

Federal Advisory Committee Act
Clean Air Act Advisory Committee

Mobile Sources Technical Review Subcommittee

Co-Chairs: Mr. Drew Kodjak and Ms. Gay MacGregor

Designated Federal Official: Ms. Elizabeth Etchells

Summary of the Subcommittee's Meeting on October 29, 2013
Washington D.C.

Introduction/Opening Remarks

The meeting was called to order at approximately 9:00 am on October 29, 2013. Ms. Gay MacGregor welcomed everyone to the meeting and asked for a vote on the minutes of the December 13, 2012 MSTRS meeting (approved).

Mr. Drew Kodjak stated, based on feedback from members, that the MSTRS meetings work best when they focus on a specific, timely topic and when outside experts are allowed to speak. The theme of this meeting will be short lived climate pollutants and the primary topic is black carbon. Black carbon has usurped methane as the second most prominent global warming pollutant after CO₂. Scientists generally see the regulation of diesel as the most attractive target for reducing black carbon in the atmosphere. According to the fifth assessment report (AR5) of the Intergovernmental Panel on Climate Change (IPCC), the 100-year global warming potential (GWP) for black carbon is 900, whereas the fourth assessment report (AR4) did not include a GWP for black carbon. Organizations that have undertaken efforts to reduce black carbon include the Environmental Protection Agency (EPA), the California Air Resources Board (CARB), the Climate and Clean Air Coalition (CACC) focusing on short lived climate pollutants, the International Maritime Organization (IMO), and a coalition between the U.S. and China on black carbon. In addition to black carbon, the meeting will also address hydrofluorocarbon (hfc) and methane, including the safety implications of refrigerants, and with specific focus on the negative impact that potential high methane leakage rates could have on the climate benefits of natural gas as a mobile source fuel.

Ms. MacGregor reviewed the agenda and asked all subcommittee members and persons in attendance to introduce themselves.

Mr. Chris Grundler welcomed the new members of the subcommittee, as well as the first time members, and thanked everyone for producing useful and well-thought-out work. He gave an overview of the status of the ongoing work of the Office of Transportation and Air Quality (OTAQ). Mr. Grundler noted that the EPA has proposed the Tier 3 vehicle emissions and fuel standards, and is working to reduce emissions from the marine sector by implementing the emission control area (ECA) around the U.S. The ECA has shown benefits well inland but has been met with fierce opposition from firms operating in the 200 nautical mile zone, who argue that the standard has a disproportionately high cost. However, the population weighted approach for this standard advocated by cruise lines has been abandoned, and many of these ships will meet the standards required in the ECA by installing scrubbers or by using liquefied natural gas (LNG) or other fuels. Enforcement of the standard is in effect, with enforcement officers doing flyovers and reporting widespread compliance. Mr. Grundler also expressed disappointment that Russia proposed an amendment to delay the IMO engine standards for ships.

Mr. Grundler stated that the EPA has shifted resources to testing and compliance in order to focus on implementation of the clean air and carbon pollution rules, including Tier 3, to ensure that the public is getting the anticipated benefits of these rules. He noted the EPA's plans to upgrade the testing facilities in Ann Arbor, including the installation of heavy-duty and four-wheel chassis dynamometers, and a new coal testing facility.

Mr. Grundler stated that he is sensitive to the challenges facing port communities with their growth and the amount of diesel equipment and drayage trucks that are in operation near these areas. Mr. Grundler stated that the EPA is working to develop a sustainable ports strategy.

Activities in the international arena were also discussed, as these activities are accelerating. There is a new United Nations Environment Programme (UNEP) initiative, the Climate and Clean Air Coalition to Reduce Short Lived Climate Pollutants (CCAC). The CCAC has been established to make progress on new sets of rules. The international arena is becoming a greater part of the EPA's work. The EPA is also working with China on heavy-duty vehicles and in the vehicle sector in general.

Mr. Grundler also discussed the issues with the renewable fuels standard (RFS), including that it is highly contested, and there have been instances of fraud with the bio-diesel credits. These issues are being addressed to ensure the validity of renewable fuels credits, and a 2013 proposal will hopefully solve some of these issues. Lastly, Mr. Grundler mentioned the challenges of working with the EPA's limited budget; however, this presents opportunities to reassess how the EPA does business.

