Federal Advisory Committee Act
Clean Air Act Advisory Committee

Mobile Sources Technical Review Subcommittee (MSTRS) Meeting Summary

May 22, 2018
DoubleTree Hotel Crystal City
300 Army Navy Drive
Arlington, VA 22202

Introduction, Opening Remarks

Ms. Courtney McCubbin opened the meeting at 9:00 am on May 22, 2018 and welcomed the Clean Air Act Advisory Committee MSTRS Subcommittee members. Ms. McCubbin noted that the presentations and meeting minutes from the last MSTRS meeting are online, and the minutes and presentations from this meeting will also be posted online. She also mentioned that there is an upcoming membership round and announced that John Viera, a MSTRS member, is retiring. Ms. McCubbin then reviewed the meeting agenda (see Table 1).

Table 1. MSTRS Meeting Agenda: May 22, 2018

Time	Topic
8:30 - 9:00	Registration
9:00 – 9:15	Opening Remarks
9:15 – 10:00	OTAQ Office Director Remarks
10:00-10:45	Work Group Updates - MOVES Work Group - Ports Follow-up
10:45-11:00	Break
11:00-11:45	Setting the Frame: Data & Future Mobility Themes
11:45-1:15	Lunch
1:15-2:30	Data Theme Panel - Know Your Data - Today's Mobile Source Data: An Overview - NREL's Approach to Transportation Data Science
2:45-4:00	Future Mobility Theme Panel - The Future of Mobility: Getting on the Path to Carbon-Free Transportation - Today's Mobile Source Data: An Overview - EPA Mobile Source Technical Review Subcommittee, Future Mobility Panel
4:00-4:30	Discussion, Final Remarks & Adjourn

Mr. Rich Kassel, MSTRS co-chair, remarked that it has been a year since the MSTRS has met, and that technology disruptions seem to have affected their field in this last year. After relating a story about people needing to carry an open-air car in Russia in 1915 due to a lack of street pavement, he noted that 2018 also appears to be a time of "laying pavement" for the future of transportation.

A list of meeting attendees is provided in the Appendix. Presentations are posted online at the MSTRS website: https://www.epa.gov/caaac/mobile-sources-technical-review-subcommittee-mstrs-caaac.

Office of Transportation and Air Quality (OTAQ) – Office Director Remarks

Mr. Chris Grundler welcomed the Subcommittee and thanked everyone for their attendance and participation in the MSTRS. He noted that the EPA believes the best way to use this group's expertise is to use this collective experience to inform the Agency about the future and future needs. He also acknowledged and thanked John Viera for his service with the MSTRS and contributions to the environmental field while at Ford.

Mr. Grundler presented general remarks on changes and progress made at OTAQ since the last MSTRS meeting in May 2017. He noted that it has been a busy, eventful year, with the biggest change being the arrival of Bill Wehrum as the EPA Assistant Administrator for the Office of Air and Radiation. He noted Mr. Wehrum is engaged with OTAQ, and he visits the EPA offices in Ann Arbor, MI once a month. He mentioned that there have been some high priority actions occurring in the Agency, and he has had two meetings with the President of the United States about mobile source issues in the last year.

Mr. Grundler reported that the highest priority of OTAQ has been in certification and compliance. He stated that the EPA needs to keep its promises and implement its rules fairly and effectively to ensure fair competition. He noted that they have intensified their testing and other aspects of compliance work by reviewing the reports required, performing audits, increasing and improving their relationships with other countries, and getting regional offices involved with compliance. He noted concerned about the extent of tampering and defeat devices that are available, and the EPA has increased its compliance and enforcement work with other countries in relation to identifying these devices.

Regarding other ongoing work, Mr. Grundler related that the mid-term evaluation for the light-duty vehicle greenhouse gas (GHG) standards found that the current standards are not appropriate and should be revised. This determination was published in the Federal Register in April. For trucks, Mr. Grundler commented that the EPA was petitioned last year on the Phase 2 GHG standards adopted in 2016 regarding glider vehicles. He stated that the EPA has proposed that the Clean Air Act (CAA) was improperly interpreted with regards to regulating these vehicles. He also noted that the NOx standards for heavy-duty trucks have not been reviewed in 18 years, and the EPA has been petitioned to review these standards. The petitioners also urged the EPA to collaborate with California in its review of NOx from heavy-duty trucks and that the agencies work together to develop a uniform, national approach.

