COMMENTS OF THE
MANUFACTURERS OF EMISSION CONTROLS ASSOCIATION
ON THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S REQUEST FOR COMMENT ON EVALUATION OF EXISTING REGULATIONS

DOCKET ID NO. EPA-HQ-OA-2017-0190-0042

May 15, 2017

The Manufacturers of Emission Controls Association (MECA) is pleased to provide comments in support of the U.S. EPA's request for input on regulations that may be appropriate for repeal, replacement, or modification. We have a 40-year history of working with EPA, including responding over 50 times in just the past 15 years to requests for comments from EPA's Office of Transportation and Air Quality (OTAQ) on regulations ranging from handheld equipment to ocean going vessels and all mobile sources in between. We commend EPA for searching for opportunities to learn from the experience of implementing current regulations to gain efficiencies and reduce unnecessary burden to regulated parties through regulatory reform. This is consistent with our long interaction with the agency which has always relied on a data driven regulatory process informed by a broad range of stakeholders. OTAQ's regulatory process has been motivated by the premise that environmental policy should minimize costs and ensure a much greater benefit.

MECA has been called upon numerous times to review and comment on the accuracy of the cost information for emission control and engine efficiency technologies that have been considered as possible pathways toward compliance with agency regulations. Numerous studies have shown that the health benefits of OTAQ regulations to reduce air pollution are significantly higher than the cost of implementation. In fact, the Clean Air Act is estimated to result in $2 trillion in benefits in 2020, which represents $30 in benefits for every dollar spent. These economic benefits are due in large part to the development and enforcement of important air pollution regulations by the U.S. EPA as required by the Clean Air Act Amendments of 1970. EPA and California Air Resources Board (ARB) policies have not only provided important health benefits stemming from large reductions in emissions from mobile sources but have also created an industry with significant numbers of highly skilled jobs and a global economic reach. MECA supports efforts to increase the benefits from EPA rules and voluntary programs while reducing regulatory burden where possible. MECA has supported EPA's programs through changes in Administrations and we welcome the opportunity to continue our long and productive collaboration. In our comments, we will focus on current and potential future mobile source emission regulations that will continue to advance the U.S. emission control and efficiency industry and ensure the competitiveness of U.S. manufacturers in the global vehicle marketplace.

Founded in 1976, MECA is a trade association of the world's leading manufacturers of emission control and combustion efficiency technology for mobile sources. Our members have over 40 years of experience and a proven track record in developing and manufacturing technologies for reducing criteria emissions and improving engine efficiency for a wide variety of on-road and off-road vehicles and equipment in all world markets. This includes small handheld equipment, passenger cars, heavy-duty trucks, construction equipment, locomotives,

marine vessels, and stationary engines, amongst others. Our industry has played an important role in the emissions success story associated with mobile sources in the United States and has continually supported efforts to develop innovative, cost effective emissions programs to mitigate air quality problems.

In summary, MECA supports EPA's regulatory reform efforts and would like to highlight some main points for the agency's consideration:

- The emission controls industry creates tens of thousands of jobs in the U.S. and makes a positive contribution to the U.S. economy. Environmental regulations provide certainty for our companies to make long term investments and compete with the rest of the world.
- Cost effective technologies are available to meet the latest light-duty vehicle fuel economy standards through 2025, and MECA encourages EPA to work with NHTSA and the California Air Resources Board to develop one national program. One area that would benefit from interagency coordination is to help suppliers pre-certify fuel saving technologies in order to encourage adoption by car manufacturers.
- Heavy-duty fuel economy and criteria pollutant standards should be set on the same timeline so that engine developers can best optimize the performance and emissions footprint of engines. Alignment of heavy-duty NOx and CO_2 emission standards will minimize the cost of integration when technologies are employed to meet these standards.
- Currently available technologies are being optimized to meet significantly lower NOx emissions than the current heavy-duty vehicle NOx emission standard. EPA should work with California to set a national heavy-duty low-NOx emission standard that will enable states to meet NOx and ozone targets.
- EPA should review the current 1986 aftermarket catalytic converter policy and consider a national program with similar elements as California that can be applied across the rest of the nation. Our industry has proposed a voluntary certification program that is operated and enforced by the industry, through an independent administrator to certify and audit the performance of parts in the field.
- There is a trend toward the use of sealed fuel tanks on PHEVs and potentially other vehicles to reduce fuel vapor generation, and these technologies are not adequately covered by current EPA regulations. MECA recommends that EPA, working with California ARB, conduct a rulemaking to revise the evaporative and refueling emission test procedures and any needed regulatory provisions for PHEVs and sealed tank vehicles under 40 CFR 86.

