LAW OFFICES

NEAL GERBER & EISENBERG

TWO NORTH LASALLE STREET
CHICAGO, ILLINOIS 60602
(312) 269-8000

93-7-4
6/10/93

XC: Bd Mbrs
JS TAC
JD MSD
JB Legal

JED R. MANDEL
(312) 269-8042

FACSIMILE
(312) 269-1747

June 8, 1993

VIA FACSIMILE

Mr. Bob Cross
California Air Resources Board
9528 Telstar Avenue
El Monte, California 91731

Dear Bob:

Enclosed is the Oral Statement that EMA intends to present at the June 10, 1993 public hearing on urban bus standards. If you have any questions, or wish to discuss the Statement further, please do not hesitate to call.

I appreciate your assistance on this matter.

Very truly yours,

Jed R. Mandel

JRM/kdr
Enclosure

AIR RESOURCES BOARD
STATE OF CALIFORNIA

NOTICE OF PUBLIC HEARING TO CONSIDER AMENDMENTS TO REGULATIONS REGARDING CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 1985 AND SUBSEQUENT MODEL HEAVY-DUTY DIESEL-ENGINES AND VEHICLES, TO SPECIFY STANDARDS FOR 1994 AND SUBSEQUENT URBAN BUS ENGINES.	)	Mail-Out #93-19 Public Hearing June 10, 1993

ORAL STATEMENT OF THE ENGINE MANUFACTURERS ASSOCIATION

Jed R. Mandel
Lisa A. Stegink
NEAL GERBER & EISENBERG
Two North LaSalle Street
Suite 2300
Chicago, Illinois 60602
(312) 269-8000

Glenn F. Keller
Executive Director
Engine Manufacturers Association
401 North Michigan Avenue
Suite 2400
Chicago, Illinois 60611
(312) 644-6610

June 10, 1993

AIR RESOURCES BOARD
STATE OF CALIFORNIA

NOTICE OF PUBLIC HEARING TO CONSIDER AMENDMENTS TO REGULATIONS REGARDING CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 1985 AND SUBSEQUENT MODEL HEAVY-DUTY DIESEL-ENGINES AND VEHICLES, TO SPECIFY STANDARDS FOR 1994 AND SUBSEQUENT URBAN BUS ENGINES.	)	Mail-Out #93-19

ORAL STATEMENT OF THE ENGINE MANUFACTURERS ASSOCIATION

Good afternoon. My name is Glenn Keller. I am the Executive Director of the Engine Manufacturers Association -- EMA -- on whose behalf I am speaking today. EMA is the national trade association representing the manufacturers of engines for all applications other than airplanes and passenger cars. EMA's members include the major manufacturers of engines used in urban bus applications.

Today's proposal is intended to align certain of California's regulations with those recently adopted by the U.S. Environmental Protection Agency (EPA) and to implement the requirements of Senate Bill 135. Thus, the proposal includes the adoption of EPA's newly revised definition of urban bus, the adoption of stringent standards for the further reduction of particulate emissions from urban buses, optional emission standards that may be used in a mobile source emission credit program, and an extended 10 year useful life period. Finally, today's proposal also includes the adoption of a 4.0 g/bhp-hr NOx standard for urban buses. Unlike

EPA's rules, however, California proposes to adopt the 4.0 gram NOx standard in 1996 -- two years in advance of the federal standard.

EMA and its members have had numerous discussions with the Board's staff in which we expressed our concerns about certain aspects of the proposed regulations. We very much appreciate the staff's willingness to hear our concerns and consider alternative approaches.

EMA supports the Board's efforts to bring its program more in line with EPA's treatment of urban buses. As I think you well know, EMA and its members are strong proponents of emission standard harmonization -- not just in the United States, but worldwide. EMA also supports the staff's decision to delay the positive crankcase ventilation requirements until after the staff has had an opportunity to review the results of Southwest Research Institute's study of diesel crankcase emissions. And, we are strong supporters of voluntary, incentive based emission credit programs such as the one included in today's rule. While we would have liked to see credits generated at any level and at finer increments below the primary standards, we nevertheless support the program.

EMA's one major concern today is with the mandatory NOx emission standards proposed to be effective with the 1996 model year. The urban bus standards as proposed for 1996 create significant problems for manufacturers of heavy-duty diesel engines used in urban buses. Primary of those problems is the fact that attempting to implement the technology necessary to bring urban bus

engines into compliance with the 1996 model year standards will not be cost effective -- especially given the significant other regulatory requirements facing engine manufacturers during this same time period.