For fuels, Mr. Grundler remarked that this is a challenging area for regulation. He noted that there have meetings at the White House about the renewable fuel standard (RFS) program. He mentioned that the EPA is considering some options for the program, such as allowing year-

round sales of higher-ethanol blends and having small refinery hardship allowances. He noted that there is a lot of litigation every year regarding the RFS.

Mr. Grundler mentioned that with regards to assessment and science, the office is updating the MOVES model and is watching for emerging issues. For ports, he noted that the Diesel Emissions Reduction Act (DERA) implementation should help with ports emissions, and he expects some Volkswagon settlement funds to be used for ports projects.

Comments and Discussion

Mr. Jim Kliesch asked Mr. Grundler for an update on the regulatory reform agenda. Mr. Grundler responded that the EPA has a regulatory reform task force that is working on this. He stated that all the EPA offices were asked for their reform priorities, and his office saw the most opportunity with the fuels program. He noted that reforming rules takes as much effort as establishing new rules, so prioritization is necessary. He noted that if the office goes forward with new heavy-duty NOx standards, they would include regulatory reform ideas in those standards.

Ms. Elena Craft asked whether there would be a Science Advisory Board (SAB) review of the rule for gliders. Mr. Grundler replied that the SAB has requested to review the glider rule and also the mid-term evaluation of the light-duty GHG standards.

Mr. Steve Cliff asked about the future of the certification program and what its next phase may be. Mr. Grundler said there is ongoing discussion about this, including how to ensure vehicle performance throughout its lifecycle. He noted that one thought would be to follow the European model of basing certification on emissions that occur throughout the vehicle useful life. However, he said he is reluctant to follow the European Union path, since it is not based on real driving conditions, but the EPA will confront this question in the heavy-duty arena.

Ms. Kate Blumberg Commented that its is useful to look at real driving emissions (RDE), but she agrees this program is not working well in Europe. However, she noted that this path could be followed and improved upon in the U.S. and California.

Mr. Kliesch asked whether the EPA and California can work together going forward to avoid having similar but different requirements between the two agencies. Mr. Grundler responded that it is difficult to think past current efforts, but this is a reasonable request. Mr. Bill Charmley added that the EPA is currently working on five rulemakings related to regulatory reform, and the Agency needs to prioritize where its efforts are expended.

Mr. Rey Agama commented that the not to exceed (NTE) emissions standards seemed to have worked, on the whole. Mr. Charmley responded that the EPA thinks the program is working for its designed purposes, but now with 20 years of experience with the program, it can be improved upon. Mr. Grundler added that engines have gotten cleaner, but in real use, they are only in the NTE zone a small part of the time and less time than expected.

Mr. Kassel mentioned that group introductions had not been made at the start of the meeting, and asked that everyone introduce themselves.

Work Group Updates

Presentation – MOVES Review Work Group Update

Mr. Matt Barth of the University of California-Riverside presented the progress of the MOVES Review Work Group. Mr. Barth provided an overview of the EPA's MOVES model and its use in estimating emission impacts, in the preparation of emission inventories for State Implementation Plans (SIPs) and transportation conformity, and in academic research when analyzing policy impacts.

Mr. Barth noted that the currently used version of MOVES is MOVES2014a, and the EPA is planning a major revision of MOVES to be completed in 2019 at the earliest, with a minor update that will be released in the summer of 2018. The minor update will improve nonroad emission estimates but will not change onroad inventories. The major update will include new data based on the latest test programs and analyses, the latest vehicle population and activity data, include the effects of newer rules, and improve the model's functionality and performance. The MOVES Review Work Group consists of experts in modeling emissions from highway and nonroad vehicles, who coordinate with their organizations to provide comments and recommendations on the EPA's model update proposals. Dr. Barth outlined historic Work Group discussion topics and future meeting topics. Dr. Barth then provided both short-term and long-term MOVES recommendations provided by the MOVES Review Work Group.

Mr. Barth reported that more information on MOVES is provided on the MOVES web page: https://www.epa.gov/moves.

Comments and Discussion

Mr. Agama asked whether MOVES and the EMFAC model would be merged so there would only be one model that needs to be used. Mr. Bath replied that while it has been discussed for a long time, moving to just one model hasn't happened. He did mention that data sharing between the two models is quite good.