Economic Contribution of the Emission Controls Industry

According to data collected by MECA, our member companies accounted for over 70,000 jobs across North America in 2016. These jobs are located in nearly every state in the United States – the top 10 states in the U.S. are Michigan, Texas, Illinois, Virginia, New York, Indiana, North Carolina, Ohio, Pennsylvania, and South Carolina – as well as in Canada and Mexico. The jobs represented by MECA member companies are skilled manufacturing and technology jobs and do not include the tens of thousands of additional jobs in the automobile, truck, and engine manufacturing industries that are involved with installing these technologies on today's vehicles and equipment.

MECA estimates that the emission control technology market for new light-duty and heavy-duty vehicles in North America will reach approximately $20 billion in 2017 (as part of an overall global market of $95 billion). Looking back to the introduction of emission controls on passenger cars in 1975, a conservative estimate of the cumulative economic activity associated with emission controls on just light-duty vehicles in the U.S. is $250-300 billion. Going forward, MECA estimates that the North American market will continue to show strong growth, reaching over $23 billion by 2020. These economic benefits are due in large part to the implementation over the years of cost-effective and technically feasible clean vehicle and fuel regulations by EPA and ARB. We expect this emission control economic activity to grow even more as the industry continues to ramp up its efforts to meet the requirements of existing air quality regulations – such as EPA/ARB's Tier 3/LEV III light-duty vehicle programs and federal rules to improve fuel economy and reduce greenhouse gas emissions from cars and trucks – as well as new and more stringent regulations in the future in the U.S. and around the world.

Driven by long term and stable regulations, suppliers of emission controls and efficiency technologies continue to innovate to provide cost effective solutions that respond to the public's need for clean air. These companies now have decades of experience developing and optimizing emission controls and efficiency technologies for internal combustion engines. The knowledge gained through the application of technologies on light-duty vehicles like passenger cars has led and continues to lead to developments in emission controls for heavy-duty vehicles and equipment. For example, there is a test program being conducted at Southwest Research Institute in San Antonio, Texas that is using the lessons learned through application of advanced NOx emission control technologies on light-duty diesel cars to demonstrate similar technologies for heavy-duty trucks and reduce their emissions. The data that MECA has derived from these types of test programs over the past 40 years has been provided to U.S. EPA and ARB to inform their regulatory processes, resulting in emission regulations that are grounded in real world demonstration of technology capability. History has repeatedly shown that the ultimate cost of implementation of technology is far less than we estimated at the time of initial technology demonstration.

The U.S. mobile source emission control program has rightly earned the reputation as one of the world's great environmental success stories. Today, emissions of harmful pollutants from new on- and off-road vehicles and equipment are a small fraction of those emitted from those made in the 1970s. As a result, the ambient air we breathe is much cleaner than it was 40 years ago. Notable technologies that have contributed to this success story include catalytic converters, diesel particulate filters, selective catalytic reduction systems, evaporative emission controls, and sensor technologies. In addition, powertrain efficiency technologies – such as turbochargers, fuel injection, waste heat recovery, and 48-volt hybrid technology – are being commercialized for mobile sources to improve fuel economy and reduce greenhouse gas emissions. Furthermore, emission control technologies have been applied to not only new engines but to in-use engines as well through the introduction of heavy-duty diesel retrofit programs – namely, EPA's clean diesel program funded under the Diesel Emissions Reduction Act and ARB's suite of in-use diesel fleet rules such as the Truck and Bus Regulation – and light-duty gasoline aftermarket converter programs.