Engine manufacturers presently are working to develop the technology that will be required to meet a 4.0 g/bhp-hr NOx standard in 1998. That job is by no means finished. Attempting to pull ahead diesel technology by two full years to meet the proposed California standard may not be feasible and is unlikely to be cost effective given the very small California market -- 300-400 sales annually -- for urban bus engines. Engine manufacturers' human and capital resources are stretched to the breaking point. In the next few years manufacturers must meet new EPA and CARB rules for emissions from nonroad engines, the new EPA urban bus rules, the stringent new CARB emission rules for medium-duty vehicles, the EPA rules for NOx emissions for all heavy-duty engines, and a myriad of additional regulatory requirements.

We have discussed engine manufacturers' concerns with the staff and they have indicated a willingness to address the problem. One suggestion was the use of California's low sulfur, low aromatic fuel for certification of urban bus engines for the 1996 and 1997 model years. In addition, we discussed allowing a limited number of urban bus engines to be exempt from the 4.0 gram NOx standard, and expanding the proposed voluntary emission credits to include an averaging program available to engine manufacturers.

Allowing the use of low sulfur diesel fuel will not have any ameliorative effects on NOx emissions. However, low aromatic fuel will provide some NOx reduction benefits. Those benefits do not compensate for the difference between California's more stringent 4.0 g/bhp-hr standard and EPA's 5.0 g/bhp-hr standard for 1996 urban bus engines, but they will help.

Nevertheless, the use of California low sulfur, low aromatic diesel fuel for certification, by itself, will not necessarily assure that California's transit fleets will be able to meet their engine needs. That also is true for those buses that require higher horsepower engines where alternative fuel models currently are not available. Thus, it is critical that some additional relief be provided to urban bus engine manufacturers. Such relief could include a limited number of exemptions from the 4.0 gram NOx standard or an averaging program for urban bus engines that allows engine manufacturers to use the credits generated under the emission credit program to offset the sale of 5.0 g/bhp-hr NOx engines in 1996 and 1997.

Finally, the staff has informed us that the reference to "1994 model year" as the compliance date for requiring replacement engines to meet the proposed urban bus standards should read "1996 model year." The staff also has clarified that rebuilt engines are to meet the standards effective for the date of the engine's original manufacture, and that reconditioned engines are included in the definition of rebuilt engines.

In conclusion, we encourage the Board to recognize the severe economic burden placed on engine manufacturers by accelerating the 4.0 gram NOx standard from 1998 to 1996 and the potential for disruption in the urban bus marketplace. EMA and its members will continue to work with the staff in implementing the suggestions that have been made today. In the meantime, if there are any questions, I would be pleased to answer them.

Thank you.

93-7-4
6/10/93

XC: Brd mbrs
JS TAC
JD MSD
JB Legal

Manufacturers of Emission Controls Association
1707 L STREET, N.W.
SUITE 570
WASHINGTON, D.C. 20036-4201
202-296-4797 FAX: 202- 331-1388

June 3, 1993

VIA OVERNIGHT MAIL

Ms. Pat Hutchens
Board Secretary
California Air Resources Board
Executive Office
2020 L Street
Sacramento, CA 95814

Dear Ms. Hutchens:

RE: Proposed Regulations for 1994 and Later Model Year Urban Bus Engines

Please find enclosed 20 copies of MECA's testimony on the above-referenced rulemaking being considered at the June 10, 1993 Public Hearing. I plan to present oral testimony on behalf of MECA at the hearing.

Sincerely,

Bruce Bertelsen

Bruce I. Bertelsen
Executive Director

Statement
of the
Manufacturers of Emission Controls Association
on the
Air Resources Board's
Proposed Amendments to Regulations Governing 1994
and Subsequent Model Year Urban Bus Engines

June 10, 1993

Good Morning.

My name is Bruce Bertelsen. I am the Executive Director of the Manufacturers of Emission Controls Association (MECA). MECA is please to present testimony on the Air Resources Board's proposed amendments to regulations affecting 1994 and later model year urban buses.

We wish to commend the Board for its efforts to strike a balance by proposing a program which is intended to preserve the clean diesel as an available option while providing incentives to transit authorities to opt for use of very low emitting bus engines. We believe, however, that the staff's proposal could be further strengthened by setting the particulate standard at a 0.05 g/BHP-hr level beginning in 1994, rather than waiting until 1996.

MECA is a non-profit association of companies that manufacture various motor vehicle emission controls. Our membership includes companies with extensive experience and a proven track record over the past 20 years in the development and application of motor vehicle emission controls. Currently, these companies are developing and manufacturing control technologies to further reduce exhaust emissions from gasoline-, diesel-, and alternative fuel vehicles.