Discussion

Mr. Robert Sawyer asked whether the EPA was conducting any work to reduce aircraft emissions. Mr. Grundler stated that the EPA is working on an endangerment finding for lead in aviation fuel and is engaged in standard setting efforts for aircraft CO₂ emissions. However, the EPA has had to reduce its investment in the aviation sector, as there is generally a greater opportunity to reduce emissions from marine craft.

In response to a question about the EPA's cooperation with other organizations, including Environment Canada and CARB, Mr. Grundler said that the EPA is cooperating on both the standard development and implementation sides with other organizations, and there is further interest in coordinating with the agencies to determine where the greatest risks and chances for reductions are. It is important to share the workload between organizations, especially testing resources, as not all organizations test the same things.

Presentations

Presentations are posted online at the MSTRS website: http://www.epa.gov/air/caaac/mobile_sources.html. As the presentations are posted for public view, the notes below primarily reflect the discussions that occurred in response to the presentations.

SmartWay Legacy Fleet Work Group Update for MSTRS – Buddy Polovick, EPA and Terry Goff, Caterpillar

Mr. Goff provided a background of the SmartWay workgroup. There are three sub-workgroups associated with the three elements of the charge (i.e., trucking and rail legacy fleet, marine vessels and air freight and the nonroad sector). The SmartWay workgroup is unique because it looks at an already very successful program. The program is at a state of maturity, and the question of “where to go from here” needs to be answered. Mr. Polovick and Mr. Goff reviewed the ten over-arching recommendations of the workgroup, as well as the specific recommendations for each sub-workgroup. The workgroup is preparing a final recommendations report that should be available by November 15, 2013, and there will be a conference call this winter after the report is submitted to the MSTRS so that subcommittee members can approve or comment on the report. After the MSTRS review of the report, it will be sent to the Clean Air Act Advisory Committee (CAAAC) for review, and, if approved, it will then be sent to the EPA administrator. The Administrator and the Administrator’s staff will review the report and send a response back to the CAAAC.

Discussion

Mr. Kodjak directed the subcommittee’s attention to recommendation G-9, which concerns SmartWay’s operations from a global perspective. He noted that the CCAC has programs for heavy-duty diesel. Countries are adopting pieces of SmartWay, including Canada, Mexico, and Brazil. Mr. Kodjak also mentioned the International Smart Freight Center, founded by the Shell Foundation, which is a program for reducing emissions and improving fuel efficiency in the global supply chain.

Mr. Don Anair asked about the SmartWay workgroup’s intent to only focus on large drayage fleets of 50 or more, as outlined in recommendation 1-2. Mr. Anair pointed out a potential discord between recommendation 1-2 and recommendation 1-4, which recommends that SmartWay ease and simplify participation for small carriers and owner/operators. Mr. Polovick and Mr. Goff responded that there are ways to work with small fleets but there is a point where the owner/operator will not have the technological efficiencies to enter SmartWay. The workgroup would like to move SmartWay down to the smaller operators but must also ensure that SmartWay maintains a reasonable standard of technological rigor for entry.

Mr. Kodjak asked what the workgroup means in recommendation 1-3, which considers providing credit opportunities for third party logistics (3PL). Mr. Polovick responded that there is a range of third party providers that can foster mode shifts and operational improvements to achieve emission reductions, and the workgroup should be looking at ways for these third parties to get credit within the SmartWay system.

Mr. Anair asked if the workgroup had considered programs for clean construction requirements. Mr. Goff responded that Smartway looks at voluntary programs on a national basis, and considering initiatives that have been used for specific projects was beyond the scope of the workgroup.

Mr. Grundler asked about the opportunities the workgroup had considered beyond technology for emission reductions in the non-road sector. Mr. Goff responded that the workgroup considered job site metrics, such as changing the profile of a haul road to achieve fuel efficiency improvements. Operator training programs and renewable fuels are also available options that are not technology-based. Mr. Polovick expressed the need to incentivize operational-based strategies in addition to technology-based strategies.

