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Arnold Schwarzenegger
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DATE: November 25, 2003

TO: Interested Stakeholders

FROM: Robert H. Cross, Chief
Mobile Source Control Division

RE: PROPOSED MODIFICATIONS TO THE EXHAUST EMISSION
STANDARDS FOR HEAVY DUTY URBAN BUS ENGINES AND THE
FLEET RULE FOR TRANSIT AGENCIES

The Air Resources Board (ARB) has received several requests to modify the 2007 diesel urban bus engine standard in 1956.1 (a)(12) to match the heavy-duty truck engine standards in 1956.8. Engine manufacturers have informed ARB that they will not be able to meet California's 0.2 g/bhp-hr PM standard until 2010 because their efforts are focused on the national truck engine standard. The federal law allows engine manufacturers to reduce NOx emission through averaging as a percentage of sales until the standard requires 100% of sales to be of engines meeting 0.2 g/bhp-hr in 2010.

In addition, ARB has also received requests to modify the diesel engine standards for 2004 to 2006 model years. Engine manufacturers will not be certifying diesel urban bus engines to California's standard for those years, 0.5 g NOx/bhp-hr, because they are focused on the 2007 national standards. Some requesters specifically want ARB to modify the 2004 to 2006 urban bus engines standards to allow diesel hybrid electric urban buses to be sold. Currently, diesel hybrid electric buses are required to meet the same standard as other diesel urban bus engines.

As a result of these two California standards, ARB expects there to be no diesel urban bus engines certified in California from 2004 to 2009. Alternative-fuel urban bus engines, however, are being certified and should be readily available.

ARB is currently modeling expected emissions resulting from the current regulations and several scenarios that would encompass the suggested changes. Staff believes, but has not yet confirmed, that because the existing diesel urban bus standards prevent purchase of new diesel engines for six years, emissions will remain higher than if the engine exhaust emission standards are modified.

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: <http://www.arb.ca.gov>.

California Environmental Protection Agency

Interested Stakeholders

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Additional suggestions for obtaining needed emission reductions have been received from interested parties. Options that staff is considering include the following:

- Do not modify the diesel urban bus exhaust emission standards because alternative fuel buses are available 2004-2006 and may be available 2007 to 2009.
- Require all transit agencies to purchase alternative fuel buses (eliminate the diesel fuel path)
- Reopen the alternative NOx strategy exemption to all transit agencies; those transit agencies that receive the exemption would be able to purchase non-complying urban bus engines 2004-2006 but would have to demonstrate reductions in NOx emissions through some mechanism.
- Add a new optional 2004-2006 engine exhaust emission standard for early introduction of advanced engine technology, set at 1.2 g NOx/bhp-hr, the expected level of compliance for 2007-2009 engines.
- Eliminate the 2007 California urban bus engine exhaust emission standards. Bus engines would certify to the applicable heavy-duty diesel truck engine standards beginning with the 2007 model year. This would result in one standard for all heavy-duty diesel engines nationwide beginning with the 2007 model year.

In the following draft regulations for comment, staff has illustrated the last two options from the list above. In addition, the draft regulations include modifications to the Fleet Rule for Transit Agencies, including the addition of standards for non-urban buses and a revision of the zero-emission bus requirements. Each of the proposals will be discussed in greater detail at the workshops on December 2nd (El Monte) and 3rd (Sacramento). Please refer to the workshop notice issued on November 3, 2003, for the specific locations and times.

As requested in the workshop notice, please send your comments by January 16, 2004, to Ms. Kathleen Mead by e-mail at kmead@arb.ca.gov or by mail to Ms. Kathleen Mead, Air Resources Board, Mobile Source Control Division, P.O. Box 2815, Sacramento, California 95812. Please also send a copy of your comments to Dr. Nancy L.C. Steele, nsteele@arb.ca.gov.

1956.1 Exhaust Emission Standards and Test Procedures - 1985 and Subsequent Model Heavy Duty Urban Bus Engines and Vehicles

- (a) The exhaust emissions from new 1985 and subsequent model heavy-duty diesel cycle urban bus engines and vehicles fueled by methanol, natural gas, liquefied petroleum gas, and petroleum shall not exceed the following, by model year:
- (1) [No Change]
 - (2) [No Change]
 - (3) [No Change]
 - (4) [No Change]
 - (5) [No Change]
 - (6) [No Change]
 - (7) [No Change]
 - (8) [No Change]
 - (9) [No Change]
 - (10) [No Change]
 - (11) [No Change]
 - ~~(12) 2007 and subsequent – 0.2 g/bhp-hr NO_x, 0.01 g/bhp-hr PM, 0.05 g/bhp-hr NMHC, 5.0 g/bhp-hr CO, and 0.01 g/bhp-hr formaldehyde.~~
 - (12) 2004-2006 optional standards for diesel-fueled, dual-fuel, and bi-fuel engines except for heavy-duty pilot ignition engines -- Manufacturers may choose to certify 2004 – 2006 model year diesel-fueled, dual-fuel, and bi-fuel bus engines to an optional 1.2 g/bhp-hr NO_x plus NMHC standard, measured as the arithmetic sum of the NO_x and NMHC exhaust component certification values, without restriction on individual component certification values; provided that engines certified to this optional reduced-emission