For diesel-powered heavy-duty engines our companies are manufacturing diesel oxidation catalysts, trap oxidizers and catalyzed trap oxidizers. Our members are also developing and manufacturing catalytic fuel additives to enhance the performance of trap oxidizer technology. For alternative fueled engines, including methanol, ethanol, LPG, and CNG, these companies are optimizing catalysts to help address the unique emission control challenges presented by each type of alternative fuel. In addition, MECA companies are developing catalyst technology to reduce NOx emissions from both diesel and natural gas fueled engines.

The 0.05 g/BHP-hr Particulate Standard

The technological feasibility of a trap-equipped diesel urban bus engine to meet the 0.05 particulate standard clearly has been demonstrated. Both major urban bus engine manufacturers have successfully certified diesel-powered trap equipped engines for the 1992

and 1993 model years which achieved levels well below the 0.05 g/BHP-hr level in FTP emission testing. In fact, Cummins, for purposes of compliance with federal requirements, set a particulate matter family emission limit (FEL) of 0.05 for its 1992 trap-equipped L10 engine (The FEL is the standard Cummins must meet for both assembly-line audit and in-use compliance).

Operating experience with trap technology is being rapidly accumulated worldwide. In the U.S. alone, over 1400 trap equipped buses in revenue service have accumulated a total of over 40,000,000 miles of operating experience. We anticipate that this experience will result in further improvements in the technology and will favorably enhance efforts to reduce costs.

Other technological approaches also are being pursued to meet the 0.05 particulate level. For example, as reported recently by the U.S. EPA, at least one urban bus manufacturer believes it may be able to meet a 0.05 particulate level using an oxidation catalyst. The effectiveness of oxidation catalysts for application on diesel engines is well established. Diesel oxidation catalysts have been used for years on thousands of off-road diesel engines to control particulate emissions. Catalysts are currently being installed on light-duty diesel vehicles at a rate of over 500,000 a year in Europe. Finally, oxidation catalysts will be used on a significant percentage of heavy-duty trucks in the U.S. beginning in 1994 to meet the 0.1 g/BHP-hr particulate standard.

Given the fact that both U.S. urban bus engine manufacturers have certified trap equipped diesel engines for the 1992 and 1993 model years and achieved emission levels below the 0.05 particulate level in certification testing, together with the extensive operating experience which is being accumulated with trap-equipped buses, we encourage the Board to adopt a 0.05 particulate standard in 1994 rather than delay implementation until 1996.

Setting the standard at 0.05 g/BHP-hr in 1994 would send a strong and positive message to both engine and control manufacturers that the ARB will require emission reductions to the greatest degree technologically feasible. This is an important message to send to industry as ARB begins work on its heavy-duty engine low emission standards which no doubt will require commitment of considerable time and resources on the part of both engine and control manufacturers to develop needed technologies and control strategies. Specifically, establishing a 0.05 particulate standard for 1994 and later model urban buses will provide the incentive to further refine technology to achieve the greatest particulate reductions technology possible.

The 4.0 g/BHP-hr NOx Standard

We have only limited comments with regard to the proposed 4.0 g/BHP-hr NOx standard. First, to the extent bus engine manufacturers opt for a strategy which reduces engine out NOx emissions at the expense of increasing particulate emissions, we believe the

particulate exhaust controls discussed above will assist in reducing these elevated particulate levels to permit compliance with the 0.05 particulate standard. Second, as noted above, our members are actively developing lean NOx catalyst technology for diesel engines. While considerable progress is being made and this technology looks extremely promising, we do not anticipate that it will be commercially available for diesel powered urban buses by 1996.

Conclusion

We hope our comments have been helpful to the Board in its consideration of the proposed regulations affecting urban bus engines. Our industry stands ready to do its part, working with the engine manufacturers, to help California bring about a reduction in emissions from urban buses.

LONG BEACH TRANSIT

1300 GARDENIA AVENUE, P.O. BOX 731, LONG BEACH, CA 90801 (310) 591-8753 FAX (310) 218-1994

93-7-4
6/10/93

XC: Bd Mbrs
JS TAC
JD mSD
JB Legal

June 8, 1993

Air Resources Board
Board Secretary
Post Office Box 2815
Sacramento, California 95812

Members of the Board:

On June 10 and 11, 1993, the California Air Resources Board will consider the adoption of amendments to the California Exhaust Emissions Standards and Test Procedures for 1985 and Subsequent Model Heavy-Duty Diesel-Engines and Vehicles. These amendments apply specifically to engines used in urban buses.