In response to a question about whether there is a desire include idle time as an updated parameter, Mr. Barth replied that functionality within the model exists to include this. However, he added that it would require more user time and data.

Mr. Rasto Brezny asked how MOVES treats Tier 4 vehicles with diesel particulate filters (DPF) compared to vehicles without it. Mr. Barth stated that this is one of the key updates. Mr. Charmley added that the emissions factor in the model is weighted based the percentage of the fleet with DPF and without DPF from certification and sales volume data.

Mr. Phil Heirigs commented that EMFAC has drop-down boxes for model choices, and he asked whether this type of enhanced user interface is being included in MOVES. Mr. Barth stated that the EPA is adding functionality and is trying to make the model easier to use.

Presentation – Update on EPA's Ports Initiative

Ms. Sarah Froman gave a presentation updating the MSTRS on the actions the EPA has taken in response to the 2016 MSTRS Ports Initiative Work Group recommendations. She noted that the

overarching recommendation was to provide funding, technical resources and expertise to enable and encourage environmental improvements. She then presented information on the Ports Initiative and recent activities. Actions to date include:

Funding. The EPA awarded $18 million in Diesel Emissions Reductions Act (DERA) grant funds to port projects in 2017, and the DERA RFP for 2018 is open through June 12th.

Technical Tools. The EPA is completing the Port Everglades partnership to develop an activity-based baseline inventory and emission reduction scenarios. They are also supporting other port emissions inventory/analyses, including inventories for Chicago/Detroit and Seattle/Tacoma. In addition, the EPA is launching a new advanced technology assessment, promoting a national port strategy assessment and developing operational strategy factsheets and other materials.

Coordination. In Federal coordination to support clean air projects as a part of major federal infrastructure project, the EPA is working on a case study of an Army Corps marine vessel repower offset program to meet general conformity in New York/New Jersey.

Communications. The EPA Regional offices and headquarters are developing web resources, hosting public events and engaging stakeholders by enhancing the Ports Initiative website, developing regular e-newsletters, developing a case study on the Clean Action Plan for the Ports of Los Angeles and Long Beach, and hosting events as part of the regional Diesel Collaborative forums.

Collaboration. The EPA has developed draft tools and resource material promoting port/community decision-making. The EPA is piloting these tools, delivering technical assistance, and convening dialogues with local partners.

Comments and Discussion

Mr. Kassel asked whether the EPA is trying to do any other port case studies. Ms. Froman replied that they are adding one – the Port of New York and New Jersey.

Ms. Craft asked how well-coordinated the EPA is with how states are using Volkswagon settlement funds and whether the EPA is facilitating any discussions. Ms. Froman responded that the National Association of Clean Air Agencies (NACAA) and the National Association of State Energy Officials (NASEO) are compiling data about the projects being implemented and putting it on a website. She noted that there are some that specifically discuss port projects. Mr. Karl Simon added that the EPA has very deliberately not told states how to use these settlement funds.

Presentation - MSTRS: Future Mobility

Mr. Karl Simon gave a presentation to set the frame for the MSTRS discussions about future mobility. He began by presenting a graph, which showed that around 2016, transportation emissions overtook the power generation industry in emissions of GHGs. Several additional graphs depicted the anticipated future growth in light-and heavy-duty vehicle miles traveled, increases in passenger air travel and increases in freight rail for domestic shipping. In the future, availability of automated, shared, and electric vehicles may change how and why people travel, and this will likely affect transportation emissions. However, it is unclear whether these advancements will increase or decrease emissions overall. Mr. Simon then presented a series of

slides with multiple-choice questions for the subcommittee to answer regarding when and how they think these advancements will occur and the effects of their implementation. The group recorded their answers for compilation and review in a later presentation.

Comments and Discussion

Panel Presentations – Data Theme Panel

Ms. Angela Cullen, the moderator for this data panel session, introduced the presenters and the topics to be discussed in this panel.

Presentation – Know Your Data

Ms. Cullen introduced Ms. Jane Macfarlane of the University of California, Berkeley and the Lawrence Berkeley National Laboratory.