NOx plus NMHC standard may not participate in any averaging, banking, or trading program set forth in the test procedures document incorporated by reference in subdivision (c) of this section. Manufacturers certifying to this optional standard must also certify to a PM standard of 0.01 g/bhp-hr.

(b) [No Change]

(c) [No Change]

New Sections for the Fleet Rule for Transit Agencies:

Sections 2020 through 2027, title 13, California Code of Regulations (CCR) have been set aside for diesel particulate matter control measures for in-use vehicles. Currently, the Fleet Rule for Transit Agencies resides in title 13, CCR, sections 1956.2 – 1956.4. ARB staff proposes moving the Fleet Rule for Transit Agencies to title 13, CCR, section 2023, but keeping the urban bus certification requirements in title 13, CCR, section 1956.1.

Section 2023 will contain definitions and requirements pertinent to both urban bus and non-urban bus engines; section 1956.2 requirements and section specific definitions will be placed section 2023.1; section 2023.2 will contain the new non-urban bus requirements; section 1956.3 will be moved to section 2023.3; and 1956.4, record keeping requirements, will be moved to 2023.4 and expanded to incorporate non-urban bus record keeping requirements.

Proposed Modifications to the Fleet Rule for Transit Agencies:

~~Strikethrough~~ is used for the deletion of previously adopted language. Underline is used for addition of new language.

2023 Fleet Rule for Transit Agencies

Definitions:

(a) For purposes of the fleet rule specified in sections 2023.1 through 2023.4, the following definitions apply:

(1) “Alternative fuel” [No change]

(2) “Active fleet” [No change]

- (3) "Emergency contingency vehicle" [No change]
- (4) "Heavy-duty pilot ignition engine" [No change]
- (5) "Spare bus" [No change]
- (6) "Transit agency" [No change]
- (7) "Urban bus" means a passenger-carrying vehicle powered by a heavy heavy-duty diesel engine, or of a type normally powered by a heavy heavy-duty diesel engine, with a load capacity of fifteen (15) or more passengers and intended primarily for intra-city operation, i.e., within the confines of a city or greater metropolitan area. Urban bus operation is characterized by short rides and frequent stops. ~~To facilitate this type of operation, more than one set of quick operating entrance and exit doors would normally be installed. Since fares are usually paid in cash or token, rather than purchased in advance in the form of tickets, urban buses would normally have equipment installed for the collection of fares. Urban buses are also typically characterized by the absence of equipment and facilities for long distance travel, e.g., restrooms, large luggage compartments, and facilities for stowing carry-on luggage.~~
- (8) "Non-urban bus" means a passenger-carrying vehicle powered by a medium or heavy heavy-duty diesel engine, or of a type normally powered by a medium or heavy heavy-duty diesel engine; with a load capacity of fifteen or more passengers owned or operated by a transit agency; and which is not an urban bus.

(b) The following subparagraphs apply to Sections 2023.1 and 2023.2:

(These sections have been moved from 1956.2 so that they apply to the new non-urban bus requirements in addition to the urban bus requirements.)

- (1) A transit agency that installs a diesel emission control strategy to reduce diesel PM shall use a diesel emission control strategy that is verified by the Executive Officer in accordance with section 2700 et seq., title 13, CCR, or an urban bus retrofit device that has been exempted under Vehicle Code section 27156 as an engine rebuild kit and that reduces PM to 0.10 g/bhp-hr when used on an engine model 6V92TA DDEC for the model years specified for that engine.