Long Beach Transit would like to make the following comments regarding these amendments:

- Bus operators should not be forced to bear the costs associated with emissions requirements and alternative fuels research alone. The proposed standard is to take effect two years ahead of the 1998 federal EPA standard that applies to all heavy diesel engines. The market to which these amendments apply is small...approximately 3% of the total number of heavy duty diesel vehicles. The truck market represents the majority of diesel engines in our state. Trucks and urban buses should be brought into compliance at the same time. This would allow all of us in the transportation industry to work together in addressing the issues associated with a whole new fueling and engine technology. In that manner, acceptable fuels will be developed which may be used by the entire transportation industry.

- Suitable engines which meet proposed air quality standards have not yet been fully developed. We would question the potential availability of engine technology which meets the time table set out in the requirements.

Long Beach Transit is committed to the quest for clean air in California. We support any cost effective and equitable program that contributes to meeting this goal. Thank you for your consideration.

Sincerely,

Laurence W. Jackson
President and General Manager

(7)

COMMENTS OF
Leo B. Thomason, Executive Director of
THE CALIFORNIA NATURAL GAS VEHICLE COALITION
on California Air Resources Board Proposal to Specify New Exhaust Emission Standards and Test Procedures for 1994 and Subsequent Urban Bus Engines

Before the California Air Resources Board (ARB) Public Hearing
June 10, 1993

The California Natural Gas Vehicle Coalition (Coalition) is an organization dedicated to improving air quality in California by promoting the commercialization of natural gas as a vehicle fuel and natural gas vehicles (NGVs) in the State. Membership includes Pacific Gas & Electric Company, San Diego Gas & Electric and Southern California Gas Company.

The California NGV Coalition recognizes ARB's contribution towards leading the nation in improving air quality by establishing technology-forcing standards that ultimately are adopted by the remainder of the United States. ARB's activity in this area has stimulated the development of vehicle emission controls, and has helped to establish a market for clean-burning NGVs. The Coalition appreciates ARB's efforts and commends its position.

The Coalition attended the April 24 and September 21, 1992 workshops on this subject, providing oral comments at the latter workshop. In addition, a meeting was held with ARB staff on October 6, 1992 for purposes of discussing in greater detail the economics of natural gas as a transit bus fuel. Issues addressed and discussed during that meeting included natural gas supply, deliverability, price and service reliability. Finally, we provided written comments on October 13, 1992 reflecting our concern that ARB's proposal to establish a NO_x standard for transit buses beginning in 1996 which is greater than original equipment manufacturer transit engines currently produced that meet the originally-proposed 2.5 g/bhp-hr standard would send a clear message to transit engine manufacturers that research and development efforts to produce low NO_x engines is fruitless and has been a waste of their time and resources.

The Coalition is aware of testimony presented by California transit districts regarding the lack of favorable economics for alternative-fueled buses, and clearly this testimony has influenced ARB's proposal to adopt a 4.0 g/bhp-hr NO_x standard. After careful review, the Coalition determined that the transit district testimony centered around a single alternative fuel--not natural gas. Additionally, Chris Weaver of Engine, Fuel, and Emissions Engineering represented the national Natural Gas Vehicle Coalition at the September 21 workshop, providing information regarding the economics of natural gas powered transit buses in California that is clearly more favorable, even than diesel.

At the February 19, 1993 Board Hearing, this Board approved Guidelines for the Generation and Use of Mobile Source Emission Reduction Credits. One of the specific guidelines approved is for the generation of emission reduction credits through the purchase of low-emission transit buses. The particular emission reduction credit generated through this activity is for NO_x credits. The Coalition recognizes the incentive provided to transit districts for the purchase of transit buses meeting NO_x emission levels substantially below the ARB tailpipe standard existing at the time of purchase. This credit mechanism will help to offset the establishment of tailpipe emission standards that are significantly higher than alternative-fueled ARB-certified transit engines currently available.

The Coalition supports ARB's combined approach to requiring lower tailpipe emissions from transit buses purchased in 1996, coupled with an incentive program to allow NO_x credits for transit districts that purchase transit buses with engines that are certified to NO_x levels significantly lower than the standard.

A comment is made on page 13 of the staff report that because of the higher storage volumes and heavier fuel tanks needed for a gaseous fuel, six large tanks weighing approximately 2500 pounds are required, and that this added weight makes it difficult for transit agencies to meet maximum axle weight requirements when carrying a full passenger load. Although not currently available in transit bus sizes, two on-board natural gas fuel cylinder manufacturers, Brunswick Composites of Lincoln, Nebraska and EDO of Alberta, Canada recently began offering for sale full composite tanks that weigh 60% less than a composite aluminum tank currently utilized on transit buses. This means that CNG tanks for transit bus applications can be manufactured with a combined weight ranging from 750 to 1,000 pounds for six tanks.

