * *

E. California Exhaust Emission Standards

* * * *

1.14 Greenhouse Gas Emission Requirements. The greenhouse gas emission levels from new 2009 and subsequent model year passenger cars, light-duty trucks, and medium-duty passenger vehicles shall not exceed the requirements set forth in Section E.2.5 of these test procedures. Light-duty trucks from 3751 lbs. LVW – 8500 lbs. GVW that are certified to the ~~Optional~~ Option 1 LEV II NOx Standard in Section E.1.1.2 of these test procedures are exempt from these greenhouse

gas emission requirements, however, passenger cars, light-duty trucks 0-3750 lbs. LVW, and medium-duty passenger vehicles are not eligible for this exemption.

Commentary: California Assembly Bill 1493 specifies that light-duty work trucks, i.e., those that certify to the Option 1 LEV II NOx Standard in section 1961(a)(1), shall be exempt from greenhouse gas requirements. This was the intent of the original proposal. However, Section E.1.1.2 contains both 50,000 and 120,000 mile Option 1 LEV II emission standards and Optional 150,000 mile emission standards. Therefore, it was not clear that the intent of the originally proposed language was to provide an exemption for work trucks. (Any light-duty vehicle can be certified to the Optionaal 150,000 mile emission standards.) This post-hearing modification clarifies the original intent of the proposal, which is to exempt light-duty work trucks from greenhouse gas emission requirements.

* * * *

2.5.2.1.2 **A/C Direct Emissions Allowance.** A manufacturer may use the following A/C Direct Emission Allowances, upon approval of the Executive Officer, if that manufacturer demonstrates that the ~~corresponding~~ following requirements are met. Such demonstration shall include specifications of the components used and an engineering evaluation that verifies the estimated lifetime emissions from the components and the system. A manufacturer shall also provide confirmation that the number of fittings and joints has been minimized and components have been optimized to minimize leakage. No A/C Direct Emissions Allowance is permitted if the following requirements are not met.

Commentary: These post-hearing modifications are for clarification purposes and do not change the substance of the regulation.

* * * *

2.5.2.1.3 **A/C Indirect Emissions Allowance.** A manufacturer may use the following A/C Indirect Emissions Allowances, upon approval of the Executive Officer, if the manufacturer demonstrates using data or an engineering evaluation that the air conditioning system meets the ~~corresponding~~ following requirements. A manufacturer may use the following A/C Indirect Emissions Allowances for other technologies, upon approval of the Executive Officer, if that manufacturer demonstrates that the air conditioning system achieves equal CO_2-equivalent grams per mile emissions reductions.

(a) ~~An allowance of 5.0 CO_2-equivalent grams per mile per 100ccs of compressor displacement shall be given for an air conditioning~~ An "A/C system with reduced indirect emissions" shall be defined as one that meets all of the following criteria:

i. Has managed outside and recirculated air balance to achieve comfort, demisting, and safety requirements, based on such factors as temperature, humidity, pressure, and level of fresh air in the passenger compartment to minimize compressor usage;~~,~~

ii. Is optimized for energy efficiency by utilizing state-of-the-art high efficiency evaporators, condensors, and other components;~~,~~ and

iii. Has an externally controlled compressor (such as an externally controlled variable displacement or variable speed compressor or an externally controlled fully cycling fixed displacement compressor) that adjusts evaporative temperature to minimize the necessity of reheating cold air to satisfy occupant comfort.

(b) For an A/C system that meets all of the criteria for an "A/C system with reduced indirect emissions," the allowance shall be calculated using the following emission factors, up to a maximum allowance of 9.0 CO_2-equivalent grams per mile for a system that has one evaporator and up to a maximum allowance of 11.0 CO_2-equivalent grams per mile for a system that has two evaporators:

i. 5.0 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement for a system that does not use CO_2 as the refrigerant

ii. 27.5 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement for a system that uses CO_2 as the refrigerant

(c)~~(b) An allowance of 0.2 CO_2-equivalent grams per mile per 100ccs of compressor displacement shall be given f~~ For an air conditioning system equipped with a refrigerant having a GWP of 150 or less, the allowance shall be calculated using the following emission factors, up to a maximum allowance of 0.5 CO_2-equivalent grams per mile:

i. 0.2 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for a system that does not use CO_2 as the refrigerant and

ii. 1.1 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for a system that uses CO_2 as the refrigerant.

