State of California
AIR RESOURCES BOARD

Second Notice of Public Availability of Proposed Modified Text and Availability of Additional Documents and Information

PUBLIC HEARING TO CONSIDER AMENDMENTS TO THE
EMISSION CONTROL AND SMOG INDEX LABELS REGULATIONS

Public Hearing Date: June 21, 2007
Public Availability Date: April 4, 2008
Deadline for Public Comment: April 18, 2008
Deadline for Public Comment Period has been extended to April 21, 2008

At its June 21, 2007, public hearing, the Air Resources Board (ARB or Board) approved the amendment of section (§) 1961 and §1965 of Title 13, California Code of Regulations (CCR), which revised the smog index in the existing Smog Index Label and established a global warming index to be incorporated into that label.

The Board's Action

At the hearing, the Board adopted Resolution 07-26, approving, with modifications, the amended regulations originally proposed in the Staff Report (Initial Statement of Reasons) released on May 4, 2007. In response, Staff proposed additional modifications based on comments received, public testimony, and the Board's directive at the June 21, 2007 hearing, and made these modifications available to the public on December 7, 2007 for additional review and comment.

Waiver Denial

On December 19, 2007, the United States Environmental Protection Agency (U.S. EPA) denied California the waiver needed to implement § 1961.1, Title 13, CCR, which requires certification of vehicles' greenhouse gas emissions to meet a declining fleet average standard. Portions of § 1961.1, Title 13, CCR are cited in the vehicle labeling regulatory amendments that were the subject of this public hearing, and certified test results were proposed for use to determine the global warming index for the new label. Without further clarification, ARB would be unable to enforce the global warming portion of the new label and thus would not meet statutory requirements. AB 1229 (Stats. 2005, Chap. 575). Therefore, additional regulatory amendments are being proposed to require an alternate method for reporting global warming emissions to be applied to the label's global warming index, until U.S. EPA grants a waiver to enforce § 1961.1.

Other Minor Modifications

In further response to comments received from the December 7, 2007 through January 4, 2008 comment period, Staff is proposing additional minor modifications that

affect only the California Environmental Performance Label Specifications (CEPLS) for 2009 and Subsequent Model Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Passenger Vehicles.

Modified Text Being Made Available

The Board's approved modified text, with staff's subsequent modifications, is attached to this notice as Attachment 1. By this notice, the modified text, with proposed additional modifications, is being made available for public comment prior to final action by the Board's Executive Officer. All of these documents are available online for public inspection at ARB's Internet website for this rulemaking: http://www.arb.ca.gov/regact/2007/labels07/labels07.htm.

Summary of Proposed Modifications

The following summarizes the proposed modifications and the rationale for making the modifications. The section numbers and paragraphs are referenced as renumbered in the attached proposed modified text.

1. Alternate method for reporting global warming emissions

Proposed modifications to paragraph 3.(a) of the (CEPLS) are being made to require an alternate method for calculating global warming emissions until California receives a waiver of federal preemption from U.S. EPA under the Clean Air Act, § 209(b), to enforce § 1961.1, Title 13, CCR. In that circumstance the alternate method in paragraph 3.(a)(2) requires the manufacturer to determine a vehicle's carbon dioxide (CO_2) equivalent combined value by using an equation that accounts for all of the following CO_2 or CO_2-equivalent vehicle emissions:

- The tailpipe CO_2 emissions.
- The global warming potential of other vehicular greenhouse gas (GHG). emissions including nitrous oxide (N_2O), methane (CH_4), and hydrofluorocarbon (refrigerant) loses.
- Additional CO_2 emissions from air conditioner (A/C) operation.
- The upstream emissions generated by the production and distribution of the fuel used.

The proposed alternate method would make use of data manufacturers already provide to ARB and would provide default values for non-CO_2 GHG emissions, thereby simplifying GHG emission reporting and the scoring thereof for labeling purposes.