Additionally, Table 6 on page 18 of the staff report indicates a low price scenario for natural gas of $.30 per therm. In actuality, Pacific Gas & Electric Company's current high-volume tariff for transit districts is $.28 per therm.

Currently in California there are 46 transit buses in revenue service utilizing the Cummins L-10 natural gas engine with an additional 210 on order. This clearly demonstrates that natural gas powered transit buses are acceptable--even preferable--to at least 14 transit districts in the State.

This concludes the comments of the California NGV Coalition.

(5)

CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC HEARING TO CONSIDER AMENDMENTS TO REGULATIONS REGARDING CALIFORNIA EXHAUST EMISSION STANDARDS AND TEST PROCEDURES FOR 1985 AND SUBSEQUENT MODEL HEAVY-DUTY DIESEL-ENGINES AND VEHICLES, TO SPECIFY STANDARDS FOR 1994 AND SUBSEQUENT URBAN BUS ENGINES.

MAIL-OUT
93-19

COMMENTS OF DETROIT DIESEL CORPORATION

AIR RESOURCES BOARD HEARING
SACRAMENTO, CALIFORNIA
JUNE 10, 1993

My name is John Fisher. I am the Manager of Emission Certification at Detroit Diesel Corporation (DDC). Detroit Diesel manufactures heavy-duty diesel engines for a wide variety of applications and is the dominant supplier of engines used in urban buses.

DDC is committed to continuing to provide engines which meet the needs of all our customers in the transit industry AND to producing clean engines which will contribute to improved air quality in California and throughout the nation. Because of these commitments, we are very interested in the proposal before the Board today. We believe that with only one or two modest revisions to the proposal, DDC will be able to meet our commitment to the transit industry.

In a few moments, I will discuss our suggested revisions. Before doing this, however, I want to briefly share with you DDC's view

of the transit industry's needs and our technical capability to meet these needs over the next few years.

First, let me say that DDC currently has 6V-92 methanol engines designed and certified for urban bus use. We will continue to provide these engines and are confident that we will be able to certify them to the optional standards which have been proposed for 1994 and 1996. Additionally, DDC plans to have engines fueled with natural gas certified and available in 1994. These engines will also be capable of meeting the optional standards and generating emission credits.

Although we will be providing these low emission alternate fuel engines, we recognize that some transit properties may not be able to use them because of their higher cost, refueling infrastructure needs and other operational factors. Furthermore, the power output of these engines is limited to about 280-285 horsepower. This is not sufficient to meet the 300-330 horsepower requirement of the 60 foot articulated transit coaches which are used by some transit operators.

In recognition of these concerns with alternate fueled engines, CARB staff has proposed mandatory standards for 1994 and 1996 which it believes can be met with diesel-fueled engines. Currently, DDC has three diesel-fueled engine families certified for use in urban buses, the 6V-92TA, the 6V-92TA with a particulate trap and the Series 50. The 6V-92TA engine has been

the standard of the transit industry for many years, however it can not achieve a 0.10 g/hp-hr particulate level. As a result, it is no longer available in California and is sold Federally only with the use of emission credits. The 6V-92TA particulate trap engine uses the proven technology of the 6V-92TA, but with a Donaldson particulate trap system added. Until very recently, this was DDC's only diesel-fueled engine capable of meeting the stringent 1993 urban bus emission standards. The Series 50 is a new 4 cylinder version of our 6 cylinder Series 60 engine which has gained wide acceptance in the heavy-duty truck market. The Series 50 is currently certified for the urban bus market and is the only heavy-duty diesel-fueled engine which meets the 0.1 g/hp-hr particulate standard without aftertreatment. Because of its cost advantages and low emissions, we believe that the Series 50 will replace the 6V-92TA as the engine preferred by most transit operators throughout the country for standard bus applications up to about 280 horsepower.

Both the 6V-92TA trap engine and the Series 50 not only meet the current bus standards, but will meet the 1994 Federal and proposed mandatory California standards of 5 g/hp-hr NOx and .07 g/hp-hr particulates. In the case of the Series 50 however, an exhaust catalyst will be required. With a small amount of additional development, we are confident that both engines will also meet the 1996 Federal particulate standard of .05 g/hp-hr. Finally, we believe both of these engines have the potential to

achieve 4.0 g/hp-hr NOx and .05 g/hp-hr particulates as is required by the 1998 Federal standards.