Advanced mobile source emission control technology has been a cornerstone in our nation's continuing efforts to clean up the air we breathe. Technology development has a 15-20 year cycle from the lab to commercialization. This is why regulations are a critical signal to industry to make investments today for technologies that will be needed in the future. It is important that EPA continues to establish technology forcing regulations with clear implementation timelines so that industry partners have the certainty needed to plan strategic investments in workforce, capital and research and development. Investment in environmental industries is critical to the U.S.'s competitiveness in the global economy. The mobile source emission control technology industry alone is expected to invest approximately $3 billion in research and development in 2017. This type of investment provides economic benefits by creating jobs and increasing productivity in this country and by supporting the export of these state-of-the-art technologies to other parts of the world. Due to the U.S. leading the world in emission and fuel economy standards, it has positioned U.S. companies at the forefront of the emission controls sector. The Clean Air Act and EPA's emission standards, enforcement and compliance program have led our industry to make significant investments in capital and employment in this country that have positioned them to be technology leaders and export their products to other regions of the world as similar regulations were adopted elsewhere. The weakening of EPA's standards and enforcement program or failure to maintain the pace of setting technology forcing standards with the rest of the world will ultimately result in U.S. companies losing their leading edge against foreign competitors here and abroad, where emission and efficiency standards will continue to tighten.

Looking forward, MECA sees several areas where other countries and regions are continuing to move ahead of the U.S. In our following comments, we will highlight these opportunities and we look forward to continuing to work with U.S. EPA in streamlining and improving regulations that will keep the U.S. emission control and efficiency supplier industry the best in the world.

Regulations to Improve Fuel Economy

Optimizing Implementation of Light-Duty Vehicle Fuel Economy and GHG Standards

EPA's recent decision to revisit the light-duty GHG and fuel economy standards through model year 2025 presents an opportunity to make the rules more consistent and more cost effective. Because fuel consumption (regulated by NHTSA) and GHG emissions (regulated by EPA) are directly related, the NHTSA and EPA standards were designed to harmonize with one another; however, there are still ways in which they differ, which can cause confusion to regulated parties. One difference is how emissions credits can be earned and traded under each regulation with no restrictions on averaging to comply with EPA's standards while NHTSA restricts the transfer of credits between car and truck fleets. In addition, the two agencies have different periods over which manufacturers can bank credits. MECA supports the agencies looking at ways to reduce the costs of implementing the two regulations rather than reducing the stringency or delaying implementation. Such a change at this stage of technology development would strand innovation and investment by MECA members and other suppliers, positioning U.S. companies behind their competitors in Europe, China, Japan, and Korea where standards will continue to tighten.

As detailed in EPA's draft Technical Assessment Report (TAR) as a part of the Midterm Evaluation of the Light-Duty Vehicle Greenhouse Gas Regulation, there is a large set of technology combinations available to reduce greenhouse gas emissions from passenger vehicles and light-duty trucks, including fuel efficient, state-of-the-art and future advanced gasoline and diesel powertrains. The vast majority of technologies being deployed across the light-duty fleet represent technologies that have existed for decades and are just now being applied to conventional internal combustion diesel and gasoline engines. For the next several decades, there are likely to be numerous cost effective ways to improve fuel economy without extensive use of strong hybridization or full electrification. We urge the agencies to refrain from picking technology winners and losers but rather to enact performance based policies that facilitate innovation in all areas of vehicle fuel efficiency technologies.