Commentary: These post-hearing modifications were prepared by staff in response to comments submitted by manufacturers. Besides formatting changes, the proposed revisions include a multiplier for calculating the allowances that apply to A/C systems equipped with CO_2 as the refrigerant. The proposed revisions also establish limits for the maximum allowances that will be awarded.

In general, the emission benefit from converting a conventional A/C system to an "A/C system with reduced indirect emissions" is greater for a system with a larger compressor displacement than for a system with a smaller compressor displacement. Consequently, in the methodology for allowance calculation, the allowance is proportional to compressor displacement.

However, manufacturers have expressed concern over an unintended consequence in calculation of the allowance. For cases in which significant compressor downsizing occurs, the calculated allowance will be significantly reduced. The proposed revisions eliminate the unintended penalty for compressor downsizing that occurs when changing to use of CO_2 as the refrigerant. Prototype vehicles for CO_2-based A/C systems are using compressors with displacements of 30 - 35 cc. This is significantly lower than displacements for vehicles not equipped with CO_2 as the refrigerant, by a factor of about 5.5 to 1.

A CO_2-based A/C system with a compressor displacement of 30 cc would only obtain an allowance of 1.5 CO_2-equivalent grams per mile under the previous language. Its counterpart, an A/C system that is not CO_2-based but which has a similar level of indirect emissions, would obtain an allowance ranging from 7.8 to 8.5 CO_2-equivalent grams per mile. The proposed multiplier of 5.5 would offset the unintended penalty for compressor downsizing that is associated with CO_2-based systems.

Significant compressor downsizing is only expected to occur for A/C systems with CO_2 as the refrigerant. Small changes made to compressor displacement will not have a significant impact on the calculated allowance because the emission factor of 5.0 CO_2-equivalent grams per mile applies only to every one hundred cc of compressor displacement. Consequently, a multiplier is appropriately applied only to CO_2-based systems.

After inclusion of the multiplier, it became prudent to establish maximum limits for the allowance (to preclude installation of an unnecessarily large compressor in order to gain credits). The limits for the allowance obtained from converting to an "A/C system with reduced indirect emissions" are 9.0 CO_2-equivalent grams per mile for an A/C system with one evaporator and 11.0 CO_2-equivalent grams per mile for an A/C system with two evaporators. These limits are derived by applying upper end compressor displacements of 180 cc and 220 cc, respectively, to the emission factor of 5.0 CO_2-equivalent grams per mile per 100 cc of compressor displacement. The limits for the allowance obtained from converting to a refrigerant with a GWP of 150 or less were established by using the same compressor displacements.

2.5.2.1.4 **Upstream Greenhouse Gas Emission Adjustment Factor for Alternative Fuel Vehicles.** A grams per mile average CO_2-equivalent value for each GHG vehicle test group certifying on a fuel other than conventional gasoline, including AB 965 vehicles and vehicles certified in accordance with Section E.1.12 of these test procedures, shall be calculated as follows:

$(CO_2$ + A/C Indirect Emissions) x (Fuel Adjustment Factor) +
296 x N_2O + 23 x CH_4 + A/C Direct Emissions

where: A/C Indirect Emissions = A - B

where: "A" represents the indirect emissions associated with an A/C system that does not incorporate any of the A/C improvements described in Section E.2.5.2.1.3. "A" is determined by the following emission factors, with a maximum value of 17.0 CO_2-equivalent grams per mile for a system that has one evaporator and a maximum value of 21.0 CO_2-equivalent grams per mile for a system that has two evaporators.