Mr. Arthur Marin asked whether the recommendations report was a draft for comment or for approval. Ms. MacGregor responded that the report the MSTRS will receive from the SmartWay workgroup is a final report for approval. Once received, the report becomes the MSTRS's report and can be revised by the MSTRS members. Ms. MacGregor stated that there will be conference call of the MSTRS this winter to discuss the report, but the date of the call has not been finalized yet. The MSTRS would like to deliver the report to the CAAAC in advance of its next meeting, which will occur sometime in the spring of 2014. Ms. MacGregor expressed her hope that the EPA can consider and act on as many of the recommendations as possible.

Mr. Polovick asked the workgroup if there were any concerns, key questions or major issues. Mr. Kodjak responded that a major issue is how the Agency will manage to expand the program in a world of declining resources. Mr. Polovick agreed that this is an important issue and agreed that the report should include consideration of this topic.

Ms. Cheryl Bynum thanked the workgroup, co-chairs and members for its hard work and stated that next year is SmartWay's 10th anniversary. She further stated that we must look for ways to sustain SmartWay for the next decade.

Black Carbon and Other “Short-Lived Climate Forcers”: Climate Change Science – Benjamin DeAngelo, EPA

Mr. DeAngelo gave a presentation on short-lived climate forcers (SLCF), which are pollutants that have a relatively short atmospheric lifetime, and a relatively fast climate response is seen after reducing emissions of these chemicals. SLCFs include methane, black carbon, HFCs, and sometimes tropospheric ozone. Black carbon has a greater range and larger complexity of effects on the environment than greenhouse gases (GHGs), and interaction with clouds remains one of the largest uncertainties. Every source that emits black carbon also emits organic carbon, which has a cooling effect that counteracts the warming effect of black carbon; therefore, the ratio of organic carbon to black carbon is important. For some SLCF sources, such as diesel engines, there is a net warming effect, while for other sources, such as burning of grassland, there is a net cooling effect. The IPCC AR5 reports a warming effect from black carbon twice as large as the warming effect estimated in the AR4 for black carbon. Mr. DeAngelo presented a map showing the areas of the world where black carbon is thought to have the largest effects, including the Arctic region, where black carbon on snow and ice causes additional warming and contributes to snow/ice melting. Mr. DeAngelo also presented charts showing the magnitude of black carbon and co-emitted species emissions from different sources/sectors and by region. For instance, by latitude, diesel engines and industrial coal sources are larger contributors in the northern latitudes, while open burning is a larger contributor near the equator and in the southern latitudes. Of the global total black carbon emissions, emissions from the U.S. currently account for approximately 8%, and this fraction is declining. Mobile source black carbon emissions in the U.S. are projected to decline by 86% between 2005 and 2030 due to regulations already promulgated. Finally, Mr. DeAngelo showed the estimated 20 and 100-year GWPs for black carbon, noting that compared with GHGs at the same GWP values, black carbon has different climate impacts, which raises questions about the appropriateness of using a single metric to compare black carbon and GHGs.

Discussion

Mr. Marin asked if the 100-year global warming estimate for black carbon was a median value. Mr. DeAngelo responded that the value is an average for the entire globe, and the global warming potential could be higher in specific locations (e.g., the Arctic), depending on how much black carbon is emitted in the region and the reflectivity of the surface.

Dr. Mridul Gautam commented that some of the black carbon emissions may end up on the ground, and asked how much will actually disperse and persist in the atmosphere. Mr. DeAngelo responded that black carbon will remain suspended in the atmosphere for days to weeks, and there are estimates of the global atmospheric burden of black carbon, however, there is not a great understanding of the ambient concentrations.

In response to a question about the chart on slide 13, Mr. DeAngelo explained that the top bar provides the better understood effects of climate forcers, and the bottom bar provides the lesser understood effects.

Mr. Marin asked if the 100-year GWP number for black carbon accounts for the expected decrease in sea ice in the future. Mr. DeAngelo responded that he does not believe the number includes consideration of decreasing sea ice and only looks at current conditions. The black carbon effect in the future could be less due to decreasing sea ice.

An audience member asked if the EPA has looked at the particle size of black carbon and whether that impacts the GWP for black carbon. Mr. DeAngelo responded that all black carbon is assumed to be less than 2.5 micrometers, and is typically around 1 micrometer.

An audience member commented that on-road and non-road diesel sources are always considered separately, which does not make sense when comparing data with the rest of the world where there is no clear distinction. By separating on-road and non-road, the effects appear to be less than they would be if combined. The EPA should consider combining on-road and non-road for presentation purposes because it would provide a more accurate portrayal of diesel effects when comparing with other sources.

