COMMENTS
OF THE
MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION
ON THE AIR RESOURCES BOARD'S
PROPOSED REVISIONS TO THE FLEET RULE FOR TRANSIT AGENCIES
AND NEW REQUIREMENTS FOR TRANSIT FLEET VEHICLES

February 24, 2005

The Manufacturers of Emission Controls Association (MECA) is pleased to provide comments in support of the proposed revisions to the Air Resources Board's transit fleet rule and new requirements to reduce emissions from transit fleet vehicles (e.g., smaller buses, commuter buses and heavy-duty trucks owned or operated by transit agencies). We believe these proposed transit agency fleet rules are a balanced, fair, and flexible approach to achieve significant emission reductions in a cost-effective manner. The proposed regulations are designed to give transit operators flexibility in their strategies to reduce the diesel particulate matter (PM) and NOx emission levels from all of their heavy-duty diesel and alternative-fueled vehicles, in a manner similar to the existing rules that apply only to urban transits. Further, we firmly believe that the emission control technologies that will be needed to help meet the requirements of the proposed program will be available. Indeed, the PM and NOx control technologies cited in the ARB staff report are being used today in California and elsewhere. We commend the Board for its leadership in adopting ground-breaking rules as part of their broad Diesel Risk Reduction Plan, that to date has included regulations to reduce diesel PM from urban transits, refuse haulers, stationary engines, portable engines, and transportation refrigeration units. These programs serve as a model for reducing PM emissions from existing diesel engines not only in California, but also in other states and countries around the world. We also commend ARB's staff for its willingness to work with all interested parties to find effective, workable strategies to implement the program.

MECA is a non-profit association of the world's leading manufacturers of emission control technology for motor vehicles. Our members have decades of experience and a proven track record in developing and manufacturing emission control technologies for a wide variety of on- and off-road vehicles, and equipment. A number of our members have extensive experience in the development, manufacture, and commercial application of emission control technology for heavy-duty diesel engines like those used by transit agencies. Several of our members have verified diesel retrofit emission control technologies including diesel particulate filters, diesel oxidation catalysts, crankcase filter systems, lean NOx catalysts, and selective catalytic reduction catalysts that can be utilized on on-road and off-road heavy-duty vehicles and equipment.

Technologies to Reduce Diesel PM Emissions

The adoption of the urban bus emission control program in early 2000 has helped encourage considerable investment and effort in developing the technologies to meet the requirements of not only the urban bus program, but emission control strategies for other diesel-powered vehicles and equipment as well, including transit fleet vehicles. The ARB Staff technical report provides an overview of the emission control technology options available to reduce PM emissions from existing heavy-duty diesel vehicles and equipment. MECA supports the analysis performed by the ARB and we offer some additional comments in support of the Staff's conclusions regarding the technological feasibility of the proposed program.

Diesel Particulate Filters – Diesel particulate filters (DPFs) are commercially available today. Over 175,000 on-road heavy-duty vehicles worldwide have been equipped with DPFs – most in retrofit applications. In addition, over 1,000,000 new passenger cars have been equipped with DPFs in Europe since mid-2000. The operating and durability performance of DPFs has been very impressive. For example, a growing number of on-road DPF-equipped heavy-duty vehicles have been successfully operating for several 100,000 miles or more. Diesel particulate filters are expected to be used by all heavy-duty diesel engine manufacturers starting in 2007 to meet the 0.01 g/bhp-hr PM requirement associated with the U.S. EPA's 2007-2010 heavy-duty highway emission program.

High efficiency DPF technology can reduce PM emissions by up to 90 percent or more, ultra-fine carbon particles by up to 99+ percent and, depending on the system design, and toxic HC emissions by up to 80 percent or more. Development work is underway to further enhance the performance of filter system designs. For example, work continues to develop and implement additional filter regeneration strategies that will expand the applications for retrofitting DPFs. To date, passive regeneration DPF strategies that rely on either NO_2-based soot oxidation or sufficient exhaust temperatures to oxidize captured soot have been used extensively in diesel retrofit applications. Active regeneration DPF options are now beginning to emerge and be verified. These active strategies include electrical heating, diesel fuel burners, and diesel fuel injection at the inlet of a catalyzed oxidation catalyst to generate the heat required to accomplish a successful regeneration of the filter. Also, development work on filter materials and designs to further enhance filter system durability and to further reduce backpressure is underway. MECA expects additional DPF options to be verified by manufacturers in the coming years leading to the start of implementation of proposed rules covering transit agency vehicles.