- (2) A transit agency that installs a diesel emission control strategy on an ~~urban bus~~ engine shall use the following percentage reductions from the engine certification standard value when calculating its total diesel PM emissions: 25 percent for a Level 1, 50 percent for a Level 2, and 85 percent for a Level 3 diesel emission control strategy.
- (3) Beginning July 1, 2002, a transit agency shall not operate its diesel buses on diesel fuel with a sulfur content in excess of 15 parts per million by weight, except that a transit agency may operate its diesel buses on a fuel that is verified by the Executive Officer as a diesel emission control strategy that reduces PM in accordance with section 2700 et seq., title 13, CCR. A transit agency with fewer than 20 urban buses in its active-fleets, and that operates in a federal one-hour ozone attainment areas, is not subject to this low-sulfur fuel requirement until July 1, 2006. In areas redesignated as one-hour ozone non-attainment areas prior to July 1, 2006, a transit agency initially exempt from the low-sulfur fuel requirement shall submit a plan to the Executive Officer within 30 days of redesignation for achieving compliance with this requirement.
- (4) A transit agency with fewer than 20 urban buses in its active bus fleet or fewer than 20 non-urban buses may apply for an extension to comply with the provisions of section ~~1956-2~~ 2023.1 and section 2023.2 by submitting documentation of financial hardship to the Executive Officer, in writing, at least 30 days before the requirement becomes applicable for approval by the Executive Officer. Documentation of financial hardship shall include, but is not limited to, an analysis of the cost of compliance, the sources of available funds, and the shortfall between funds available and the cost of compliance. The transit agency must also specify the date and means by which compliance will be achieved in the request for a delay.
- (5) A transit agency that is unable to comply with an implementation deadline specified in section 2023.1 (f) (1), (2), (3), or (4) or Section 2023.2 (b)(1), (2), (3), or (4) because of the unavailability of technology may apply in writing no later than ninety days prior to the applicable implementation deadline to the Executive Officer for an extension, for a time of up to, but not to exceed, one year. The applicant must demonstrate that the technology is unavailable; shall explain why the transit agency cannot comply by replacing older buses; and shall provide a schedule for compliance.

(6) A transit agency that owns, operates, or leases fewer than 20 diesel-fueled, dual-fuel, bi-fuel, or diesel hybrid-electric urban or non-urban buses in its active fleet and that operates in a federal one-hour ozone attainment area may delay implementation of the intermediate total diesel PM emission reduction requirements provided the transit agency complies with the implementation deadlines set forth in section 2023.1 paragraphs (f)(3)(A) or (f)(4) or section 2023.2 paragraph (b)(3).

Move section 1956.2 Fleet Rule for Transit Agencies to 2023.1 and modify:

2023.1 Fleet Rule for Transit Agencies – Urban Bus Requirements

Requirements:

- (c) Transit agencies on the alternative-fuel path shall meet the following requirements:
 - (5) Transit agencies on the alternative-fuel path shall not purchase any diesel-fueled, dual-fuel, or bi-fuel buses with 2004 – 2006 model year engines certified to emissions levels in excess of those specified in paragraph (a)(11) or (a)(12) of section 1956.1, title 13, CCR, except as provided in paragraph (c)(8) or (c)(9) of this section.
- (d) Transit agencies on the diesel path shall meet the following requirements:
 - (4) Transit agencies on the diesel path shall not purchase any diesel-fueled, dual-fuel, or bi-fuel buses with 2004 – 2006 model year engines certified to emissions levels in excess of those specified in paragraph (a)(11) or (a)(12) of section 1956.1, title 13, CCR, except as provided in paragraph (d)(7) or (d)(8) of this section. Beginning July 1, 2003, a transit agency may not purchase alternative fuel buses certified to a PM emission level in excess of the optional standard of 0.3 g/bhp-hr when making new bus purchases.

PM Requirements

- (f)
 - (3) No later than January 1, 2007:

- (A) The diesel PM emission total for a transit agency on the diesel path shall be no more than 15 percent of its diesel PM emission total on January 1, 2002 or equal to 0.01 g/bhp-hr times the total number of current diesel-fueled active fleet buses, whichever is greater.

Add Proposed New Requirements for Non-Urban Buses Operated by Transit Agencies:

2023.2 Fleet Rule for Transit Agencies - Non-Urban Bus Requirements

- (a) A transit agency may not own, operate, or lease a fleet of non-urban buses with average NOx emissions in excess of the following:
 - (1) Beginning January 1, 2007, a non-urban bus fleet average of 3.2 g/bhp-hr.
 - (A) A transit agency may retire all 1997 and earlier model year non-urban bus engines by January 1, 2007, to comply with the fleet average standard requirement.
 - (2) Beginning January 1, 2010, a non-urban bus fleet average of 2.4 g/bhp-hr.
 - (A) A transit agency may retire all 2002 and earlier model year non-urban bus engines by January 1, 2010, to comply with the fleet average standard requirement.
 - (3) A transit agency shall calculate its NOx fleet average based on non-urban buses owned, operated, or leased by the transit agency. Zero-emission buses used to satisfy the requirements set forth in subdivision (e) of section 2023.1 may not be used to meet the requirements of this subparagraph.
 - (4) A transit agency may use a retrofit system verified by the Executive Officer as a diesel emission control strategy that reduces NOx by a specified percentage in accordance with section 2700 et seq., title 13, CCR to comply with the fleet average requirement, in addition to bus purchases, retirements, or engine repowering.
 - (5) A transit agency shall provide documentation of compliance with section 2023 (a) requirements in accordance with the provisions of subdivision (e) of section 2023.4, title 13, CCR.

