

**STATEMENT
OF THE
MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION
ON THE AIR RESOURCES BOARD'S
PROPOSED REGULATION FOR DRAYAGE TRUCKS**

December 6, 2007

MECA is pleased to provide testimony in support of ARB's proposed regulations for drayage trucks. We believe that this proposal represents a balanced, fair, and flexible approach to achieve significant reductions of particulate matter (PM) and nitrogen oxides (NOx) in a cost-effective manner. Although the proposed regulations are designed to give port truck operators flexibility in their strategies to reduce the diesel PM and NOx emission levels from their vehicles, we believe that additional opportunities exist for end user flexibilities and to achieve further PM reductions under Phase 1 of the program.

A variety of verified Level 3 particulate filters (with either passive or active regeneration strategies) are available today to allow 1994-2003 model year port trucks to comply with the proposed Phase I port truck regulations. Currently four Level 3 VDECS have been verified for application on older 1988-1993 trucks. In the event that funding for replacement of all pre-1994 trucks does not become available, the possibility of retrofitting older 1988-1993 model year trucks with Level 3 VDECS would serve to deliver the needed PM emissions reductions while providing additional flexibility for owner operators to depreciate their vehicles and financially justify meeting the Phase II requirements by replacing their older truck with a 2007 emissions equivalent or cleaner truck. MECA asks the Board to consider adding this additional Phase I compliance flexibility.

MECA also recommends that the 2004-2006 model year engine equipped trucks allowed under Phase I compliance be also required to install an appropriately verified Level 3 VDECS (if it is available) to achieve further PM emission reductions from Phase I of this regulation. An uncontrolled 2004 engine emits as much as ten times the PM of a 2003 or older engine filter equipped truck. Three Level 3 technologies have already been verified that could be installed on these newer model year trucks. If verified filter technologies are available, there is no reason to give these newer engines a break on reducing their PM levels. We believe that the adoption of a rule designating a Level 3 VDECS requirement for 2004-2006 model year engines would also stimulate the market to develop additional verified technologies for these newer vehicles.

2007 model year, filter-equipped heavy-duty trucks have been successfully introduced into the U.S. market earlier this year and are available for port truck replacements for either the proposed Phase I or Phase II compliance steps.

MECA is a non-profit association of the world's leading manufacturers of emission control technology for motor vehicles. Our members have over 35 years 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 running on gasoline, diesel and alternative fuels. A number of our members have extensive experience in the development, manufacture, and commercial application of emission control technology for heavy-duty diesel engines. Many of our members have verified diesel retrofit emission control technologies including diesel particulate filters, diesel oxidation catalysts, crankcase filter systems, EGR/DPF systems and lean NOx catalysts for on-road trucks like those used to service California's ports and intermodal rail yards. Several of our members are actively involved in ARB's retrofit verification process to receive approval for advanced retrofit systems to reduce both NOx and PM from these older on-road vehicles.

Those MECA members engaged in the diesel retrofit market in California and the rest of the U.S. have already or are in the process of putting resources in place to ensure that there will be adequate supply of verified retrofit hardware to meet the expected large demand in California for both on-road and off-road applications, consistent with the implementation dates for various fleet rules adopted by ARB.

Our members are also partnering with vehicle and engine manufacturers to make "clean diesel" cars and trucks a reality here in North America by investing more than \$2 billion in R & D and capital expenditures to develop, optimize, and commercialize advanced emission control technology to meet the 2007 and 2010 on-highway and federal Tier IV off-road diesel emission standards.

Control Technologies to Reduce Diesel PM Emissions

The implementation of in-use diesel emission regulations under California's Diesel Risk Reduction activities has helped to encourage considerable investment and effort in developing the retrofit technologies to meet the requirements of emission control strategies for a wide variety of diesel-powered vehicles and equipment. The ARB Staff Technical Support Document provides an overview of the emission control technology options available to reduce PM and NOx emissions from existing heavy-duty diesel class 8 trucks like those used in port and rail yard service. MECA offers 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 and have become standard equipment on all new diesel engines and vehicles to achieve ARB's and EPA's 2007, 0.01 g/bhp-hr PM highway diesel standard and ARB's LEV II and EPA's Tier 2 PM emission regulations for light-duty passenger vehicles and trucks. The longest experience with DPFs has been generated for the past eight years in Europe where they are installed on over four million new diesel passenger cars (these

European passenger car filter applications include the use of fuel-borne catalysts and catalyzed filters). The need to clean up the long-lived diesel legacy fleet has been recognized in California and around the world with over 200,000 on-road heavy-duty vehicles having been retrofitted with high-efficiency DPFs.