A = 9.6 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for an A/C system that does not use CO_2 as the refrigerant or

A = 52.8 CO_2-equivalent grams per mile per 100cc of maximum compressor displacement for an A/C system that uses CO_2 as the refrigerant.

B = A/C Indirect Emissions Allowance as calculated per Section E.2.5.2.1.3.

~~A/C Indirect Emissions = 9.0 CO_2-equivalent grams per mile per 100ccs of compressor displacement – A/C Indirect Emissions Allowance as calculated per Section E.2.5.2.1.3.~~

A/C Direct Emissions = 9 CO_2-equivalent grams per mile – A/C Direct Emissions Allowance as calculated per Section E.2.5.2.1.2.

Commentary: One of the proposed revisions in this section is a correction to a minor discrepancy in the calculation of an indirect emission factor, variable "A". In reviewing the numerical calculation for variable "A", we noted that an adjustment in the modeling excercise was not carried through. To correct this oversight, variable "A" has been revised from 9.0 to 9.6 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement.

The remaining post-hearing modifications were prepared by staff in response to comments submitted by manufacturers. The proposed revisions are essentially a carryover from Section 2.5.2.1.3. A commentary within that section explains why a multiplier is being proposed in the determination of allowances for A/C systems that use CO_2 as the refrigerant. The proposed multiplier of 5.5 eliminates the unintended penalty for compressor downsizing that occurs when changing to use of CO_2 as the refrigerant. The commentary within Section 2.5.2.1.3 also discusses the basis for establishing an upper limit for allowances. Essentially, the revisions made in that section need to be carried over to the indirect emission calculation in this section.

Consequently, the calculation of variable "A" includes a multiplier of 5.5 for CO_2-based A/C systems. For systems that do not use CO_2 as the refrigerant, variable "A" is 9.6 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement. For CO_2-based A/C systems, variable "A" is 52.8 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement.

Just as upper limits were applied to the allowances in Section 2.5.2.1.3, it is also appropriate to apply an upper limit to the value of variable "A". Consider that the value of variable "B", the allowance obtained from Section 2.5.2.1.3, is limited by an upper end maximum compressor displacement of 180 cc for a system with one evaporator, and a maximum compressor displacement of 220 cc for a system with two evaporators. The revisions in this section limit the value of variable "A" by applying the same compressor displacements to the emission factor of 9.6 CO_2-equivalent grams per mile per 100 cc of maximum compressor displacement. This results in a limit for variable "A" of 17 CO_2-equivalent grams per mile for a system with one evaporator, and 21 CO_2-equivalent grams per mile for a system with two evaporators.

* * * *

2.5.2.1.5 **Calculation of CO_2-equivalent Emissions for Hydrogen Internal Combustion Engine Vehicles and for Electric and Hydrogen ZEVs.** The grams per mile average CO_2-equivalent value for each GHG vehicle test group certifying to ZEV standards, including AB 965 vehicles and vehicles certified in accordance with Section E.1.12 of these test procedures, shall be:

A/C Direct Emissions + Upstream Emissions Factor

~~A/C Direct Emissions + 130 CO_2-equivalent grams per mile for electric ZEVs, A/C Direct Emissions + 290 CO_2-equivalent grams per mile for hydrogen internal combustion engine vehicles, and~~

~~A/C Direct Emissions + 210 CO_2-equivalent grams per mile for hydrogen ZEVs.~~

where: A/C Direct Emissions = 9 CO_2-equivalent grams per mile – A/C Direct Emissions Allowance as calculated per Section E.2.5.2.1.2.