What we are uncertain of, is what technologies can be used to achieve 4.0 g/hp-hr NOx with these engines and whether these technologies will be sufficiently developed to allow them to be used in 1996 to meet the mandatory standard which is being proposed today. In CARB staff's analysis of the technological feasibility of the proposed standard, several technologies were suggested. These included retarded injection timing, high injection pressure, advanced turbocharging and charge cooling, exhaust gas recirculation (EGR) and exhaust aftertreatment in the form of catalysts and particulate traps. The plain fact, however, is that with the exception of catalysts and EGR, all of these technologies are already in use on current model year DDC engines. While some refinements of these technologies may yet be possible, it must be recognized that their emission reduction potential has, for the most part, already been exploited in reaching the low emission levels which we have today.

As I mentioned previously, we expect to employ catalysts on our 1994 Series 50 bus engines. The catalysts will provide a small, but important, particulate reduction, but will not bring us any closer to the 4.0 g/hp-hr NOx standard.

Regarding EGR, the NOx reduction potential of this technology has long been recognized. In spite of this known benefit, EGR has

not been used on heavy-duty diesel engines for three major reasons. First is the added cost, complexity and uncertain reliability of the EGR plumbing and the sophisticated control system which would be required to regulate the EGR flow. Secondly, EGR can cause fouling of the engine intake air system and increased wear of cylinder components. Engine life may be significantly reduced. Finally, particulate emissions increase with the use of EGR. In addition to these traditional concerns, new challenges arise when attempting to use EGR in combination with the aftertreatment devices which will be required to meet the very stringent urban bus particulate standards. Given the concerns that exist with EGR, it is simply not reasonable to assume that this technology can be developed, proven and made available for widespread commercial application by 1996.

In summary, DDC will have alternate fuel urban bus engines in the 250 to 280 horsepower range which will meet and exceed the proposed mandatory standards for 1994 and 1996. With respect to diesel-fueled engines, however, the future is much less clear. We believe that by 1998, diesel-fueled bus engines will meet the proposed mandatory standards of 4.0 g/hp-hr NOx and .05 g/hp-hr particulates. However our ability to meet these standards for the full range of urban bus applications in 1996 is no better than 50/50. Incidentally, the Board should be aware that over the next three years, we will need to redevelop virtually our entire line of on and off-highway engines to meet several challenging new emission standards. Our limited resources will

be stretched very thin and our ability to meet the proposed 1996 mandatory standards may be governed more by resource limitations and business priorities than technical feasibility.

The Staff's "Initial Statement of Reasons for Proposed Rulemaking" makes it very clear that they intended to set mandatory standards which would ensure the availability of cost-effective low emission diesel-fueled bus engines for the foreseeable future. However, for the reasons I just discussed, we believe the staff has been over-optimistic in forecasting the availability of the technologies needed to meet a 4.0 g/hp-hr NOx level and, as a result, the current proposal, will, in fact, create a high degree of uncertainty regarding the availability of diesel-fueled engines in 1996. And because of the long purchasing cycles for buses, California transit operators will need to make difficult decisions about their 1996 bus purchases in the very near future before the availability issues are significantly clarified. They will have to choose between two options.

The first option would be to arrange to purchase alternate fueled engines in 1996 and to proceed with the installation of the required fueling infrastructure. This option would give the transit operators some certainty for planning, but given the precarious financial condition of the transit industry, the added expense associated with a temporary or permanent conversion to alternate fuels may not be feasible for some operators.

Furthermore, if it turns out that alternate fueled engines are not needed to meet the mandatory standards, the resources spent on conversion would, in retrospect, be found to be unwarranted. We understand that the Mobile Source Emission Credit Reduction programs encouraged by the Board can help transit operators generate funding which could partially offset alternate fuel conversion expenses. However, the uncertainties that exist regarding the availability of these programs and the quantity and value of the credits that might be generated make it difficult to accurately forecast the financial implications of a decision to convert to alternate fuels.

The other option available to transit operators, would be to delay scheduled bus purchases for 1996 and 1997 until diesel-fueled engines which meet the proposed 1996 mandatory standard become available. Because such engines should be available in 1998 when the Federal 4.0 g/hp-hr NOx standard takes effect, the purchasing delays should be no more than 2 years and may be feasible for some transit operators. This approach has obvious drawbacks. Not only would it disrupt normal bus funding and procurement patterns, but because it would delay the replacement of older, higher emitting buses, it would lead to a degradation rather than an improvement in the urban air quality.

To restore the Staff's intent to ensure the availability of cost-effective low emission diesel-fueled bus engines and to give transit operators a greater degree of certainty for making 1996

purchasing decisions, DDC suggests that the Board consider the following revisions to the proposal:

1) Delay the mandatory 4.0 g/hp-hr NOx standard until 1998. This change would not only provide engine manufacturers, bus builders and transit properties with the lead time needed to ensure a smooth transition to the next level of low emission diesel technology, but would keep costs down by harmonizing with the Federal regulations.