An audience member asked if there was any effort to update the emission inventory data instead of using 2005 data on black carbon, which does not reflect emission reductions that have since occurred. Mr. DeAngelo responded that the EPA Office of Air Quality Planning and Standards (OAQPS) will be updating the particulate matter (PM) and black carbon numbers. Ed Nam further responded that the inventories are updated once every few years, and the 2011 update is occurring now. The work shown in the presentation was likely conducted with the current numbers available at the time.

Ms. Lee Kindberg asked how the EPA handles international air travel and ocean shipping in the NEI. Mr. Nam responded that the NEI is a domestic inventory, which does not include emissions that occur outside U.S. county or territory boundaries.

Mr. Ayala presented a map showing the areas of California that are not meeting federal PM_{2.5} and 8-hour ozone air quality standards. Diesel trucks are the largest mobile source of PM and NO_x emissions in the state, but several regulatory actions are rapidly cleaning up the diesel fleet. Transportation accounts for the largest portion of black carbon emissions from anthropogenic sources in California. The fraction of PM that is black carbon in newer diesel truck is much less than in pre-2007 diesel trucks, however for the newer direct injection gasoline vehicles, black carbon is a much greater percentage of total carbon (around 60%) than in conventional gasoline vehicles. However, gasoline vehicle PM standards are in place in California that increase in stringency over time and will decrease PM emissions substantially. For diesel PM, California has developed several regulations specific to diesel vehicle type between 2000 and 2008 to reduce diesel PM, which is a public health priority. Overall, California's diesel program, which includes emissions standards, fuel rules and fleet rules has achieved an 85% reduction in black carbon emissions from 1990 levels. The negative trend in black carbon emissions is attributed to reduced tailpipe emissions, improved engines, and low-sulfur fuel as mandated by State policies. Brown carbon, which is produced in lower temperature smoldering combustion from fuel containing biomass, may be another climate warming pollutant, but is not accounted for in most models. California is continuing to explore opportunities to reduce SLCF emissions and is working to develop an SLCF strategy by 2016.

Discussion

An audience member commented that the governor of California was planning on visiting China and asked about California's cooperation with China on emission issues, including short-lived climate pollutants. Mr. Ayala responded that there is an interest in air quality and greenhouse gas control in China and that they are looking at California's scoping plan and cap and trade program. China wishes to learn from California's experience.

Mr. John Viera asked a similar question with regard to California's cooperation with Europe on emissions issues. Mr. Ayala responded that California has a close relationship with Europe and that Governor Brown recently visited Germany. Mr. Ayala stated that California supports harmonization with European regulations as long as it makes sense. California will continue to face its own significant challenges in terms of demonstrating attainment with the ozone standards, so they are trying to share ideas and work with others in seeking solutions to this problem.

Mr. Jim Kliesch asked if California has undertaken any effort to quantify the black carbon impact from electric vehicles. Mr. Ayala responded that California has not conducted these tests yet, but understands that hybrids and electric vehicles will be a significant part to the fleet and there is a need to quantify their impact.

Mr. Gautam asked if the chart on slide 13 included all modes of freight transport and not just trucks. This slide showed that over 70% of California's diesel soot (PM/black carbon) emissions are from freight transport. Mr. Ayala responded that the chart includes three modes: ship, air and on-road. Mr. Ayala stated that California is focusing on the impact to ports, and is looking at what it would take to achieve zero emissions in the freight industry.

Mr. Marin asked about brown carbon. Mr. Ayala responded that brown carbon is essentially soot from the combustion of carbon in a low temperature smoldering process (e.g., wildfires), and is a new term.

MOVES Update and Workgroup Recommendations – Edward Nam, Air Quality and Modeling Center, EPA

MOVES, the EPA's mobile source emission model, is used to support state implementation plans, transportation conformity, NEPA assessments, and EPA regulations. In 2012 and 2013, the EPA reconvened the MOVES FACA workgroup to review the model development process. The process for updating MOVES is ongoing and includes collection and analysis of data, development of code, prioritization, testing, release, and model validation. After releasing a new model, the entire process is repeated for the next model version. The MOVES2014 update includes new rules promulgated since the previous release, new data (test programs and analyses), data updates (future forecasts for VMT, population, sales) and data bug fixes. MOVES2014 also shifts most mapping of chemical mechanism species from SMOKE to MOVES to improve accuracy by model year, fuel, and technology. Mr. Nam presented the MOVES workgroup general recommendations, which included that further model validation should be explored, a long-term plan should be developed for future MOVES updates, the EPA should continue to seek ways to improve the model's data, data and model comparisons should be conducted by organizations outside of EPA, and the EPA should budget funds for an ongoing model improvement effort.