The draft TAR discusses a range of powertrain technologies – including engine turbochargers, exhaust gas recirculation systems, advanced fuel systems, variable valve actuation technology, advanced transmissions, 48V hybrid powertrain components, and powertrain control modules – that can be applied to both light-duty gasoline and diesel powertrains to help improve overall vehicle efficiencies and reduce fuel consumption, both of which can result in lower CO_2 exhaust emissions. Auto manufacturers will take advantage of the synergies between advanced emission control technologies and advanced powertrains to assist in efforts to optimize their performance with respect to both greenhouse gas and criteria pollutant exhaust emissions. MECA believes that light-duty diesel powertrains continue to offer a cost-effective, durable approach for vehicle manufacturers to improve the average fuel economy of their fleets, particularly in the larger power category that includes small pick-up trucks and SUVs.

MECA continues to recognize the benefit to real-world CO_2 reductions via the off-cycle credit program as a policy to expand the available technologies that vehicle manufacturers can deploy to meet the goals of the regulation. Suppliers have found it difficult to convince vehicle manufacturers to commit the full complement of resources needed to evaluate technologies on fully integrated vehicles without compelling data and indication that the agency believes a technology shows promise and is worthy of further consideration. Even a conservative estimate of the amount of credit a technology may offer would justify deployment of resources to fully demonstrate a technology. We continue to believe that a parallel supplier pathway to certification or pre-certification would greatly expand the available technologies and resources for full demonstration across a fleet of integrated vehicles. Expanding the off-cycle credit process to include EPA, NHTSA and the California Air Resources Board may be one consideration in the future to allow for resource sharing among the agencies for reviewing data and evaluating off-cycle technology pathways. In addition, EPA and NHTSA should consider raising the off-cycle credit cap as more off-cycle credits are pursued by OEMs due to the development of technologies that reduce off-cycle emissions.

MECA encourages EPA and NHTSA to use the information provided above to explore opportunities to reduce compliance costs and improve the efficiency of each agency's program and the ways in which they interact. The current review of the regulations should be fully coordinated between the EPA, NHTSA and California ARB with the goal of maximizing the

consistency and cost-effectiveness of the rules. This should include a single national program that harmonizes with California to reduce fuel consumption and GHG emissions.

Aligning Heavy-Duty Vehicle Fuel Economy (and GHG) and Criteria Pollutant Standards

The calibration of internal combustion engines is a delicate balance that has to deal with trade-offs to optimize performance and emissions. For example, there is an inverse relationship between PM and NOx emissions that engine manufacturers applied to meet emission standards up through the 2006 heavy-duty highway regulations. In 2007, the requirement to reduce both PM and NOx emissions caused OEMs to install particulate filters on diesel vehicles which allowed engine calibrators to optimize the combustion in the engine to meet lower NOx emissions while relying on the DPF to remediate the resulting higher PM emissions. This example of effective emission regulations provided a technology solution to overcome the traditional barriers of engine calibration. In 2010, another game changing technology was installed on most trucks in response to a further tightening of NOx limits. Selective catalytic reduction or SCR allowed calibrators to not only reduce the soot load on filters and soot regeneration as a way of improving fuel efficiency but also to take advantage of another well-known trade-off in combustion thermodynamics between fuel consumption, CO_2 and NOx emissions out of the engine.

Since 2010 the predominant technology to reduce NOx from diesel engines has been SCR, and every generation of SCR systems has led to improvements in catalyst conversion efficiency. The SCR system is just one technology option that has allowed engine and vehicle manufacturers to meet the first phase of heavy-duty GHG standards while still achieving NOx reduction targets from the engine. The portfolio of technology options available to reduce greenhouse gas emissions from heavy-duty trucks and engines is continually growing in response to tighter regulations, such as the EPA's Phase 1 and 2 heavy-duty GHG standards. In fact, a review of heavy-duty engines certified in the U.S. from 2002 to 2017 shows that once emission and efficiency technologies were both required on engines, after 2010, the relationship between CO_2 and NOx emissions at the tailpipe went from a trade-off to a benefit. Starting in 2010, SCR technology was added to all new heavy-duty on-road engines downstream of the engine, and OEMs began relying on the SCR system to remediate any excess NOx emissions as a result of calibration changes made to improve fuel economy. In the future, setting stringent and aligned emission targets for both CO_2 and NOx through realistic regulations incentivizes engineers to achieve both reduced NOx levels and engine efficiency improvements simultaneously. EPA should consider aligning future tailpipe NOx and CO_2 (fuel economy) standards in order to allow OEMs the best opportunity to optimize engine performance and emissions simultaneously rather than sequentially. Several 2016 and 2017 engine families are achieving certification levels as low as 0.06 g/bhp-hr, which suggests that more stringent NOx emission standards can be achieved without sacrificing fuel economy.

