**TESTIMONY**
**OF THE**
**MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION**
**ON**
**PROPOSED LEGISLATION RELATING TO THE USE OF ULTRA LOW SULFUR DIESEL FUEL AND THE BEST AVAILABLE TECHNOLOGY BY NONROAD VEHICLES IN CITY CONSTRUCTION**

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The Manufacturers of Emission Controls Association is pleased to provide testimony in support of the Council of the City of New York's proposed legislation requiring diesel-powered nonroad construction vehicles (50 hp and greater) that are owned or leased by the City of New York or used to fulfill the requirements of a public works contract to be powered with ultra low sulfur (15 ppm) diesel fuel and to utilize the best available pollution control technology when in use in Lower Manhattan.

MECA is a non-profit association made up of the world's leading manufacturers of mobile source emission controls. MECA member companies have over 30 years of experience and a proven track record in developing and commercializing exhaust emission control technologies. A number of our members have extensive experience in the development, manufacture, and commercial application of emission control technologies for diesel engines, including engines used in nonroad applications. These companies are committed to make the necessary investments to ensure that the emission control technology is available to help clean up emissions from diesel-powered vehicles. A recent survey of MECA's members revealed that our industry is investing over $1.5 billion in R & D and capital expenditures to develop, optimize, and commercialize advanced emission control technology to substantially reduce emissions from on-road and nonroad diesel engines.

**The Benefits of Using Ultra Low (15 ppm) Sulfur Diesel Fuel**

Reducing the sulfur level in diesel fuel has direct benefits in terms of reducing particulate matter (PM) emissions and also is beneficial to engine durability. In addition, ultra low sulfur fuel enables the use and optimization of PM, NOx, and toxic hydrocarbon (HC) emission control technologies on diesel engines. For example, when ultra low sulfur diesel fuel is used, catalyst-based diesel particulate filters can be utilized to achieve a 90 percent or more reduction in total PM compared to an engine without a DPF. The direct benefits of ultra low sulfur diesel fuel as well as its benefits in enabling effective emission control technology has been well-documented by regulatory agencies such as the U.S. Environmental Protection Agency and the California Air Resources Board.

**Emission Control Technologies Are Available and Emerging to Significantly Reduce Emissions from Nonroad Diesel Engines**

Technologies to reduce diesel PM, such as diesel particulate filters and diesel oxidation catalysts, are commercially available today. In fact, the use of exhaust emission control technology for nonroad diesel engines is not new. For over thirty-five years, nonroad diesel engines used in the construction, mining, and materials handling industries have been equipped with exhaust emission control technology – initially with diesel oxidation catalysts (DOCs) and followed later by diesel particulate filters (DPFs). These systems have been installed on vehicles and equipment both as original equipment and as retrofit technology on over 250,000 nonroad engines worldwide. Also, selective catalytic reduction (SCR), which has been widely used on stationary engines and in some mobile source applications on a limited basis, is another possible PM control strategy that also provides significant NOx emission reductions. Finally, NOx control technologies can be combined with PM control technologies. For example, low-pressure exhaust gas recirculation (EGR) technology combined with diesel particulate filter technology is an available retrofit strategy for selected nonroad diesel engines. Similarly, lean-NOx catalyst technology, which has been combined with both DOC technology and DPF technology, is an available retrofit technology for on-road heavy-duty engines and is being evaluated for nonroad engine applications. These technologies, which are or will be available in the near future for reducing emissions from nonroad diesel engines used in construction applications, are discussed in more detail below.

*Diesel Particulate Filters* (DPFs) – As noted above, DPFs are commercially available today. Over 70,000 on-road heavy-duty vehicles and more than 500,000 diesel passenger cars in Europe have been equipped with this technology. For nonroad engines, DPFs have been successfully installed and used on mining, construction, and materials handling equipment. In these nonroad engine applications, DPF systems have been successfully designed to function effectively over the specific duty cycle of the engine. DPF technology is projected to be utilized on highway heavy-duty diesel engines sold in the U.S. beginning with the 2007 model year. Indeed, DPFs are currently available on selected on-road diesel vehicles in the U.S. and Europe. This technology has demonstrated impressive durability characteristics in commercial operation in the U.S. and Europe and will be used across the board on diesel vehicles and engines in Japan beginning in 2005. Also, a growing number of different filter system designs and strategies – both passive and active – are emerging.