2) Allow averaging of NOx and particulate emission credits between urban bus engines. We see no logical reason why, if the Board is willing to allow urban bus credits to be used by trucks and stationary sources, they shouldn't also be willing to allow credit exchanges between urban buses. A statewide version of the Federal averaging program is suggested. An averaging program would allow transit operators to select an optimum mix of diesel and alternate fueled engines which would meet emission objectives and minimize costs.

3) Allow low sulfur, low aromatic California fuel to be used for urban bus engine certification testing beginning in 1996.

While we believe the Board should consider implementing all of these suggestions, we understand that the staff is reluctant to delay the implementation of the 4.0 g/hp-hr NOx standard and that implementation of an averaging program would require the

resolution of a number of regulatory and enforcement issues, and would require administrative resources.

Therefore, we encourage the Board to give the strongest consideration to permitting the use of low aromatic certification fuel. This change, will, by itself, lower certified NOx levels by about .50 g/hp-hr and will significantly increase the level of certainty that diesel-fueled engines can be certified to the 4.0 g/hp-hr NOx standard in 1996. As noted earlier, we believe this is consistent with Staff's interpretation of the intent of SB135. And since only the low sulfur, low aromatic fuel will be commercially available in California during the time that 1996 engines are in service, we think this change is also fully consistent with existing Federal and California philosophy and policies to simulate, as far as is reasonable, in-use conditions in certification testing.

In addition to the above changes, we believe the board should also consider exempting articulated buses from the proposed mandatory standards. Articulated buses require 300 to 330 horsepower and therefore, can not use the same 250 to 280 horsepower engines that are used in standard 35 to 40 foot transit buses. Because the California sales volume of articulated buses is typically less than 50 per year (DDC sold only 33 of these engines in 1992), it is doubtful that engine manufacturers could amortize their costs to develop special engines for this small market in 1996. Without relief, it is

likely that these engines would not be available in California in 1996 and 1997. Because of their small volume and the fact that these engines would remain subject to Federal regulation, their exemption from the proposed regulations would have minimal impact on air quality.

In closing, let me say that DDC supports the changes made in the proposal which have brought it into greater harmony with Federal regulations. We believe standards and emission levels today are sufficiently low that attempts to differentiate standards within the relatively narrow range of technological feasibility, will add expense by creating the need for multiple development programs and engine product lines, but will not produce meaningful differences in air quality. DDC also supports the staff's recommendation to defer action on positive crankcase ventiliation requirements until after the staff has had the opportunity to review the results of the Southwest Research Institute crankcase emission study. We believe this study will provide the information needed to assess the emission benefit and cost-effectiveness of crankcase controls.

And finally, DDC supports the structure of the optional standards which the staff has proposed. We believe that these standards in conjunction with the development of emission credit exchange programs can provide incentives to develop and use bus engine technologies that reduce emissions beyond the levels required by the mandatory standards. Until the credit programs are

implemented and the value of credits is established, however, it will be difficult for engine manufacturers and transit operators to determine if the incentives are sufficient to drive specific technologies. Consistent with the guiding philosophy of credit exchange programs, these decisions will, quite appropriately, be made in the marketplace.

DDC thanks the Board for their attention and for the opportunity to present our views on this proposal. If there are any questions, I would be glad to answer them at this time.

carb610b

(4)

ORAL COMMENTS OF

CUMMINS ENGINE COMPANY, INC.

ON THE

CALIFORNIA AIR RESOURCES BOARD

NOTICE OF PUBLIC HEARING TO CONSIDER
AMENDMENTS TO REGULATIONS REGARDING CALIFORNIA
EXHAUST EMISSION STANDARDS AND TEST PROCEDURES
FOR 1985 AND SUBSEQUENT MODEL HEAVY-DUTY DIESEL-ENGINES
AND VEHICLES, TO SPECIFY STANDARDS FOR 1994 AND
SUBSEQUENT URBAN BUS ENGINES

MAIL OUT # 93-19

JUNE 10, 1993

My name is Steve Butler and I am Manager of Product Environmental Management for On-Highway Applications for Cummins Engine Company, Inc. headquartered in Columbus, Indiana. Cummins is a major supplier of heavy-duty diesel engines to the North American automotive market. Our engines are offered as standard or optional equipment by every major North American truck and bus manufacturer. Cummins also produces engines for off-highway applications such as construction, mining, logging, and marine uses. I appreciate the opportunity to appear before you today to present comments regarding the proposal for amendments to regulations regarding urban bus engines.