Discussion

Mr. Kodjak asked Mr. Nam if he could give the subcommittee a sense of what type of data is input into MOVES. Mr. Nam responded that a state can use the national defaults or they can use their own data, such as meteorological data, road type distributions, or vehicle age distributions. States collect traffic data, including measurement station data, and can generate more accurate emissions estimates used this data than by using the national defaults.

Dr. Joseph Kubsh asked if there was a black carbon component in MOVES. Mr. Nam responded that MOVES does separate PM_{2.5} into organic and elemental carbon. The elemental carbon component goes forward into inventories as black carbon.

Mr. Kodjak asked how the data in MOVES matches with state inspection and maintenance (I&M) data. Mr. Nam responded that for light duty vehicles, the EPA uses I&M data. The EPA also relies on data from the In-use Vehicle Program, where manufacturers randomly recruit vehicles from actual owners, Portable Emissions Measurement Data (PEMS), and Remote Sensing Data (RSD). The EPA is moving towards using more PEMS data.

Mr. Dana Lowell asked about the EPA's plans to move the non-road program into MOVES2014. Mr. Nam responded that although the EPA is moving the program into MOVES, there are no updates to the program that are planned for 2014, but the EPA hopes to update the non-road program in the next round of MOVES updates.

Mr. Philip Heirigs commented that it is useful to have reviews conducted by outside entities, such as the Coordinating Research Council (CRC). Mr. Nam responded that the EPA looks forward to the CRC report when it is released.

An audience member asked if the EPA will continue the MOVES workgroup for the next version of MOVES. Mr. Nam responded that the EPA will initiate a new workgroup, but it is unknown when that will occur.

A subcommittee member commented that RSD produces many data points per day and asked if there is a future for using that type of data in MOVES. Mr. Nam responded that RSD has a lot of uses, especially in model validation and for vehicles that are operated in a certain way. However, RSD only covers a limited number of modes of operation and is primarily used to check dynamometer and PEMS data.

Mr. Ayala asked if there was potential in the use of on-board diagnostics (OBD) as a long-term data source for MOVES. Mr. Nam responded that OBD is important in model development as it helps to determine failure/malfunction rates. The OBD data needs to be linked to emission rates, and a study is needed.

Ms. Jacky Grimshaw asked if the EPA used real data for the age of vehicles. Mr. Nam responded that the current age distribution data comes from the Polk dataset for the light and heavy duty fleets.

Mr. Gautam commented that the EPA has done a good job validating the model given the data that the EPA has at their disposal.

The Transition from HFC-134a to a Low-GWP Refrigerant in Mobile Air Conditioners - HFO-1234yf – Fred Science, GM

The industry shift to a new, low-GWP refrigerant for vehicle air conditioners is well underway. The new chemical, HFO-1234yf, has a GWP of only 4, versus over 1,400 for the current refrigerant (R-134a). The switch will eliminate about 4% of automobile greenhouse gases. The recent move towards low GWP refrigerants is driven by the European Union (EU) Mobile Air Conditioning Systems (MAC) Directive that requires mobile air conditioner refrigerants with a GWP below 150 on new vehicle types introduced in 2011 calendar year. An SAE Cooperative research program evaluated various new refrigerant technologies, including HFO-1234yf, and concluded in 2008 that HFO-1234yf offers superior environmental performance and is acceptable for commercial use in future vehicles that are designed to use the new refrigerant. Implementation of HFO-1234yf has experienced delays due to production capacity and a claim by Daimler that testing had revealed risks in HFO-1234yf related to flammability issues. GM initiated hundreds of additional safety tests to confirm the safety of HFO-1234yf, and concluded that the Daimler test used unrealistic vehicle modifications to create ignition. Additional testing by SAE concluded that the initial SAE risk assessments are still valid. Over 100,000 GM HFO-1234yf vehicles are already on the roads globally.