Where diesel fuel with <15 ppm sulfur is used, precious metal catalyst-based diesel particulate filters (CB-DPFs) have consistently demonstrated the capability to reduce PM emissions on a mass basis by up to 90 percent or more. In addition, this technology has proven effective in reducing the carbon-based PM by up to 99.9+ percent, while significantly reducing particle numbers over the full range of particle size, including ultra-fine particles. Finally, CB-DPF technology has demonstrated the capability to reduce a wide range of toxic hydrocarbon species and PAHs by up to 80 percent or more.

*Diesel Oxidation Catalysts (DOCs)* – DOC technology is available today and can be applied to the full range of engine sizes used in construction applications. Over 250,000 nonroad vehicles and equipment, including mining vehicles, skid steer loaders, forklift trucks,

construction vehicles, and stationary engines, as well as over 35 million diesel passenger cars in Europe and over 1.5 million trucks and buses worldwide, have been equipped with DOCs. DOCs reduce PM emissions in the range of 20 to 40 percent depending on the engine type and condition, as well as the sulfur level in the fuel. If 15 ppm sulfur diesel fuel is used, DOCs can be optimized for maximum control of PM and toxic HC emissions.

*Selective Catalytic Reduction (SCR) Technology* – SCR technology is primarily a NOx emission control technology (up to 80 percent or more NOx reductions), but it also controls PM emissions (20 to 40 percent). SCR has been used to control emissions from stationary sources for over 15 years. More recently, it has been applied to select mobile sources, including trucks, marine vessels, and locomotives. In 2005, SCR is expected to be introduced in Europe on on-road diesel heavy-duty engines to help meet the Euro 4 emission standards. As noted above, applying SCR to diesel-powered engines provides simultaneous reductions of NOx, PM, and HC emissions.

*Low-Pressure EGR* – This technology is being successfully demonstrated in retrofit applications on trucks, buses, and other applications. Over 1500 systems are running worldwide. Low-pressure EGR has demonstrated a NOx control capability in the range of 30 to 60 percent. With an active DPF and <15 ppm sulfur diesel, control levels as high as 80 percent may be achievable. Current experience with low-pressure EGR is in the 185-440 hp range, but the technology could be optimized for a larger range of engine categories. This technology is expected to be an available option for nonroad diesel engines.

*Lean NOx Catalyst (LNC) Technology* – This technology, which has been utilized in passenger car applications in Europe, recently was verified by the California Air Resources Board (25 percent NOx control) in retrofit applications. This technology, which is being used in combination with both DPFs or DOCs, is being demonstrated and commercialized for a variety of nonroad applications, including heavy-duty earthmoving equipment, agricultural pumps, and portable engines.

*Crankcase Emission Controls* – Crankcase emissions can be a significant source of PM from uncontrolled, turbocharged engines. Currently on diesel engines, a rudimentary filter may be installed on the crankcase breather (the vent for the oil reservoir), but a substantial amount of particulate matter is released to the atmosphere. For diesel engines used in motor vehicle applications, emissions through the breather may exceed 0.7 g/bhp-hr during idle conditions on recent model year engines.

One solution to this emissions problem is the use of a multi-stage filter designed to collect, coalesce, and return the emitted lube oil to the engine's sump. Filtered gases are returned to the intake system, balancing the differential pressures involved. Typical systems consist of a filter housing, a pressure regulator, a pressure relief valve, and an oil check valve. These systems have the capability to virtually eliminate crankcase emissions. This technology is currently being used in Europe and will be used on highway diesel heavy-duty engines in the U.S. beginning in 2007.

## CONCLUSION

In closing, we commend the City Council of New York City for its leadership in proposing an important initiative that will provide significant health and welfare benefits in New York City. It will also serve as a model program for other cities seeking ways to reduce emissions from diesel-powered construction vehicles. If the legislation is adopted, we look forward to working with city officials, the construction industry, and other interested parties to help make this program a great success.