The Upstream Emissions Factors are:

Vehicle Type	**Upstream Emissions Factor**[1] (CO_2-equivalent g/mi)
Electric ZEV	130
Hydrogen Internal Combustion Engine Vehicle	290
Hydrogen ZEV	210

[1] The Executive Officer may approve use of a lower upstream emissions factor if a manufacturer demonstrates the appropriateness of the lower value by providing information that includes, but is not limited to the percentage of hydrogen fuel or the percentage of electricity produced for sale in California using a "renewable energy resource."

Commentary: These modifications were prepared at the direction of the Board at the September 23-24, 2004 hearing to allow manufacturers to use lower upstream emission factors for hydrogen and electric vehicles if the goal of increased use of renewable resources for the production of hydrogen and electricity is achieved. It is reasonable to assume that this goal will be achieved for two primary reasons. First, Executive Order S-7-04, initiating California's hydrogen highway effort, specifically calls for a significant and increasing use of renewables in the production of hydrogen. And second, California's Renewable Portfolio Standard (RPS) requires retail sellers of electricity in California to ensure that 20 percent of the electricity they sell in State comes from renewable resources. The RPS currently indicates that the 20 percent requirement must be met by 2017. However, the California Energy Commission, the Public Utilities Commission, and the California Power Authority have developed and adopted the Energy Action Plan committing the state to achieve the 20 percent requirement by 2010. Public Resources Code section 25741(a), which is the basis for determining whether a facility qualifies as a "renewable energy resource" per 1961.1(e), identifies criteria for qualifying facilities (i.e., the facility creates energy through the use of biomass, solar thermal, photovoltaic, wind, etc.).

2.5.2.2 **Calculation of Greenhouse Gas Values for Bi-Fuel Vehicles, Fuel-Flexible Vehicles, Dual-Fuel Vehicles, and Grid-connected Hybrid Electric Vehicles.** For bi-fuel, fuel-flexible, dual-fuel, and grid-connected hybrid electric vehicles, a manufacturer shall calculate a grams per mile average CO_2-equivalent value for each GHG vehicle test group, in accordance with Section E.2.5.2.1~~.~~ of these test procedures, based on exhaust mass emission tests when the vehicle is operating on gasoline.

2.5.2.2.1 **Optional Alternative Compliance Mechanisms.** Beginning with the 2010 model year, a manufacturer that demonstrates that a bi-fuel, fuel-flexible, dual-fuel, or grid-connected hybrid electric GHG vehicle test group will be operated in use in California on the alternative fuel ~~may~~ shall be eligible to certify those vehicles using this optional alternative

compliance procedure, upon approval of the Executive Officer.

Commentary: This is an editorial correction and does not change the substance of the regulation.

(a) [No change]

(b) For each GHG vehicle test group that receives approval by the Executive Officer under Section E.2.5.2.2.1(a)~~,~~, a grams per mile CO_2-equivalent value shall be calculated as follows:

$$CO_2\text{-equivalent value} = \left[A \times E \times B \times C\right] + \left[\left(1 - (A \times E \times B)\right) \times D\right]$$

where: A = the percentage of previous model year vehicles within a GHG vehicle test group that were operated in use in California on the alternative fuel during the previous calendar year;

B = the percentage of miles traveled by "A" during the previous calendar year;

C = the CO_2-equivalent value for the GHG vehicle test group, as calculated in Section E.2.5.2.1, when tested using the alternative fuel; ~~and~~

D = the CO_2-equivalent value for the GHG vehicle test group, as calculated in Section E.2.5.2.1, when tested using gasoline; and~~,~~

E = 0.9 for grid-connected hybrid electric vehicles or

E = 1 for bi-fuel, fuel-flexible, and dual-fuel vehicles.

The Executive Officer may approve use of a higher value for "E" for a grid-connected hybrid electric vehicle GHG vehicle test group if a manufacturer demonstrates that the vehicles can reasonably be expected to maintain more than 90 percent of their original battery capacity over a 200,000 mile vehicle lifetime. The manufacturer may demonstrate the appropriateness of a higher value either by providing data from real world vehicle operation; or by showing that these vehicles are equipped with batteries that do not lose energy storage capacity until after 100,000 miles; or by offering 10 year/150,000 mile warranties on the batteries.