The first equation paragraph 3.(a)(2)(A) is to be used for the very few vehicles that do not have an air conditioning system. This equation is:

$$CO_2\text{-equivalent combined value} = [(0.55 \times CO_2\text{-city} + 0.45 \times CO_2\text{-highway}) + 2] \times \text{Fuel Adjustment Factor}$$

The CO_2-city and CO_2-highway values are the tailpipe CO_2 emissions as tested and reported to ARB in accordance with the August 29, 2007, ARB mailout, MSO #2007-03. These tailpipe CO_2 emissions are then averaged using a 55% city and 45% highway driving cycle. A CO_2-equivalent default value of 2 grams/mile is added to the tailpipe CO_2 emissions and accounts for the global warming potential (GWP) of the N_2O and CH_4 emissions from vehicle operation. The sum of these CO_2 and CO_2-equivalent emissions is then multiplied by a Fuel Adjustment Factor to account for the relative contribution of upstream CO_2 emissions based on the type of fuel used.

The second equation paragraph 3.(a)(2)(B) is to be used for vehicles that have an air conditioning system. This equation is:

CO_2-equivalent combined value = [(0.55 x CO_2-city + 0.45 x CO_2-highway) + 25 – (A/C-direct + A/C-indirect)] x Fuel Adjustment Factor

The CO_2-city and CO_2-highway values are the tailpipe CO_2 emissions as tested and reported to ARB in accordance with the August 29, 2007, ARB mailout, MSO #2007-03. These tailpipe CO_2 emissions are then averaged using a 55% city and 45% highway driving cycle. A CO_2-equivalent default factor of 25 grams/mile is added to the tailpipe CO_2 emissions and accounts for the following GHG contributions:

- 2 grams/mile for the global warming potential of the N_2O and CH_4 emissions from vehicle operation.
- 6 grams/mile of A/C-direct emissions from air conditioning refrigerant losses.
- 17 grams/mile of A/C-indirect emissions from air conditioning operation.

The CO_2-equivalent default factor of 25 grams/mile is the sum of the above contributions (i.e., 2 + 6 + 17 = 25). The default values used are based on research and conclusions from the ARB August 6, 2004 Staff Report: *Initial Statement of Reasons for Proposed Rulemaking, Public Hearing to Consider Adoption of Regulations to Control Greenhouse Gas Emissions from Motor Vehicles* (herein referred to as August 6, 2004 Staff Report) and certain supporting documents as discussed below.

- N_2O and CH_4: The global warming potential for vehicle emissions from both Nitrous Oxide and Methane is assigned a value of 1.9 grams/mile and rounded up to 2 grams/mile CO_2-equivalent emissions for simplicity in this regulation. Prior to the rulemaking these nitrous oxide and methane emissions estimates were derived from in-house testing and computer modeling using EMFAC modeling of 2009 model year light duty vehicles as described in the August 6, 2004 Staff Report technical document “Climate Change Emissions Inventory.”

- A/C-direct: Direct A/C refrigerant emissions represent natural leakage that occurs for all systems. The greenhouse gas emissions due to normal refrigerant leakage of the vehicle’s air conditioning system are equivalent to a default value of 6 grams of CO_2 equivalent emissions per mile. The default value is based on

annual A/C direct emissions of 56 grams of HFC-134a refrigerant per vehicle for a vehicle driven 12,000 miles. Prior to the rulemaking, these emissions were estimated based on a California lifetime vehicle emissions model as described the August 6, 2004 Staff Report technical document "HFC-134a Emissions From Light-Duty Vehicles--Background, Estimation Of Emissions, And Effects Of Potential Controls." The model was populated by 2003 data on consumption of HFC-134a and A/C system repair incidence in California.

- A/C-indirect: Indirect A/C refrigerant emissions represent the additional energy required to operate a typical vehicle air conditioning system. The greenhouse gas emissions due to A/C system operation are equivalent to 17 grams of CO_2 per mile. Prior to the rulemaking, this indirect A/C emission estimate used vehicle performance modeling as described in the August 6, 2004 Staff Report technical document "Mobile Air Conditioning Systems - Indirect Emissions" and was based on typical power demand for a pneumatically controlled compressor.