Regulations to Help States Meet the Ozone National Ambient Air Quality Standard

In 2015, EPA reviewed and revised the National Ambient Air Quality Standard (NAAQS) for ozone. While MECA defers to health experts to set the appropriate standard to protect human health, MECA firmly believes that the emission control technologies for mobile

sources that can help states to meet the standards for ozone are readily available and more cost effective than stationary control measures imposed on power generating EGUs. In EPA's 2015 ozone NAAQS proposal, the agency assigned a cost benefit of $12,000 per ton of NOx removed to controls on EGUs. In MECA's comments for this proposal we estimated a NOx reduction cost-benefit of approximately $3,000-$4,000 per ton from on-road trucks and $1,000-$1,500 per ton from off-road equipment through the deployment of improved NOx controls already in commercial use on some light-duty vehicles. Historically, the health benefits of the NAAQS far outweigh the costs to meet the standards.

Future Heavy-Duty Vehicle Low-NOx Emission Standards

MECA believes that further reductions in NOx emissions from new heavy-duty on-road and off-road diesel engines beyond the 2010 on-road and Tier 4 off-road requirements are achievable and cost effective through the combination of more advanced diesel engines with advanced diesel exhaust emission control technologies. Much of the system development necessary to meet lower NOx emissions will be focused on the initial cold-start portion of the heavy-duty transient FTP test cycle representing approximately 70% of the total NOx emissions over the entire cycle. Additional NOx reductions are certainly achievable by deploying technologies that specifically address continual low temperature, low speed operation. The types of future evolutionary technologies deployed, to achieve a future lower NOx standard, will include advanced substrates, improved SCR catalysts, more efficient SCR reductant delivery technologies and algorithms, and/or passive NOx adsorber catalysts. Substrate mounting mat materials have also evolved through newer technology generations including innovative, insulating intumescent canning materials that retain heat in the catalyst during periods of engine shutdown. The emission reduction benefits achieved through the deployment of these types of technology advances and thermal management strategies will extend to increased NOx conversion during low temperature duty-cycle operations. Approaches, such as advanced substrates and SCR coated filters, are already deployed in several commercial light-duty diesel applications, and MECA has demonstrated the efficacy of these technologies to reduce NOx from heavy-duty engines in a recent demonstration program co-funded by ARB and MECA at Southwest Research Institute. The results have been published in three SAE papers last month (SAE Technical papers: 2017-01-0954, 2017-01-0965, 2017-01-0958). Furthermore, these cold-start and low temperature technologies will allow vehicle manufacturers to deploy hybrid systems, stop-start technologies and waste heat recovery to improve vehicle efficiency while still meeting tighter NOx limits.

MECA supports EPA's recent decision to begin a rulemaking effort aimed at further reducing NOx emissions from heavy-duty highway engines. Recognizing the critical contribution of NOx from heavy-duty engines, states in the Ozone Transport Region have petitioned EPA to develop tighter standards for this sector in order to help them achieve their ozone reduction goals. Improved NOx reduction technologies are available today to deliver ultra-low NOx emissions from these engines. Existing and future ozone non-attainment regions will benefit from these cost-effective NOx reductions to support attainment plans. Engine manufacturers can combine these advanced NOx emission controls with other efficiency technologies to optimize future truck performance to deliver both lower NOx emissions and improved fuel efficiency.