To date, the real-world experience with DPFs in both OEM and retrofit light-duty and heavy-duty on-road vehicle applications has been very positive. Through millions of miles of operation, DPFs continue to provide high reductions in PM emissions with very few operational problems. Significant investments in DPF production capacity have been made and will be expanded in the future to ensure that DPF demands for both new vehicles and retrofit applications in North America can be met.

These successful on-road DPF applications are generally employing durable ceramic wall-flow filters to achieve in excess of 90% reduction in engine-out PM levels over years of operation. Light-duty and heavy-duty new vehicle applications of DPFs rely on combinations of both passive and active regeneration strategies for periodic combustion of soot that accumulates on the filter. In many cases, catalysts displayed directly on the filter substrate and/or located upstream of the filter element have been used to facilitate soot oxidation under normal exhaust temperatures. When retrofitting existing engines, the applicability of passively or actively regenerating filter technologies strongly depends on the duty cycle of the vehicles and the corresponding exhaust temperatures that are generated.

Wall-flow filters, in addition to trapping soot, also trap inorganic ash constituents present in the exhaust stream that are chiefly associated with lubricant additive packages. Regular maintenance of wall-flow filters to remove accumulated ash is necessary to keep engine backpressures at acceptable levels. However, through the use of low-ash containing lubricants, improved engine designs that minimize lubricant consumption, proper filter substrate sizing, and novel filter substrate cell designs (e.g., asymmetric inlet and outlet cell sizes), ash cleaning intervals can be extended to many thousands of hours of operation. Some engine manufacturers expect maintenance intervals for filters equipped on new 2007 heavy-duty trucks to reach 300,000 miles or more in Class 8 long haul trucks. Filter maintenance intervals for retrofit filters will depend strongly on duty cycles and engine lubricant consumption characteristics. MECA published a report on filter maintenance practices and experience in 2005. This report is available on the MECA website at: www.meca.org/galleries/default-file/Filter_Maintenance_White_Paper_605_final.pdf

MECA supports the staff proposal that will require that all 1994-2003 model year port truck engines be retrofit with a verified, Level 3 PM emission control device such as a diesel particulate filter however we feel that a significant opportunity is lost in achieving the maximum PM benefit from this proposed regulation by not extending the Level 3 VDECS retrofit requirement to 2004-2006 model year engines.

Technologies to Reduce Diesel NOx Emissions

Although the emphasis with diesel retrofit emission controls to meet earlier regulations as part of the Diesel Risk Reduction Plan has been initially placed on reducing PM emissions, the recent commitments for the state implementation plan has identified a need to significantly reduce NOx as well. This need has been the greatest in Southern California and the San Joaquin Valley. As a result, original equipment and retrofit technology options for reducing NOx emissions from heavy-duty diesel engines are coming into the marketplace. Manufacturers are committed to verifying retrofit technologies that combine Level 3 PM control with high efficiency NOx reduction technologies, like selective catalytic reduction (SCR) for existing on-road truck applications that should be available for Phase II compliance on existing port trucks. Moyer funds should be used to assist owner operators who wish to go beyond the proposed regulations and install any retrofit options that also provide NOx reductions not required for port trucks as a part of the proposals presented by staff.

Lean NOx Catalyst (LNC) Technology – ARB has already verified a technology option that combines a lean NOx catalyst with a diesel particulate filter to achieve 25 percent NOx reduction with Level 3 particulate control on a wide variety of on-road heavy-duty engines for model years covering Phase 1 implementation of this proposal. This technology uses diesel fuel as the reagent for NOx reduction, and therefore does not require special infrastructure. Because of this, it is sometimes called hydrocarbon selective catalytic reduction (HC-SCR). To date, more than 3500 LNC/DPF based VDECS have been deployed in California in transit, refuse, and line haul applications.

Low-Pressure EGR – This technology is being successfully demonstrated in retrofit applications on trucks, buses, and other applications. Over 2,000 systems are running worldwide. Low-pressure EGR has demonstrated a NOx control capability in the range of 30 to 60 percent. ARB has verified a low-pressure EGR+DPF systems with up to 40 percent NOx reduction for a variety of 1998-2001 on-road diesel engines.