Equation 3.(a)(2)(B) offers credits for A/C systems demonstrated as "low-leak" or "improved" systems. The credits are found in the equation as (A/C-direct + A/C-indirect). Manufacturer's opting to receive such credits must demonstrate using test data and an engineering evaluation that the A/C system qualifies as a "low-leak" or "improved" system and submit these results to the Executive Officer for review and approval. The following discussion explains the requirements and credit values obtainable for both "low-leak" and "improved" A/C systems.

<u>"Low-Leak" Air Conditioning System</u>

It is recognized that A/C system improvements that can result in lower direct refrigerant emissions are technically feasible. A discussion of A/C direct emissions and a current technology assessment is available in the in the August 6, 2004 Staff Report technical document "Mobile Air Conditioning Systems - Direct Emissions Technology Assessment." Recent field tests of European and Japanese vehicles, as noted in the SAE J2727 presentation Developed by the SAE Interior Climate Control Standards Committee, suggest that A/C direct emissions of less than 25 grams of HFC-134a per year are possible from production-ready systems. It is also noted that system improvements can include lower system refrigerant charge. A significant reduction in the global warming impact can also be achieved by using low-GWP refrigerant alternatives such as HFC-152a, CO_2, or the new hydrofluoroolefin (HFO) substance in development. Thus, a manufacturer may choose to demonstrate a mobile A/C system as a "low-leak" system with emissions lower than the default value of 6 grams of CO_2 equivalent emissions per mile.

To qualify as a "low-leak" A/C system that uses HFC-134a as the refrigerant, the following requirements apply and the Executive Officer will review submitted demonstrations for approval:

(A) The manufacturer must demonstrate via engineering evaluation that the A/C

system minimizes overall refrigerant leakage by:

i. Minimizing the number of fitting and joints.
ii. Limiting the use of single O-rings for pipe and hose connections.
iii. Using lowest permeability hose for containment of the refrigerant.
iv. Minimizing leakage from compressor shaft seal and housing seals.

(B) Annual leakage refrigerant emissions are determined in accordance with SAE International standard J2727 (Rev. Jul. 2007)

If the A/C system is determined to be a "low-leak" system in accordance with paragraphs (A) and (B) above and is approved by the Executive Officer, the A/C-direct credit is then calculated using the following equation:

A/C-direct = SAE J2727 measured annual refrigerant leakage in grams x 1300 / 12,000

Where: 1300 is the global warming potential of the refrigerant and 12,000 is the average annual miles travel by a vehicle.

For an A/C system that uses a refrigerant with a GWP ≤ 150, the A/C-direct credit is equal to 6 grams per mile.

<u>"Improved" Air Conditioning System</u>

A/C system efficiency improvement is also possible regardless of the refrigerant used. A discussion of air conditioning thermodynamics and system performance is available in the August 6, 2004 Staff Report technical document "Air Conditioning Thermodynamics." Continuing work of the SAE Improved Mobile Air Conditioning (I-MAC) Cooperative Research Program, as noted in the Nov., 2005, Torino Italy, European MAC Workshop "SAE Improved Mobile Air Conditioning Cooperative Research Program" which shows that compressor, heat exchanger, controls, and plumbing can be improved to yield up to a 30% increase in the coefficient of performance (COP) of the system. In addition, a new SAE J2766 standard is nearly complete that will assess the Total Equivalent Warming Impact of an A/C system and includes efficiency models and engineering evaluations of various systems and components. Thus, a manufacturer may choose to certify a mobile A/C system as an "improved" system with emissions lower than the default value of 17 grams of CO_2 per mile.

To be recognized as an "improved" system, the following requirements apply and the Executive Officer will review submitted demonstrations for approval:

(A) The manufacturer shall demonstrate using data in an engineering evaluation that the A/C system achieves lower A/C indirect emissions than the default value.
(B) The system manages outside and re-circulated air balance to achieve

comfort, demisting, and safety requirements, based on factors as temperature, humidity, pressure, and level of fresh air in the passenger compartment to minimize compressor usage.

(C) The system is optimized for energy efficiency by utilizing state-of-the-art high efficiency evaporators, expansion devices, condensers, and other components.

(D) The system has external controls that adjust the evaporative temperature to minimize the necessity of reheating cold air to satisfy occupant comfort.