Commentary: This modification was prepared in response to concern that as a grid-connected hybrid electric vehicle ages it will not be able to maintain the all electric range it had when it was new due to deterioration of the battery. To address this concern, and not "over credit" the lifetime greenhouse gas emission benefits of a grid-connected

hybrid electric vehicle, staff used the best available information currently available, provided by Dr. Andy Frank, with the University of California at Davis, Institute for Transportation Studies. Dr. Frank estimates that there will be no loss of all-electric range for the first 100,000 miles of the vehicle's life. At that point, there is expected to be linear deterioration of the battery to 80 percent capacity at 150,000 miles. This corresponds to a 20 percent loss in all-electric range. Assuming that linear deterioration of the battery continues to occur between 150,000 and 200,000 miles, it is expected that the all-electric range of the vehicle will be reduced to 60 percent of its original range at 200,000 miles. A discount factor of 10 percent has been applied within the above equation to take into account this loss of all-electric range over the life of the vehicle.

Staff also considered a further discount factor to account for the possibility that over time, some vehicles may not be plugged in regularly due to change of ownership or infrastructure issues. Staff did not include such a factor because electricity is widely available, which greatly reduces the concern that a vehicle owner will need to operate the vehicle using its conventional engine. In addition, since it is expected that it will be less expensive to operate the vehicle using electricity rather than the conventional engine, the vehicle owner will have a financial incentive to charge the vehicle as needed to maintain the maximum possible all electric range.

(c) For the first model year in which a grid-connected hybrid electric vehicle model is certified for sale in California, the manufacturer may estimate the sales and percentage of total vehicle miles traveled information requested in Section E.2.5.2.1(a) in lieu of providing actual data, and provide final sales data and data demonstrating the percentage of total vehicle miles traveled using electricity by no later than March 1 of the calendar year following the close of the model year.

Commentary: This modification was prepared at the direction of the Board at the September 23-24, 2004 hearing. Under the original staff proposal, grid-connected hybrid vehicles could not earn additional credit for all-electric operation in their first year of introduction. Rather, data from the first year would be used to establish the appropriate credit for vehicles introduced in the second year. The Board directed this change in response to testimony, which indicated that precluding grid connect hybrid vehicles from earning credit in their initial year of introduction would discourage manufacturers from pursuing this promising technology.

* * * *

2.5.4.5 If a manufacturer's average California sales exceed 10,000 units of new PCs, LDTs, MDVs and heavy-duty engines based on the average number of vehicles sold for the three previous consecutive model years, the manufacturer shall no longer be treated as an independent low volume manufacturer and shall comply with the fleet average requirements

applicable to larger volume manufacturers as specified in Section E.2.5.1 beginning with the fourth model year after the last of the three consecutive model years.

Commentary: This is an editorial correction.

* * * *

3.2.3.1 A manufacturer shall equalize Greenhouse Gas emission debits by earning g/mi Greenhouse Gas emission credits in an amount equal to the g/mi Greenhouse Gas debits, or by submitting a commensurate amount of g/mi Greenhouse Gas credits to the Executive Officer that were earned previously or acquired from another manufacturer. ~~For 2012 and for 2016 and subsequent model years, manufacturers shall equalize emission debits by the end of the following model year. For the 2009, 2010 and 2011 model years, a manufacturer shall equalize Greenhouse Gas debits for PCs , LDTs, and MDPVs within four model years and prior to the end of the 2013 model year. For the 2013, 2014 and 2015 model years, a~~ A manufacturer shall equalize Greenhouse Gas debits for PCs, LDTs, and MDPVs within ~~four~~ five model years after they are earned ~~and prior to the end of the 2017 model year~~. If emission debits are not equalized within the specified time period, the manufacturer shall be subject to the Health and Safety Code section 43211 civil penalty applicable to a manufacturer which sells a new motor vehicle that does not meet the applicable emission standards adopted by the state board. The cause of action shall be deemed to accrue when the emission debits are not equalized by the end of the specified time period. For the purposes of Health and Safety Code section 43211, the number of passenger cars and LDT1s not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year by the g/mi Greenhouse Gas fleet average requirement for PCs and LDTs 0-3750 lbs. LVW applicable for the model year in which the debits were first incurred. For the purposes of Health and Safety Code section 43211, the number of LDT2s and MDPVs not meeting the state board's emission standards shall be determined by dividing the total amount of g/mi Greenhouse Gas emission debits for the model year by the g/mi Greenhouse Gas fleet average requirement for LDTs 3751 lbs. LVW – 8500 lbs. GVW and MDPVs applicable for the model year in which the debits were first incurred.