Ms. Macfarlane presented an overview of how "bad" data can be identified and the potential effects on analyses using unidentified "bad" data. She showed some examples of data that were presented visually, such as by aligning GPS data with digital maps, which showed data issues that would not have been identified without the visualization. She noted that including the "bad" data could lead to wholly incorrect analysis results, with emissions being attributed to the wrong locations. To combat these issues, she offered some recommendations for dealing with large data sets, including using labeled data sets whenever possible, knowing the data being used, not using machine learning as a black box, and not expecting to get good results with small data sets. She also recommended that everyone share data to the greatest extent possible.

Comments and discussion were held until after all panel presentations were delivered.

Presentation - Today's Mobile Source Data: An Overview

Ms.Cullen introduced Mr. Matt Barth of the University of California Riverside.

Mr. Barth began by stating that the general components of an emissions inventory are emissions/energy factors, vehicle activity and fleet composition. Transportation is undergoing four major revolutions, including shared mobility, electrification, connectivity and automation. Data from these revolutions can be used to enhance emissions inventories. There is currently also a transition going on in emissions measurements from principally laboratory measurements to more on-road measurements. There is also more data available, including freight "big data," connected vehicle data, and data from low-cost monitors. With all of this data available, the next challenge is to develop or support applications that use this data to minimize energy and emissions. These could include an eco-driving feedback system, PHEV and HEV system optimization, and/or route optimization to lower human exposure to emissions. There may also be an opportunity to develop dynamic energy and emissions management systems (DEEM).

Comments and discussion were held until after all panel presentations were delivered.

Presentation – NREL's Approach to Transportation Data Science

Ms.Cullen introduced Mr. Adam Duran from the National Renewable Energy Laboratory (NREL).

Mr. Duran began his presentation by asking why big data may be needed and remarked that data along with the right tools and expertise can lead to insights about the issue under investigation. He noted that machine learning loves big data, but how do you know if you have big data? One way to measure the size of data is the semi-truck method: if it's faster to drive your data somewhere in a truck than to transfer it over the internet, the data may be pretty big. In addition to the size of the data, the structure of the data needs to be considered, which can range from structured, traditional databases to semi-structured data, to unstructured data, such as images and audio data. The next consideration is what to do with all of this data, and who should be using it. A data scientist with an intersection of skills, including computer hacking, math and statistical knowledge and substantive expertise in the field of investigation is the best qualified to use big data. Mr. Duran then provided some information about NREL, its computers and its computing capabilities. He also noted that the use of cloud computing is on the rise at NREL and other laboratories and companies. Regarding big data applications for transportation, Mr. Duran provided a few examples. In one example, NREL fleet data and analysis was used in the EPA's development of the Phase II GHG and fuel efficiency standards for medium- and heavy-duty vehicles, ensuring the regulations are representative of real-world conditions. In another example, fleet data were used to characterize urban delivery vehicle duty cycles and develop representative drive cycles for various modes. This information was used to size drivetrain components and optimize energy storage control strategies. In a third example, NREL analyzed fuel savings data from platooning studies to help in the development of next-generation adaptive platooning technologies.

Comments and discussion for all data theme panelists

Mr. Agama commented that China requires all new trucks to have GPS and noted that there may be value in analyzing the data collected from these trucks. He also noted that China will also be requiring GPS to be included in non-road equipment.

Ms. Peg Hanna remarked that it would be interesting to overlay emissions monitoring data with the information the panelists have been collecting. Mr. Barth replied that there have been a few studies that have done this. Ms. Macfarlane added that the paper cited in her presentation discussed the dual use of data.

Mr. Kliesch asked whether there are any privacy concerns regarding the collection of data from vehicles. Ms. Macfarlane responded that companies sometimes use privacy concerns as a false reason to not share their data, but did acknowledge that some data presents legitimate privacy concerns. She stated that there are ways to hide data that present privacy concerns, such as aggregating data to a higher level. She stated that data needs to be democratized and also noted that a lot of data is fairly redundant.

Panel Presentations – Future Mobility Theme Panel

Ms. Lisa Snapp of the U.S. EPA, the moderator for this future mobility panel session, presented the collective responses to the questions posed in Mr. Simon's presentation. She then introduced the presenters and the topics to be discussed in this panel.

Presentation – The Future of Mobility: Getting on the Path to Carbon-Free Transportation

Ms.Snapp introduced Mr. Don Anair of the Union of Concerned Scientists (UCS).