- (b) A transit agency shall reduce the total diesel PM emissions of its diesel non-urban buses relative to its total diesel PM emissions from non-urban buses as of January 1, 2005, according to the schedule below. A transit agency shall calculate its diesel PM emission total for non-urban buses by summing the PM (FTP) certification standard, in grams per brake horsepower-hour (g/bhp-hr), for each non-urban bus, as identified in the Executive Order for the specific engine used in the bus. For 1987 and earlier model year engines, the PM. certification standard shall be deemed to be 1.0 g/bhp-hr. A transit agency shall provide documentation of compliance with these requirements in accordance with the provisions of subdivision (e) of section 2023.4, title 13, CCR.
- (1) No later than January 1, 2007, the diesel PM emission total for a transit agency's non-urban buses shall be no more than 75 percent of its diesel PM emission total on January 1, 2005.
- (2) No later than January 1, 2009, the diesel PM emission total for a transit agency's non-urban buses shall be no more than 50 percent of its diesel PM emission total on January 1, 2005.
- (3) No later than January 1, 2011, the diesel PM emission total for a transit agency's non-urban buses shall be no more than 20 percent of its diesel PM emission total on January 1, 2005, or equal to 0.01 grams per brake horsepower-hour (g/bhp-hr) times the total number non-urban buses in the current fleet, whichever is greater.

Move 1956.3 Zero-emission Bus Requirements to 2023.3

Move section 1956.4 Reporting Requirements for all Urban Bus Transit Agencies to 2023.4, and modify:

2023.4 Reporting Requirements for all ~~Urban Bus~~ Transit Agencies

- (a) The following reports on new urban bus purchases and/or leases by transit ~~operators~~agencies on the alternative-fuel path shall be submitted as described below:
- (b) The following reports on new urban bus purchase and/or leases by transit ~~operators~~agencies on the diesel path shall be submitted as described below:

- (c) Each transit agency shall submit the following reports on the urban bus NOx fleet average requirement:
- (d) Each transit agency shall submit the following reports on the total diesel PM emission requirements for its urban buses:
- (e) Each transit agency shall submit the following reports for its non-urban buses:
 - (1) An annual report of the number, manufacturer, make, and model year of engines, and fuel used for each non-urban bus it currently owns, leases, or operates as of January 1st of each year, beginning in 2006. The first report shall be submitted by January 31, 2006, and subsequent reports shall be submitted annually by January 31 through the year 2016.
 - (2) For the NOx fleet average reduction requirements set forth in section 2023.2 (a):
 - (A) Initial documentation submitted by January 31, 2006, of the non-urban bus fleet NOx emission average as of January 1, 2006
 - (B) A report submitted by January 31, 2007, detailing the non-urban bus fleet NOx emission average as of January 1, 2007, or documenting the retirement of all model year 1997 and earlier non-urban bus engines by January 1, 2006.
 - (C) A final report submitted by January 31, 2010 detailing the non-urban bus fleet NOx emission average as of January 1, 2010, or documenting the retirement of all model year 2002 and earlier non-urban bus engines by January 1, 2010.
 - (3) For the total diesel PM reduction requirements set forth in section 2023.2 (b):
 - (A) Initial documentation submitted by January 31, 2006, of the PM engine certification value of each non-urban bus engine and the non-urban bus diesel PM total as of January 1, 2005.
 - (B) A report submitted by January 31, 2007, of the non-urban bus diesel PM total as of January 1, 2007, and the

percentage diesel PM reduced, documenting compliance with the requirement in section 2023.2 (b)(1) of title 13, CCR.

(C) A report submitted by January 31, 2009, of the non-urban bus diesel PM total as of January 1, 2009, and the percentage diesel PM reduced, documenting compliance with the requirement in section 2023.2 (b)(2) of title 13, CCR.

(D) A final report submitted by January 31, 2011, of the non-urban bus diesel PM total as of January 1, 2011, and the percentage diesel PM reduced, documenting compliance with the requirement in section 2023.2 (b)(3) of title 13, CCR.

(E) If a diesel emission control strategy has been applied to an engine, each report specified above must include the Diesel Emission Control Strategy Family Name in accordance with the requirements of section 2705 (g)(2), title 13, CCR; and the date of installation correlated to a specific non-urban bus engine.

~~(e)~~(f) The following reports on the zero-emission bus demonstration program.....

~~(f)~~(g) The following reports on new zero-emission bus purchases....

~~(g)~~(h) Transit agencies exempted from the requirements