Comments of the Manufacturers of Emission Controls Association on the U.S. Environmental Protection Agency's Amendments to Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines; New Source Performance Standards for Stationary Internal Combustion Engines

Docket ID No. EPA-HQ-OAR-2008-0708

August 9, 2012

The Manufacturers of Emission Controls Association (MECA) is pleased to provide comments in response to the U.S. Environmental Protection Agency's (EPA) reconsideration of National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines and New Source Performance Standards for Stationary Internal Combustion Engines. We commend the agency for its continuing efforts to develop and implement effective emission control standards for major sources of air pollution such as this category of engines.

MECA is a non-profit association made up of the world's leading manufacturers of mobile source emission control equipment for automobiles, trucks, buses, and off-road vehicles, as well as stationary internal combustion engines. MECA member companies have over 35 years of experience and a proven track record in developing and commercializing exhaust emission control technologies for the types of engines impacted by these regulations.

MECA supported the original regulations governing the control of hazardous air pollutants (HAPs) from stationary CI and SI engines that were adopted on February 17, 2010 and August 10, 2010 respectively. Our primary reason for supporting the regulations was that they presented a balanced and cost effective approach for controlling hazardous air pollutants from this category of stationary RICE engines. The required control technologies include diesel oxidation catalysts for some diesel and lean-burn engines and non-selective catalytic reduction or three-way catalyst technology on some stoichiometric and rich-burn spark-ignited engines. Both of these technologies represent the most cost effective means for controlling HAPS from this category of engines. Oxidation catalysts offer additional co-benefits of reducing 25-50% of the PM and over 90% of VOCs and CO from diesel and other lean-burn engines. NSCR catalysts not only reduce over 95% of the HAPs and other VOCs they simultaneously reduce over 95% of the NOx and CO from SI engines at no extra cost.

Several of the proposed amendments to these regulations represent a significant roll-back of the original rule and we believe that EPA's Regulatory Impact Analysis underestimates the increase in emissions as a result of the proposed changes. MECA's comments focus on four primary amendments to the regulation: the allowance for emergency stand-by engines to operate for up to 100 demand response hours, without the use of exhaust controls; the allowance for existing area source four stroke rich-burn

(4SRB) engines in unpopulated areas to only follow management practices; the use of 30% total hydrocarbon (THC) reduction as a surrogate for 76% formaldehyde reduction from 4SRB engines that employ NSCR technology and the use of 75% CO or 30% THC as a surrogate for a 76% formaldehyde reduction from 4SRB engines in area sources located in populated regions. Further detail for our recommendations on each one of the proposed changes is provided below.

Extension of Demand Response Usage Allowance to 100 hours/year

In the original regulation for reducing HAPs from stationary diesel engines, EPA exempted emergency stand-by engines from exhaust controls for up to 15 hours/year of demand response (DR) use and up to 100 hours of non-emergency use such as for testing and maintenance. EPA assumed that this usage would not require exhaust controls such as DOCs on emergency engines. Many of these emergency engines can also be used to supply power during periods of high energy demand or peak shaving and can be registered with utility companies as available for emergency demand response programs. For both of these functions the operators are well compensated financially which helps to offset the cost of the engines. As EPA stated in their own analysis, most demand response programs require at least a 60 hour/year commitment of availability in order to qualify for the program. Our members believe that this represented a significant incentive for operators to install emission controls on their stand-by engines in order to qualify for the financial incentives of DR programs. By extending the allowable time for stand-by engines to be used for emergency demand response from 15 to 100 hours allows all of these engines to qualify for demand response programs without the need to employ catalytic controls. MECA members experience is consistent with EPA's analysis that most demand response engines operate in the range of 25-100 hours per year. Under the proposed revisions, by allowing up to 100 hours of DR operation, operators will not need to install controls and the program will lose the benefit of emission reductions that would have been achieved under the existing rule.

Diesel oxidation catalysts (DOCs) are the most cost effective emission control strategy for reducing hazardous air pollution from stationary diesel engines. Typically using a very light loading of platinum catalyst on a monolithic support, they are able to oxidize CO, HC, and the soluble organic fraction (SOF) of PM in a diesel engine's exhaust stream. DOCs installed on engines running 500 ppm or less sulfur fuel have achieved total particulate matter reductions of 20 to 50 percent, hydrocarbon reductions of 60 to 90 percent (including those HC species considered toxic), and significant reductions of carbon monoxide, smoke, and odor. The reduction of odor is especially important for engines located at hospitals and other sensitive areas.