If the A/C system is determined to be an "improved" system in accordance with paragraphs (A) through (D) above and is approved by the Executive Officer, the A/C-indirect credit is then calculated using the following equation:

A/C-indirect = Compressor Displacement in cubic centimeters x 5 / 100

Where: the ratio 5/100 represents 5 CO2-equivalent grams per mile per 100 cc of maximum compressor displacement.

Equation 3.(a)(2)(B) also includes an upstream fuel multiplier "Fuel Adjustment Factor," based on fuel type, relative to the upstream emissions generated during fuel production and distribution. These proposed adjustment factors are specified in paragraph 3.(a)(2)(B)v and based on values determined by the ARB August 6, 2004 Staff Report.

Paragraph 3.(a)(2)(C) is an exemption clause for vehicles that use electricity or hydrogen as the sole fuel source and specifies a constant CO_2-equivalent combined value to be used for the label's global warming score. These specified values are based on values determined by the ARB August 6, 2004 Staff Report.

2. Allowing bar coding, stocking, and other vehicle related information to be displayed on same label feedstock

Proposed modifications to paragraph 2(a) of the CEPLS are being made to further clarify the use of bar coding, stocking, and other information on the same label feedstock as the Environmental Performance information. Paragraph 2(a)(5) was added to the proposed modifications and now allows for inclusion of stock numbers and other vehicle related information for consumers on the same label feedstock as the Environmental Performance label. This modification will allow for inventory and label ordering flexibility among manufacturers.

3. Printer and label feedstock alignment tolerance

Proposed modifications to paragraph 6. and paragraph 7. of the CEPLS are being made to apply a plus or minus 1.0 millimeter tolerance to the printer and label feedstock alignment rather than applying the plus or minus 1.0 millimeter tolerance to each dimension. This modification is being made to address potential misalignment between printer and label feedstock rather than the graphics dimensioning which is normally very

precise. The plus or minus 1.0 millimeter tolerance gives a total range of 2.0 millimeters.

4. Extension of implementation date

Proposed modifications to the front page and paragraph 1 of the CEPLS are being made to extend the implementation date from October 1, 2008 to January 1, 2009. This extension is required to allow the auto manufacturers additional lead-time to accommodate the additional changes proposed in this notice.

5. Removal of grid-connected hybrid electric vehicles as a multiple fuel vehicle

Proposed modifications to paragraph 5 of the CEPLS are being made to remove the grid-connected hybrid electric vehicle from being identified as a vehicle capable of operating on more than one fuel. These vehicles are still under development and not yet available to the consumer as a new production vehicle. Therefore a label is not currently required. Also, special testing procedures are under developed to account for the plug-in capability of these unique vehicles and will address the multiple fuel emissions of smog forming and global warming pollutants.

6. Correcting the Gross Vehicle Weight (GVW) rating of medium duty passenger vehicles

Proposed modifications to paragraph 3.(c)(3) and paragraph 4.(b) of the CEPLS are being made to correctly specify the GVW of a medium duty passenger vehicle. The correct rating is 8501-9999 lbs. GVW.

7. Other minor modifications

Staff is also proposing other minor conforming modifications to the regulation for clarification purposes such as modifying text font style and size, specifying placement of text and graphics, and correcting typographical or numbering errors. Minor modifications to the specifications in Attachment A and Attachment B are being proposed to use a standard font style, Arial, and standard font sizes. Minor modifications in paragraphs 6 and 7 are being proposed to more precisely locate label text and graphics. These minor modifications will provide for label consistency from one manufacturer to the next. Additional minor modifications are being proposed to correct typographical and numbering errors and are not described separately in this notice but can be found in the attached proposed modified text in Attachment 1.

Additional Supporting Documents Being Made Available

In accordance with Government Code §11347.1 and Title 1, CCR, § 2(c)(3) and § 44, staff has added to the rulemaking file additional documents identified below. As part of the proposed modifications noticed herein, some of these additional documents are

proposed for incorporation by reference to support specified default values and establish testing procedures used for certification testing as required in the CEPLS. Others are referred to or provide support for changes proposed in this notice. All of these documents are available by following the provided link, where available, and by inspection at the postal mailing address noted herein.