National Aftermarket Catalytic Converter Program

One near term solution that would help states meet the ozone NAAQS is a national standard for aftermarket gasoline replacement catalytic converters that aligns emission limits with ARB's 2009 aftermarket converter program. MECA continues to believe that the most effective way to achieve maximum emission reductions from the in-use light-duty fleet is through a revised federal aftermarket converter program harmonized with California into a national program. In 2009, California exempted aftermarket converters that meet the same emission limits as original manufacturer's products but at a fraction of the cost. EPA's current aftermarket standard was established in 1986 and no longer represents the state of technology deployed on modern passenger cars. The presence of two disparate standards across the U.S. results in an unlevel playing field that penalizes companies that manufacture high performance aftermarket solutions and results in a race to the bottom with inferior technologies to remain competitive.

MECA, the Autocare Association and our member companies have engaged in direct discussions with EPA and other stakeholders over the past 8 years to try to revise the current federal interim aftermarket converter policy to be more in line with California's comprehensive aftermarket converter program. While states are granted the authority under Section 177 of the Clean Air Act to adopt California's LEV requirements for light-duty vehicles, significant differences exist between the available resources among states and light-duty fleet composition in California and other states. These differences can create complexities in successfully implementing ARB's aftermarket converter standards across different states and in achieving all of the emission benefits of the regulation.

The Ozone Transport Commission (OTC) has expressed a similar need for a revised federal aftermarket converter standard to give the OTC states the tools needed for nonattainment areas in these states to achieve attainment. Therefore, we would welcome the opportunity to work with EPA staff to look for a path to revise and update the 1986 federal aftermarket catalytic converter policy to align with the emission requirements of the California program and streamline the process of offering to the 48 states the advanced aftermarket converters that are already being sold in California and New York. A federal aftermarket converter regulatory update is supported by both states and our industry as a way to provide the best technology to allow vehicle owners to maintain their vehicles. Our industry has proposed a voluntary certification program that is operated and enforced by the industry, through an independent administrator to certify and audit the performance of parts in the field. We would like to work with EPA to further develop this program into a policy that states could use toward their SIP commitments for ozone NAAQS.

VOC Emission Controls for Future Vehicles

To provide clarity and certainty for manufacturers it is important that emission regulations and related test procedures be revised to keep up with changes in vehicle technology. Since 2009, manufacturers have offered an increased number of plug-in hybrid electric vehicle (PHEV) models. Today there are about 20 PHEV models in production and more are expected

in response to EPA GHG and NHTSA fuel economy standards. Furthermore, there is a trend toward the use of sealed fuel tanks on these PHEVs and potentially other vehicles to reduce fuel vapor generation. EPA evaporative and refueling emission regulations in 40 CFR 86 do not cover either of these technology advances.

It is important that the GHG rule not result in a backsliding on VOC inventories as PHEVs are developed and optimized and, that if there are new requirements, they be developed in a timely manner so manufacturers can incorporate them into future PHEV fuel system designs and optimizations. Thus, MECA recommends that EPA, working with California ARB, conduct a rulemaking to revise the evaporative and refueling emission test procedures and any needed related regulatory provisions for PHEVs and sealed tank vehicles under 40 CFR 86.

Summary

MECA thanks the agency for providing this opportunity to comment on ways to improve and reduce the cost of regulations. The success story of the U.S. mobile source emission control and efficiency technology industry has proven that a clean, healthy environment and economic growth are not mutually exclusive. In fact, many analyses conclude that a healthy environment and economic growth are positively correlated. The comments provided herein are meant to offer recommendations for making minor changes to the implementation of current regulations as well as cost effective suggestions for undertaking future regulatory needs. This has been a time tested and proven approach to growing American jobs in our industry and to ensure that U.S. companies remain competitive around the world. MECA continues to value our decades-long relationship with EPA that has enabled us to work together to ensure cost-effective regulations and voluntary programs. We support EPA's decision to search for areas where regulations can be clarified and implemented in a more efficient manner, with the goal of reducing unnecessary burden while still achieving EPA's mission of clean air for all Americans.

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