Our member's experience has shown that demand response programs are a lucrative way to pay for emergency stand-by engines that are otherwise just sitting idle for most of the year. MECA believes that it is reasonable to require operators wishing to make money with their stand-by engines to be required to reinvest a portion of the proceeds to clean-up the pollution created by those engines. Extending the DR limit to 100 hours, including 50 hours for peak shaving, gives all of these operators a free opportunity to pollute the air for financial gain. This was not the original intent of the NESHAP regulation. Furthermore, we believe that EPA has not accounted for the increased emissions from this change in their analysis. The agency incorrectly assumed that the original 100 hour non-emergency allowance is equivalent to the 100 hour DR allowance that the proposed amendments would allow. While EPA may not have expected DR engines to install emission controls under the original CI NESHAP rule, MECA members experience indicates that this is a significant portion of the diesel engine emission control market. If the regulation allows these engines to qualify for demand response programs, rather than only allowing 100 hours for testing and maintenance, operators will find a way to maximize the use of the engines for the full time allowed without the use of emission controls. Emergency engines registered in a demand response program cannot guarantee to stay within an annual operating hour limit if called upon during a power emergency and therefore, many states consider any DR engine no longer an emergency engine. We agree with this classification. The bottom line is that if engines are emitting pollution for the purpose of financial gain than a portion of that compensation should be reinvested into pollution controls to remediate those emissions.

Exemption of 4SRB Engines > 500 hp in Unpopulated Areas

The large spark ignited engines in unpopulated areas represent the major portion of the engines used in the production of natural gas, complementing the diesel engines used in drilling rig operations, electric generators, hydraulic fracturing pumps and recovery pumps. These 4SRB engines are employed to compress natural gas from the well to the gas processing plant and ultimately to the gas pipeline. Although remotely located, 4SRB gas engines, by necessity, have operated successfully unattended in remote locations. State air agencies have permitted these engines with NSCR catalytic converters and air fuel ratio controllers for many years. The original SI NESHAP regulation required the use of NSCR catalysts on these largest rich-burn engines, regardless of location.

Closed loop, non-selective catalytic reduction (NSCR) technology is a very cost-effective way to reduce HAPs from stationary rich-burn engines because this is essentially the same three-way catalyst technology that has been employed on passenger cars since the late 70s and employed on stationary rich-burn engines for over 30 years. NSCR for stationary engines is a proven technology based on automotive three-way catalyst that has been installed on over 300,000,000 automobiles with outstanding results. Today's commercial NSCR technology can easily reduce HAPs and other hydrocarbons by over 95%. In fact with the use of state of the art air fuel controllers, conversion efficiencies of over 99% for all three criteria pollutants have been demonstrated. Our members have installed tens of thousands of these catalysts on rich-burn stationary natural gas fueled, reciprocating engines and have repeatedly demonstrated 99% reduction relative to the untreated exhaust. Most of these installations are in remote, unpopulated areas. The engines tend to be clustered in close proximity to facilitate inspection and maintenance of numerous engines with a single visit. The staff report argues that these engines may be difficult to access, lack electricity and be unmanned most of the time. NSCR technology is a passive, durable technology that requires little maintenance or monitoring. Although the air/fuel controllers may need periodic calibration and catalysts may require an occasional cleaning, this is being done on thousands of existing NSCR installations in remote areas today.

When EPA adopted the original SI NESHAP rule, they concluded that the use of emission controls such as NSCR on these very large non-emergency rich-burn engines is a cost effective, feasible and readily available control strategy regardless of location and we believe that this conclusion remains valid today. EPA's own impact analysis showed that this amendment alone results in 113,000 tons per year more NOx, VOC and HAP emissions than under the original 2010 SI RICE NESHAP rule. This is an approximately 70% increase. Although these engines may be in remote areas, pollutants such as NOx, VOCs and HAPs are transported from region to region ultimately resulting in higher ozone levels in states far from their origin. Although this rule did not address the control of ozone precursors when originally adopted, the unintended consequence of their creation as a result of rolling back originally justified controls should not be ignored. Particularly at a time when the agency is considering further tightening of national ambient standards that states are struggling to meet. The lost opportunity to capture these NOx and VOC emissions will require other back-stop measures to reduce equivalent emissions from other sources to make-up for reductions that were already justified in the current SI RICE NESHAP rule.