- The ARB mailout, MSO #2007-03, which is available at http://www.arb.ca.gov/msprog/mailouts/mso0703/mso0703.pdf.
- The ARB August 6, 2004 Staff Report: *Initial Statement of Reasons for Proposed Rulemaking, Public Hearing to Consider Adoption of Regulations to Control Greenhouse Gas Emissions from Motor Vehicles* and subsequent addendum, which are available at http://www.arb.ca.gov/regact/grnhsgas/isor.pdf and http://www.arb.ca.gov/regact/grnhsgas/addendum.pdf respectively.
- The following ARB August 6, 2004 Technical Support Documents For Staff Proposal Regarding Reduction of Greenhouse Gas Emissions From Motor Vehicles:
    - Climate Change Emissions Inventory, which is available at http://www.arb.ca.gov/cc/ccms/documents/august_tsd/emissions_august.pdf
    - HFC-134a Emissions From Light-Duty Vehicles--Background, Estimation Of Emissions, And Effects Of Potential Controls, which is available at http://www.arb.ca.gov/cc/ccms/documents/august_tsd/hfc_background_august.pdf
    - Mobile Air Conditioning Systems—Direct Emissions Technology Assessment, is available at http://www.arb.ca.gov/cc/ccms/documents/august_tsd/hfc_direct_august.pdf
    - Mobile Air Conditioning Systems - Indirect Emissions, which is available at http://www.arb.ca.gov/cc/ccms/documents/august_tsd/hfc_indirect_august.pdf
    - Air Conditioning Thermodynamics, which is available at http://www.arb.ca.gov/cc/ccms/documents/august_tsd/ac_thermo_august.pdf
- A description of the SAE I-MAC Cooperative Research Program and program goals, which is available at http://www.sae.org/news/releases/mobilecooling.htm."
- A description of the Mobile Air Conditioning Society Worldwide and program goals, which is available at http://www.epa.gov/cppd/mac/#partnership."
- The Society of Automotive Engineers SAE International *Surface Vehicle Standard* J2727, Revised July 2007, which is available at http://www.sae.org
- SAE J2727 presentation Developed by the SAE Interior Climate Control Standards Committee.
- The IMAC presentation at the November 2005 European MAC Workshop in Torino Italy, which is available at http://www.fluorocarbons.org/documents/presentations/Clima%20Auto/Torino%20I-MAC%20Status.pdf
- SAE and IMAC presentation “Cooling Cars with less Fuel” at the October 2006 International Energy Agency Workshop, which is available at http://www.iea.org/textbase/work/2006/car_cooling/Session4/4b%20Hill%20Standard%20test%20projects.pdf
- Draft SAE J2766, “Life Cycle Analysis to Estimate the CO2-Equivalent Emissions from MAC Operation.”

Comments and Subsequent Action

In accordance with §11346.8 of the Government Code, the Board directed the Executive Officer to adopt these proposed modifications, after making them available to the public for comment for a period of at least 15 days. The Board further provided that the Executive Officer shall consider such written comments as may be submitted during this period, shall make such modifications as may be appropriate in light of the comments received, and shall present the regulations to the Board for further consideration if warranted.

Written comments on the modifications approved by the Board, or additional proposed modifications presented in this notice, may be submitted by postal mail, electronic mail, or facsimile as follows:

Postal mail:	Clerk of the Board, California Air Resources Board 1001 I Street, Sacramento, California 95814
Electronic submittal:	http://www.arb.ca.gov/lispub/comm/bclist.php
Facsimile submittal:	(916) 322-3928

Please note that under the California Public Records Act (Government Code section 6250 et seq.), your written and oral comments, attachments, and associated contact information (e.g., your address, phone, email, etc.) become part of the public record and can be released to the public upon request. Additionally, this information may become available via Google, Yahoo, and any other search engines.

In order to be considered by the Executive Officer, comments must be directed to the ARB in one of the three forms described above and received by the ARB by 5:00 p.m. on the deadline date for public comment listed at the beginning of this notice. Only comments relating to the above-described proposed modifications to the text of the regulations shall be considered by the Executive Officer.

Attachment