Cummins recognizes that this proposed amendment intends to harmonize several elements of the California regulation with those recently promulgated by the U.S. Environmental Protection Agency (EPA). To that end, the adoption of the EPA urban bus definition, the stringent standards of particulate emissions, the newly adopted 10 year useful life period, the delay of the requirement for positive crankcase ventilation, and the harmonization of the tamper-resistant clause all promotes consistency between the regulatory agencies with whom we must deal. However, one element of the proposed regulation, that of adopting a 4 g/bhp-hr level for NOx in 1996, is not consistent with the U.S. EPA and causes

much concern in the industry. Urban bus engines are the most stringently regulated heavy-duty engines. In 1994, the PM standard will be lowered to 0.07 g/bhp-hr and in 1996 the PM standard will be lowered further to 0.05 g/bhp-hr; standards the Air Resources Board is proposing to adopt with this rulemaking. These changes necessitate significant development work by engine manufacturers. Combining a 4 g/bhp-hr NOx standard in 1996 would exacerbate this development effort further. The U.S. market for urban bus engines is only 3000 units annually, with the California market being only 300-400 units annually. A unique standard in California for such a small volume of engines simply is not cost effective. For Cummins it will necessitate a separate engine family; and for the bus manufacturers it may necessitate two different urban bus product lines, one for California and a second for the other 49 states. The parts inventories for the engine manufacturer, the bus manufacturer and likely the transit bus fleets would be burdensome. For the following reasons, Cummins recommends that the 4 g/bhp-hr NOx requirement be delayed until the 1998 model year.

First, the development effort required to meet the 4 g/bhp-hr NOx and 0.05 g/bhp-hr PM level with the required confidence level, while still maintaining customer requirements of lowest installed cost, durability,

reliability, fuel economy, low operating cost and engine/vehicle compatibility, takes a full 4 years to develop, test, certify and release into production. With this proposal, there is only a two year leadtime for the 1996 model year.

Second, Cummins, like other manufacturers, is striving to meet several other California and EPA mandates to reduce NOx and PM emissions. The impending regulations and standards include:

- the 3.9 g/bhp-hr NOx + HC standard for Medium Duty Vehicles in 1995/1996.
- the very stringent LEV and ULEV levels for Medium Duty Vehicles of 3.5 and 2.5 g/bhp-hr NOx + HC for 1998,
- the proposed rule for off-road vehicles with a 6.9 g/bhp-hr NOx level for 1996 for California and EPA,
- the 1996 EPA Urban Bus regulations of 5 g/bhp-hr NOx and 0.05 g/bhp-hr PM,
- the EPA rule for 1998 Heavy-Duty Diesel Engines with a 4 g/bhp-hr NOx level,
- the CARB ODB II rule for engines used in the Medium Duty Vehicle classification, effective in 1996 for diesel engines.

The annual sales volume represented by the other applications listed above is significantly larger than the urban bus market, and consequently the air quality benefits and NOx and PM reduction will be significantly larger than the benefit attributable to a 4 g NOx level for buses for this two year period.

CARB's figures indicate a California urban bus market of 300-400 engines per year. Efforts to pull ahead technology, with the risk of creating quality problems, is not cost effective and not a wise business decision in light of all of the other development activities currently underway and perhaps not the next most cost effective emission reduction strategy.

In addition, the certification process is very demanding and there has been little consideration given to streamlining the certification process for new technologies, as evidenced by the certification requirements for the Cummins Natural Gas program and the Cummins L10 with particulate trap program, leaving less of the two year leadtime for engine development.

If the industry is required to develop unique engine hardware than what would normally be developed for a 1998 requirement, then we will have introduced into commerce non-standard parts which must be stocked and serviced. This adds expense and complexity to the customer. The urban bus market

has gone thru considerable upheaval in the last decade, and is the most regulated market in which we serve. This additional requirement for a unique two-year engine is not justified.

There are only two engine manufacturers offering products for the urban bus market. One or the other, or both, may elect not to participate in this business in 1996 and 1997 with diesel engine offerings. Without market competition the cost study and air quality benefit presented in the staff report is, needless to say, in jeopardy.

In summary, the development work required to bring a high quality product to market 2 years ahead of the EPA schedule, when combined with a very low anticipated sales volume, and when further combined with all the other emission reduction development already underway makes the 1996 CARB Urban Bus development project impractical.

Based on the above justification, Cummins recommends that the California Air Resources Board modify their regulation to delay the 4 g/bhp-hr NOx requirement from 1996 as proposed to 1998.

If there are any questions, I would be happy to entertain them at this time.