3.2.3.2 Greenhouse Gas emission credits earned in the 2000 through 2008 ~~2011~~ model years shall be treated as if they were earned in the 2011 model year and shall retain full value through the 2012 model year. Greenhouse Gas emission credits earned in the ~~2012 through 2015 model years shall be treated as if they were earned in the 2015 model year and shall retain full value through the 2016 model year. Greenhouse Gas emission credits earned in the 2016~~ 2009 and subsequent model years shall retain full value through the ~~subsequent~~ fifth model year after they are earned. The value of any credits earned in the 2000 through 2008 ~~2011~~ model years that are not used to equalize debits accrued in the 2009 through 2012 model years shall be discounted by 50% at the beginning of the ~~2014~~ 2013 model year, shall be discounted to 25% of its original value if not used by the beginning of the ~~2015~~ 2014 model year, and will have no value if not used by the beginning of the ~~2016~~ 2015 model year. ~~The value of any~~

~~credits earned in the 2012 through 2015 model years that are not used to equalize debits accrued in the 2012 through 2016 model years shall be discounted by 50% at the beginning of the 2018 model year, shall be discounted to 25% of its original value if not used by the beginning of the 2019 model year, and will have no value if not used by the beginning of the 2020 model year.~~ Any credits earned in the 2009 ~~2016~~ and subsequent model years that are not used ~~to equalize the previous model year's debit~~ by the end of the fifth model year after they are accrued shall be discounted by 50% at the beginning of the ~~second~~ sixth model year after being earned, shall be discounted to 25% of its original value if not used by the beginning of the ~~third~~ seventh model year after being earned, and will have no value if not used by the beginning of the ~~fourth~~ eighth model year after being earned.

Commentary: In comments submitted by the Alliance of Automobile Manufacturers a request was made to allow credits to retain their full value for five years and for debits to be equalized within five years instead of one year. The Alliance reasoned that short term shifts in consumer preference may occur and that, while manufacturers may be able to adjust to such shifts in the long term, in the short term they may need to restrict product offering.

Staff, however, does not agree with the Alliance comments that the greenhouse gases requirements are unlike criteria emission requirements and that consumer choice determines fleet average greenhouse gas emissions. In addition, while consumer choice may shift from larger to smaller vehicles or from smaller to larger vehicles for many reasons, manufacturers can change their product production schedules to adapt to such shifts without restricting product offering.

Nonetheless, while a long leadtime is provided for full implementation of the regulation, staff recognizes that unforeseen circumstances may arise whereby a manufacturer may experience difficulties in complying with the requirements. It is for this reason that the concept of credits and debits was included in the Low-Emission Vehicle program and has worked successfully for the manufacturers. Since the fleet average greenhouse gas requirement declines every year, debits cannot be equalized one for one by credits earned later. Therefore, it would not be in the best interest for any manufacturer to accrue unreasonable amounts of debits. Accordingly, staff believes that extending the full value of credits to five years and allowing equalization of debits within five years would not adversely impact the effectiveness of the regulations and would provide additional compliance flexibility to the manufacturers.

* * * *