Selective Catalytic Reduction (SCR) – SCR technology is a proven NOx emission control strategy. SCR has been used to control NOx emissions from stationary sources for over 20 years. More recently, it has been applied to select mobile sources, including trucks, marine vessels, and locomotives. Applying SCR to diesel-powered engines provides simultaneous reductions of NOx, PM, and HC emissions. Open loop SCR systems can reduce NOx emissions from 75 to 90 percent. Closed loop systems on stationary engines have achieved NOx reductions of greater than 95 percent. Modern SCR system designs have been detailed for mobile source applications that combine highly controlled reductant injection hardware, flow mixing devices for effective distribution of the reductant across the available catalyst cross-section, durable SCR catalyst formulations, and ammonia slip clean-up catalysts that are capable of achieving and maintaining high NOx conversion efficiencies with extremely low levels of exhaust outlet ammonia concentrations over thousands of hours of operation.

In 2005, SCR using a urea-based reductant was introduced on a large number of on-road, diesel heavy-duty engines to help meet the Euro IV and V heavy-duty NOx emission standards. There are now more than 100,000 SCR-equipped trucks operating in Europe. SCR is being given serious consideration by engine manufacturers for complying with future on-road heavy-duty diesel engine emission standards in both the U.S. and Japan (in the 2009-2010 timeframe). Several auto manufacturers are also developing SCR systems for light-duty diesel vehicles that will be sold in California and across the U.S. before the end of this decade. The U.S. Department of Energy's APBF-DEC program (completed in 2005) included the evaluation of two different combined DPF+SCR systems on a 12-liter heavy-duty diesel engine. These results included the operation of these two different SCR+DPF systems for 6,000 hours of durability with emission performance near the EPA 2010 heavy-duty on-road emission limits.

Volvo AB, in the summer of 2004, launched 27 diesel transit buses in Sweden that are operating with a combined SCR+DPF system to reduce PM and NOx emissions below the European 2008 Euro V heavy-duty emission limits. A number of small test fleets of heavy-duty, over-the-road diesel vehicles are also now operating within the U.S. to demonstrate the capabilities of combined PM and NOx control using SCR and DPFs in advance of the ARB and EPA 2010 heavy-duty emission standards. Manufacturers are also running trials in the U.S. on existing heavy-duty vehicles equipped with retrofit DPF+SCR system designs.

We have highlighted examples of NOx and PM technology retrofit demonstrations and the significant role that both technologies will play in helping engine and vehicle manufacturers meet the 2010 heavy duty federal and California emission standards. MECA agrees with staff's assessment that additional time is needed for manufacturers to complete ARB's verification protocols for advanced retrofit systems that combine Level 3 PM control with a high efficiency NOx reduction technology like SCR. Manufacturers are working aggressively to verify new NOx and PM reduction technologies and we thank ARB for providing flexibilities in this regulation (and others to be considered in the future) to allow the use of verified PM and NOx retrofit technologies as compliance option for achieving 2007 or 2010 heavy-duty engine performance levels on older trucks.

The availability of VDECS is predicated on efficient and effective retrofit verification protocols. MECA and its members are engaged with ARB staff as they prepare their amendments to the verification procedure for presentation to the Board in January 2008. MECA member companies feel that ARB's retrofit verification program is severely under-resourced to facilitate the efficient transfer of verified technologies to the marketplace. Additional qualified resources are necessary with a working knowledge of the latest NOx reduction technologies, like SCR, to handle the diversity of applications and complexity of technologies required to achieve the goals of this and future in-use regulations.

In closing, we ask the Board to consider MECA's recommendations to achieve additional PM reductions and provide additional flexibilities for the use of VDECS under Phase I of the proposal. 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 deliver an estimated 32.5 tons per day of NOx reductions by 2014 and an estimated 2.5 tons per day of PM reductions starting in 2010 from drayage trucks. MECA believes that technologies to achieve both the PM and NOx emission reduction goals from on-road vehicles and engines are technically feasible for heavy-duty on-road diesel engines, and are either available today as original equipment or retrofit options, or will be available in the near future for retrofit on existing trucks. These emission control technologies can play an important role in reducing emissions from trucks servicing California's ports and rail yards. Our industry is committed to continue to invest in the development and verification of cost-effective, retrofit emission control technologies for all existing diesel engine applications, including the older port truck fleet to ensure that this important regulatory initiative is a success and the desired emission reductions are effectively achieved.

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