The use of 30% THC reduction as a surrogate for 76% formaldehyde reduction

MECA supports the use of a surrogate for demonstrating a formaldehyde reduction consistent with the requirements of the SI RICE NESHAP regulation. It would be desirable to identify a suitable surrogate compound that would reduce the cost of compliance measurements for the end user. The catalyst literature documents the use of CO, formaldehyde and most HAPs as suitable surrogates because of their relatively similar light-off temperatures. In natural gas fired engines, over 90% of the total hydrocarbons (THCs) are methane. After a review of the data and analysis supporting the petition submitted by Dresser-Waukesha, we understand that the petitioners are not proposing a true surrogate that correlates with a defined level of reduction but rather a worst case THC concentration that would insure a level of formaldehyde reduction at least as high as the existing 76% formaldehyde reduction currently required to comply with the regulation. THC conversion is strongly tied to exhaust temperature, exhaust composition, the level of degradation of the catalyst, the setting of the air/fuel ratio control and the position of the catalyst in the exhaust. Furthermore, the hydrocarbon composition of natural gas fuels can vary greatly depending on the source of the fuel. All of these factors this will dictate the THC conversion.

From the perspective of using THC to represent a worst-case emissions limit we believe that the approach has merit and we believe that it is technically feasible to achieve over a 30% THC conversion across today's commercial NSCR catalysts. However, because methane is very difficult to convert over a catalyst and the Waukesha analysis failed to consider the condition of the catalyst among other important variables, we believe further work is needed to establish the appropriate level of THC conversion that would guarantee a 76% formaldehyde conversion over the long timeframe that NSCR catalysts operate in the field.

The use of 75% CO reduction as a surrogate for 76% formaldehyde reduction

EPA is proposing to require area source four-stroke rich-burn engines greater than 500 hp located in populated regions to install an NSCR catalyst and demonstrate a 75% CO emissions limit or a 30% THC limit, rather than the current 76% formaldehyde limit. Four-stroke lean-burn engines in similar applications are held to a 93% CO reduction standard. MECA's concern with the discrepancy between rich and lean burn engines lies in the fact that a rich-burn engine can be calibrated to an air to fuel ratio that results in an oxygen rich (lean) exhaust allowing it to very easily achieve a 75% CO reduction while not meeting the desired 76% formaldehyde efficiency because of the difference in light-off temperatures between the two gases. A 75% CO limit can be met easily, even with inferior catalysts. Furthermore the engine out CO content in rich-burn engine exhaust can be changed dramatically by changing the air to fuel ratio thus allowing apparent catalyst efficiency to be controlled by minor adjustments during testing. Normal engine loads or small transient operation during source testing may be unavoidable and result in inadvertent changes to air/fuel ratio that would ultimately affect the measured CO conversion efficiency. This possibility provides an opportunity for incorrect measurements and operator abuse that would result in increased HAP emissions. To ensure that the HAP emission reductions of the original rule are met, MECA supports the existing 76% formaldehyde reduction or a 93% CO reduction for rich-burn engines to harmonize 4SRB and 4SLB engines greater than 500 hp to the same emission standards.

Conclusion

We thank EPA for this opportunity to comment on the proposed changes to the NESHAP and NSPS regulations for CI and SI RICE stationary engines. We commend staff for receiving input from all stakeholders, holding workshops and listening sessions prior to proposing changes to an existing emission regulation. Although some of the proposed changes are justified, there are several, as noted above, that we have concerns about because of their impact on emissions. Furthermore these changes represent a significant roll-back on the use of the most cost effective control technology that was clearly justified in the original rulemaking.

MECA believes that given the recent classification of diesel exhaust as a known carcinogen to humans by the World Health Organization, provides EPA with an opportunity to require stationary diesel engines to install diesel particulate filters (DPFs) to reduce the health hazards of diesel exhaust.

DPFs have demonstrated to be very effective in reducing PM emissions from both mobile and stationary diesel engines. The combination of using ultra-low sulfur diesel fuel with high-efficiency DPFs (e.g., DPFs that use wall-flow ceramic filters) provides the maximum reduction in PM emissions and additional co-benefits of significant reductions in toxic hydrocarbons, CO, and black carbon (a significant climate forcing agent) emissions when catalyst-based DPFs are employed. MECA believes DPFs should be installed on in-use stationary diesel engines wherever technically feasible. We believe that the use of DPFs on existing stationary diesel engines can be implemented on both prime and emergency stand-by engines with power ratings of 50 hp or greater. In addition, the combination of DPFs with SCR systems can be an effective solution for delivering combined PM and NOx reductions from in-use stationary diesel engines. In situations where DPFs are not technologically feasible, DOCs should be considered as an alternative option to help achieve at least a minimum level of PM and toxics control from applicable stationary diesel engines.

MECA and its member companies look forward to working with EPA, the engine and equipment manufacturers, end-users, and others in implementing the final changes to these regulations.

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