Mr. Anair began by stating that the strategic goal of the UCS is to achieve net-zero global warming emissions by mid-century. He showed a series of graphs which indicated that transportation is now contributing more to CO_2 emissions than any other sector, light-duty VMT continues to increase, and petroleum is still the dominant source of energy for the transportation sector. He also presented a graph showing that fuel economy for cars and trucks has been increasing since the mid-2000's. However, the future of mobility could change the current trajectory. The use of autonomous vehicles (AV) could increase CO_2 emissions if the AV system is large, and the potential energy impacts of self-driving cars is unknown, with some features potentially increasing overall energy consumptions and others decreasing it. Electric vehicle (EV) sales have been increasing, reaching 1% of national sales and 5% of sales in California. Across the country, emissions attributable to the use of these EVs is less than the emissions resulting from conventional vehicles, however, the emissions caused by electric vehicle use varies depending on the source of energy used in a given region. There could be a major increase in EV sales when their costs become less than conventional vehicle costs. Shared mobility may also affect emissions, with some studies showing it to be likely that there will be an increase in VMT. Creating the right policies to address automation, electrification, and shared mobility is critical to ensure a low carbon future for transportation.

Comments and discussion were held until after all panel presentations were delivered.

Presentation – Energy Efficient Mobility Systems Program

Ms.Snapp introduced Mr. Michael Berube from the U.S. Department of Energy (DOE).

To begin, Mr. Berube stated that transportation is fundamental to our way of life, with over 3 trillion VMT and 11 billion tons of freight moved through the U.S transportation system. He also noted that the population and population density of the U.S. is increasing, Americans are living longer, transportation costs are high, and transportation technologies and fuel choices are expanding. Some of the new technologies and the on-demand economy are disrupting traditional personal transportation and goods movement. The DOE and the national labs are undertaking new research to better understand the potentially dramatic energy impacts of these technologies. There are four activity areas the DOE and the national labs are focusing on with respect to future mobility: 1) Advanced R&D projects, in which they are partnering with industry and academia to research and develop technologies that lead to energy savings, 2) SMART Mobility Lab Consortium, in which they are investigating key questions around the energy implications of future mobility opportunities, 3) HPC4Mobility/big transportation data analytics, which incorporates analytics for new tools and models to address specific knowledge and data gaps, and 4) Living Labs, in which data are being gathered to understand the energy impacts of transportation innovations in real-world mobility systems.

Comments and discussion were held until after all panel presentations were delivered.

Presentation – The Future of Mobility: Getting on the Path to Carbon-Free Transportation

Ms.Snapp introduced Mr. Kevin Book from ClearView Energy Partners.

Mr. Book started his presentation by showing trends in U.S. crude oil production and net petroleum imports, noting that with increasing domestic production and decreasing imports, there is less concern about energy security. Since 2002, gasoline as a share of U.S. personal

expenditures has also decreased; however, light-duty VMT has increased over this period. Mr. Book also presented a graph showing that U.S. shale oil production is highly elastic, a graph showing increasing sales of crude oil from the strategic petroleum reserve over the next 10 years, and a graph showing that CO_2 produced per dollar of gross domestic product (GDP) generated has decreased since 2000, while the average atmospheric CO_2 concentration has increased in that same time period. Given this information and the goal of reducing emissions, there is a universe of policy options, each with its own set of political challenges. Mr. Book also presented a graph showing potential times for EVs to achieve cost parity with conventional vehicles, which ranges from 2 to 13 years from now. However, as fuel efficiency in conventional vehicles improves, this further pushes out the cost parity for EVs.

Comments and discussion for all future mobility theme panelists

Mr. John Viera asked Mr. Anair what needs to be done on the energy side, as opposed to the vehicle side, to get to net-zero global warming emissions. Mr. Anair responded that the progress to date has been due to government actions at the federal and state levels. He added that, to date, renewable sources of energy have only made it to the grid based on cost. He remarked that with more EVs on the grid, more energy will be needed, and more renewable energy will be needed to get to net-zero.

Mr. Luke Tonachel commented that having more publicly validated datasets will be increasingly important for AV and asked whether the DOE and private companies have a process to share that data with the public. Mr. Berube responded that the DOE has experience taking in data from various sources and maintaining confidentiality, and they are considering how raw data can be shared.