Discussion

Mr. Marin asked if the new refrigerant can be applied in existing vehicles. Mr. Sciance responded that HFO-1234yf is only for use in new vehicles, and has not been evaluated or approved in retrofits.

Mr. Kodjak asked what was occurring in Europe with regards to the new refrigerants. Mr. Sciance responded that GM did their full safety presentation with European agencies, and these agencies have a lot of information on which to judge the safety of the refrigerant.

Mr. Grundler asked if there were supply issues with the CO₂ refrigerant alternative as with HFO-1224yf. Mr. Sciance responded that there were not supply issues with the refrigerant itself, but with the parts to use it.

Black Carbon, Arctic Climate & the International Maritime Organization – Wayne Lundy, US Coast Guard

The primary international conventions of the International Maritime Organization (IMO) are the Safety of Life at Sea (SOLAS) and the International Convention for the Prevention of Pollution from Ships, 1973 as modified by the Protocol of 1978 (MARPOL 73/78). The IMO established a work item at the Marine Environment Protection Committee (MEPC) to consider the impact of black carbon emissions on the Arctic from international shipping. MEPC tasked a technical subcommittee, subcommittee on Pollution Prevention and Response (PPR), to consider issues regarding black carbon, including developing a definition, considering and identifying the most appropriate measurement methods and investigating appropriate control measures. The PPR favors a measurement approach of black carbon that focuses on its light-absorbing properties. Three possible technical definitions of black carbon include black carbon as elemental carbon, as equivalent black carbon or as refractory black carbon. The measurement methods being considered include: laser incandescence, multi-angle absorption photometry, photo-acoustic spectroscopy, filter smoke number and thermal-optical reflectance or transmittance. The criteria for selecting the most appropriate measurement method include the cost, availability and proven ability to measure black carbon.

Discussion

Mr. Kodjak asked about the voting requirements at the IMO that would be required to pass legislation on black carbon, and commented that the voting requirements may depend on the mechanism that would be used to require emission standards (e.g., MARPOL). Mr. Lundy responded that he did not know what the voting threshold would be.

Mr. Ayala commented that California is working with the International Council on Clean Transportation and that the IMO should try to use lessons already learned on black carbon rather than reinvent the wheel. Mr. Ayala recommended that the IMO consider the work done in the transportation sector in its efforts to determine a technical definition and measurement method.

Short Lived Climate Pollutants: Methane and Natural Gas – Rachel Muncrief, International Council on Clean Transportation

Ms. Muncrief presented charts showing the breakdown of methane and CO₂ emissions by source. A large portion of CO₂ emissions are from transportation (31%), while only a very small portion of

methane emissions are from transportation (0.29%). A large portion of methane is emitted by natural gas and petroleum systems (30%). Natural gas infrastructure has been growing around 11% per year from 2009 to 2012, and the number of natural gas fueling stations has grown to around 1500 (1.2% of total number of fueling stations). Several U.S. companies plan to convert part of all of their fleets to natural gas vehicles. The impact of the market penetration of natural gas vehicles is that CO₂ transportation emissions will decrease while methane emissions from natural gas systems and transportation will increase due to leakage and other factors. The environmental defense fund (EDF) conducted a study to determine the maximum well-to-wheel leakage rates that would still allow for climate benefits from natural gas vehicles today, and determined this leakage rate to be 1% for diesel vehicles and 1.6% for gasoline vehicles. Studies indicate a well-to-pump methane leakage rate range of 1.1% to 6.9% (including 1.55% from an EPA 2013 study), and a pump to wheels leakage rate of 0.6% from an EDF estimate (although very little data is available). The EDF is leading a series of collaborative studies to determine leakage from the natural gas value chain. There are already strategies that can be used to reduce leaks, and some regulations may help reduce methane emissions, such as new source performance standards for hydraulically fractured gas wells, the greenhouse gas reporting program and the greenhouse gas emissions standards for medium- and heavy-duty engines and vehicles. However, there are still concerns for the future because a small amount of methane can have a large impact on climate.

Discussion

Mr. Anair asked how the heavy duty engine tailpipe standard of 0.1 g/hp-hr compares with leakage rates. Ms. Muncreif responded that it is probably on the same level.