As mentioned in the Staff report, Level 2 emission control options capable of reducing greater than 50 percent of the engine-out PM are also now emerging with one Level 2 technology already verified by ARB. A variety of different Level 2 systems are being evaluated and MECA anticipates that additional Level 2 systems will be verified and available in the near future for use on vehicles where a high efficiency DPF (e.g.,

Level 3, 85% or greater reduction efficiency with respect to PM) is not an available option.

Diesel Oxidation Catalysts – Diesel oxidation catalysts (DOCs) are capable of reducing PM emissions typically in the range of 20 to 40 percent and can reduce toxic HC emissions by up to 70 percent. DOCs have been used in retrofit applications for over 30 years. Over 100,000 on-road vehicles and 250,000 off-road vehicles and equipment have been retrofitted with DOCs. In addition, over 50,000,000 million light-duty vehicles in Europe and over 1.5 million trucks and buses in the U.S. have been equipped with DOCs as original equipment. DOCs retrofits have been used effectively as part of the U.S. EPA's urban bus retrofit/rebuild program and in Hong Kong, where approximately 40,000 heavy-duty vehicles have been retrofit with DOCs.

Technologies to Reduce Diesel NOx Emissions

Although the emphasis with diesel retrofit emission controls has been initially placed on reducing PM emissions, technology options for reducing NOx emissions from in-use diesel engines are coming into the marketplace. In most cases these NOx emission reduction strategies are or will be combined with PM reduction technologies to achieve reductions in both PM and NOx.

ARB has already verified a technology option that combines a lean NOx catalyst with a diesel particulate filter to achieve 25% NOx reduction with Level 3 particulate control on a wide variety of on-road heavy-duty engines. Early in 2005 the first DOC/selective catalyst reduction (SCR) technology was verified for some off-road heavy-duty engines, offering Level 1 PM control and 80% NOx conversion efficiency. Other SCR retrofit options are undergoing fleet evaluations in California and other states, including systems that combine SCR with high efficiency particulate filters that can offer Level 3 PM control. MECA expects additional SCR technology verifications to occur over the next two to three years for both on-road and off-road existing diesel engines. Urea-SCR systems are now being offered on new highway diesel engines in both Europe and Japan to comply with tighter NOx emission standards in both of these marketplaces. A number of auto manufacturers are also actively evaluating SCR for future light-duty diesel vehicles. At the recent North American International Auto Show held in Detroit, Ford Motor Co. exhibited the Meta One light-duty diesel sport wagon. This concept vehicle combined a hybrid electric powertrain with urea-SCR, advanced diesel oxidation catalysts, and a diesel particulate filter for ultra-low tailpipe emissions. Ford stated that this concept diesel hybrid is capable of achieving ARB's Partial Zero Emission Vehicle (PZEV) limits, a first for a light-duty diesel vehicle.

Other emerging retrofit technology options for controlling NOx emissions from existing diesel engines are undergoing extensive development and fleet tests including combinations of high efficiency DPFs with low pressure exhaust gas recirculation (EGR) systems, and combinations of diesel fuel reformers with lean NOx catalysts and/or lean NOx adsorber catalysts. MECA expects versions of these NOx reduction technologies to be verified and available for NOx reductions on existing diesel engines and equipment.

Emulsified diesel fuel has already been verified by ARB for use in some diesel engines, offering reductions in both NOx and PM emissions. Emulsified diesel fuel can also be combined with DOCs and DPFs to achieve even greater reductions in PM than from use of the fuel alone.

In closing, we commend the Air Resources Board for its continuing efforts to provide the people of California with healthy air quality and for demonstrating true leadership in this innovative regulatory program that will significantly reduce emissions from transit fleet vehicles operating in the State. We also wish to thank the ARB staff for its willingness to work closely with all interested parties and for its tireless efforts to develop effective implementation strategies. Our industry pledges its continued support to ensure that this important regulatory initiative is a success and the desired emission reductions are effectively achieved.