Ms. Simone Sagovac asked whether there are any efforts to find "low hanging fruit" and quick solutions, such as operational changes to reduce emissions. She also asked about the driving patterns of the millennials. Mr. Berube replied that millennials are a critical component of the transportation equation, noting that what matters is how technology is used, not just what is available. He thinks there may be a transportation mindset change that will occur with this generation. Mr. Anair remarked that researchers are giving consideration to the impacts of the current system and not just new technologies; however, it is worth reminding everyone to think about current impacts. He added that young people have more options for transportation, and they may be more likely to adopt new technologies than older generations that are used to things being a certain way. Mr. Book added that millennials may have an overall impact on personal transportation, but they seem to have no impact on the number of trucks sold.

Ms. Kate Blumberg commented that it is hard to see what is in the future, but new transportation businesses are popping up, such as those providing scooters in San Francisco. She added that if options are available that are attractive and fun, they could be chosen over conventional transportation.

Mr. Chris Nevers commented that safety will be the factor driving the change to AV.

Ms. Craft remarked that after Hurricane Harvey in Texas, over 500,000 cars were destroyed, which presents an opportunity to do targeted replacement. She asked whether anyone

investigated what those vehicles were replaced with and suggested this could be an area for study, as it may provide useful information about the future.

Mr. Kassel noted that the group had not discussed EV charging infrastructure and suggested there could be some labor issues associated with EVs and issues with the uptake of charging infrastructure. Mr. Book commented that there is a regressive skew to the adoption of EVs and that EVs could change the price of electric power.

Final Remarks and Adjourn

In closing, Mr. Rich Kassel noted that the topics included in today's meeting were not about presenting answers but about teeing up questions for future discussion. He noted that reports and documents discussed today can be shared by email, and he hopes MSTRS members will keep these conversations going. Mr. Kassel thanked the presenters and meeting participants for their attendance and thanked those that helped to set up this meeting.

Ms. McCubbin thanked everyone for their attendance and adjourned the meeting.

Appendix

MSTRS Meeting Attendance List	
Subcommittee Members and Presenters	
Name	**Organization**
Reynaldo Agama	Caterpillar Incorporated
Don Anair	Union of Concerned Scientists
Deborah Bakker	Hyundai Motor Company
Mathew Barth	Center for Environmental Research and Technology
Michael Berube	U.S. Department of Energy
Kate Blumberg	International Council on Clean Transportation
Kevin Book	ClearView Energy Partners
Rasto Brezny	Manufacturers of Emission Controls Association
Blair Chikasuye	Hewlett Packard
Steve Cliff	California Air Resources Board
Mike Cooper	Cummins, Inc.
Elena Craft	Environmental Defense Fund
Adam Duran	National Renewable Energy Laboratory
Sarah Froman	U.S. Environmental Protection Agency
Chris Grundler	U.S. Environmental Protection Agency
Peg Hanna	New Jersey Department of Environmental Protection
Phil Heirigs	Chevron Global
Michael Iden	Association of American Railroads
Tracey Jacksier	AIR LIQUIDE Research & Development
Rich Kassel	Tri-State Transportation Campaign
Barbara Kiss	General Motors
Jim Kliesch	American Honda Motor Company
Jane McFarlane	UC Berkeley
Courtney McCubbin	U.S. Environmental Protection Agency
Matt Miyasato	South Coast Air Quality Management District
Chris Nevers	Alliance of Automobile Manufacturers
Simone Sagovac	Southwest Detroit Community Benefits Coalition
Rashid Shaikh	Health Effects Institute
Dan Short	Marathon Petroleum Company
Karl Simon	U.S. Environmental Protection Agency
Luke Tonachel	Natural Resources Defense Council
John Viera	Ford Motor Company
Other Attendees	
Lauren Baily	NADA
James Bland	UAI
Angela Cullen	U.S. Environmental Protection Agency
Ezra Finkin	Diesel Technology Forum
Paul Fiore	Auto Care Association
Robert Fronczak	Association of American Railroads
Maxine Joselow	E&E News
Ameya Joshi	Corning

Amy Kopin	Mitsubishi
Amandine Muskus	Association of Global Automakers
Hillary Neger	Hogan Lovells
Stuart Parker	IWP News
Joanne Rotundi	Hogan Lovells
Abby Smith	Bloomberg Environment
Lisa Snapp	U.S. Environmental Protection Agency
Patty Strabbing	FCA US
Luke Tonachel	NRDC
Robert Wyman	Latham & Watkins
Contractor Support	
Lesley Stobert	SC&A Incorporated