Mr. Kodjak asked what could be done beyond mitigating the leakage rate at the pump. Ms. Muncreif responded that the whole natural gas value chain must be considered.

There was a discussion of the various technologies for reducing methane emissions in engines, including low-NO_x burners. A subcommittee member commented that it is difficult to combust methane in the exhaust if you do not have high enough temperatures, however, a catalyst could be used. Another member responded that 3-way catalysts tend to deteriorate quickly.

Ms. Pamela Campos commented that the latest EDF pump-to-wheels emissions estimate is expected to be released in the spring of 2014. There are various upstream challenges with natural gas, but there is progress being made. However, in the transportation sector, there are also user issues such as the frequent venting. To mitigate the effects of leakage rates, there may be ways to reduce emissions through a regulatory proposal, such as a proposal to minimize venting.

Adjournment

Ms. MacGregor thanked everyone for attending and stated that there will be a conference call or webinar by January. She and Mr. Kodjak are going to try to survey the subcommittee members to determine issues of interest and further work that should to be done with existing workgroups or new workgroups. Ms. MacGregor asked subcommittee members to call her if they have any comments. The membership cycle will expire in 2014, and members will be notified about expiration of membership and renewals.

Mr. Grundler stated the importance that the subcommittee meetings keep discussions relevant to our world and what is changing, and members will be surveyed to determine where the EPA and the subcommittee can make the most change.

Mobile Sources Technical Review Subcommittee

October 29, 2013

Presenters and Subcommittee Members in Attendance

Name	Organization	Attendance
Agama, Reynaldo	Caterpillar, Inc.	X
Anair, Don	Union of Concerned Scientists	X
Ayala, Alberto	CARB	X
Babik, Robert	GM	X
Campos, Pamela	EDF	X
Chason, Lindsay	Home Depot	
DeAngelo, Ben	EPA	X
Etchells, Elizabeth	EPA	X
Flint, Steve	NY DEP	X
Gautam, Mridul	Mid-Atlantic Research Institute	X
Goff, Terry	Caterpillar	X
Grimshaw, Jacky	CNT	X
Grundler, Chris	EPA	X
Heirigs, Philip	Chevron	X
Hwang, Roland	NRDC	
Jorgensen, Robert	Cummins	
Kindberg, Lee	MAERSK	X
Kliesch, Jim for Ichiro Sakai	Honda	X
Kodjak, Drew	ICCT	X
Kubsh, Joseph	MECA	X
Leister, Mike	Marathon Petroleum	X
Lily, Amy for Deborah Bakker	Hyundai	X
Lowell, Dana for Thomas Balon	MJ Bradley and Associates	X
Lundy, Wayne	Coast Guard	X
MacGregor, Gay	EPA	X
Marin, Arthur	NESCAUM	X
Muncrief, Rachel	ICCT	X

Nam, Ed	EPA	X
Polovick, Buddy	EPA	X
Sawyer, Robert	American Lung Associating	X
Sciance, Fred	GM	X
Standlee, Chris	Abengoa Energy	
Tennent, Christine	Corning, Inc.	X
Viera, John	Ford	X
Wallerstein, Barry	SCAQMD	

Attendees

Name	Organization	Attendance
Steve Berry	Volvo	X
Patrick Brennan	Ingram Barge Company	X
Cheryl Bynum	EPA	X
John Cabaniss	Global Automakers	X
David Cetola	Johnson Matthey	X
David Cooke	Union of Concerned Scientists	X
Jeneva Craig	EPA	X
Anthony Greszler	Volvo	X
Paul Izdebski	Environment Canada	X
Rich Kassel	Gladstein Neandross & Associates	X
Amy Kopin	Daimler	X
Amy Lilly	Hyundai	X
Steve Lomax	Koch Industries	X
Aaron Lowe	Automotive Aftermarket Industry Association	X
Roy Mann	CNH America	X
Leigh Merino	MEMA	X
Stuart Parker	IWP News	X
Anita Rajan	Misubishi Motors	X
Julia Rege	Global Automakers	X

Allen Schaeffer	Diesel Tech Forum	X
Patty Strabbing	Chrysler	X

Contractor Support

Name	Organization	Attendance
Lesley Stobert	EC/R Incorporated	X
Alden West	EC/R Incorporated	X