Federal Advisory Committee Act

Clean Air Act Advisory Committee

Mobile Sources Technical Review Subcommittee

Co-Chairs: Michael Walsh and Suzanne Rudzinski Designated Federal Official: Suzanne Rudzinski

Minutes of the Subcommittee's Meeting on October 4, 2004
Washington, D.C.
FINAL December 14, 2004

Purpose

The Mobile Sources Technical Review Subcommittee (MSTRS) met on October 4, 2004 to discuss the recommendations made in the National Academy of Science *Air Quality Management in the United States* (referred to hereafter as the NAS report).

The Subcommittee heard presentations on the following information and issues raised in the report:

- The Clean Air Act Advisory Committee review of the report (given by Suzanne Rudzinski, EPA)
- Identifying light-duty vehicle (LDV) high-emitters (presentation by Dan Harrison, EPA)
- Federal measures for non-road engines and vehicles (presentation by Bill Charmley, EPA)
- Evaluating averaging, banking, and trading provisions in the gasoline sulfur program (given by John Holley, EPA)
- EPA programs that address emissions from existing diesel engines (given by Jim Blubaugh, EPA)

The Subcommittee also heard a presentation on the Kansas City gasoline particulate matter (PM) project (given by Gene Tierney) and an update from the Retrofit Work Group (given by Jim Blubaugh).

Welcome and Introductory Remarks

Mike Walsh (consultant, co-chair) and Suzanne Rudzinski (EPA, co-chair) called the meeting to order at approximately 9:00 a.m. Jeff Holmstead (EPA) opened the meeting by thanking the Subcommittee members for their participation. He looks forward to work the MSTRS is doing to respond to NAS report. The Subcommittee is an important group in terms of EPA's priorities. There are technical issues surrounding the implementation of programs to deal with high-emitting gas and diesel vehicles, such as retrofit programs.

Mr. Holmstead commented on the NAS report. He expressed his initial skepticism that the report would effect real change due to the politics and differing views surrounding the issues. However, other Subcommittees are being very productive, and he is looking forward to this group's contributions. There is a real opportunity to improve our approach to air quality issues

through administrative changes under existing legislation in the near term, and in the long term with possible legislative changes.

Margo Oge (EPA) outlined the following priorities for the Office of Transportation and Air Quality (OTAQ):

1. The highest priority is to successfully implement the diesel program. Work is also being done on implementation of the non-diesel program. A collaborative effort with agencies such as the California Air Resources Board (CARB) is underway to obtain heavy-duty diesel in-use data.
2. The second priority focuses on locomotive and marine diesel engines. There is also a focus on the mobile source air toxics rule, which will hopefully be proposed in early 2005. Programs for small engines (50 horsepower and lower) with a focus on hydrocarbon emissions are also being considered.
3. The third priority focuses on addressing existing heavy-duty diesels. The goal is to retrofit or replace the entire existing fleet of 11 million engines by 2014. This may be accomplished by voluntary measures such as reducing or eliminating idling, using cleaner fuels, and other strategies. The Retrofit Work Group has been established to specifically address these issues, as well as emissions from freight, ports, and construction.

There was a recommendation to focus more effort on integrating internationally with clean engines and fuels. China was identified as a possible country for a collaborative effort.

Vickie Patton (Environmental Defense) asked about the results of the comment period on the commercial shipping and locomotive program. Ms. Oge replied that she hopes to report out at the next meeting, but she did not hear of any unexpected comments.

CAAAC Review of NAS Report (Suzanne Rudzinski)

This presentation outlined the review process of the Clean Air Act initiated by the CAAAC. The resulting report from the NAS prompted the CAAAC to establish the Air Quality Management Workgroup (AQMW). The Workgroup was charged with drafting a report to the CAAAC recommending specific short and long term actions to address the issues raised by the NAS. The role of the MSTRS in this process is to provide recommendations on the mobile source sector to the AQMW. These recommendations will be rolled into the AQMW report.

The NAS raised the following recommendations for mobile sources:

- Reduce emissions from high-emitting gasoline vehicles.
- Reduce emissions from existing sources.
- Expand use of federal emission-control measures.
- Implement and evaluate fuel regulations.
- Retain and improve conformity requirements

Additional information was provided regarding the transportation conformity recommendation of the NAS report. The SAFETEA bill was cited as a way to reduce the time period covered by transportation conformity to 10 years (with a couple of exceptions), and a way

to require a regional emissions analysis for the last year of the transportation plan for informational purposes.

Subcommittee members raised the following points:

- The successes of the existing mobile sources programs should be recognized, especially in the light-duty sector. However, a few high emitters still exist and they need to be considered. There is a need for an international effort. A partnership between EPA and UNEP is trying to get the message out. There have been many workshops in China, Brazil, and Mexico and we are making progress.
- The first two NAS recommendations are what can be done by 2010. We need to figure out what we can do about the existing fleet.
- STAPPA/ALAPCO has concerns about reducing the time period of conformity. This action ignores the responsibility of the SIP to attain and maintain the standard for 20 years.
- Nancy Krueger (STAPPA/ALAPCO) and Vickie Patton (Environmental Defense) emphasized that conformity is an essential component of communication about transportation plans and their impact on air quality.
- Synchronizing the ozone and PM SIP submittals may cause problems depending on the timing. Requiring SIPs to be synchronized according to the three year timeline versus the five year timeline will cause controversy.
- The NAS report has highlighted the rather unsuccessful history of trying to penetrate the transportation sector with respect to conformity. Conformity means integration and coordination at the State level, and that's important in addressing the Regional Haze, ozone and PM rules. This is a strong support for maintaining conformity and hard-earned gains of technological advances.

The following suggestions were raised on how to respond to the NAS report:

- There may be a need to brief the CAAAC on the new transportation rules.
- The requirement is for "transportation" vs. "highway" conformity. Conformity is nonexistent in port authorities, rail, and local agencies. All types of transportation should be included in conformity analyses to make sure what is accomplished in the on-road sector is not undermined. This may fall under a long-term legislative change, since the pre-1990 CAA covers only on-road transportation sources.
- A recommendation capturing the essential nature of transportation conformity should be written. Margo Oge asked Nancy Krueger and Vicki Patton to write up their concerns on the transportation conformity recommendation.

"High-Emitter" LDV Issues in the NAS Report on Air Quality Management in the United States (2004) (Dan Harrison)

This presentation discussed the following programs and regulations to try to prevent, detect, and remedy high emitters, in accordance with NAS report recommendations:

1. Emissions standards and warranted emissions control systems
2. Manufacturer-Run In-Use Vehicle Testing Program
3. EPA In-Use Testing Program
4. Inspection and Maintenance (I/M) Programs
5. On-board diagnostics (OBD) and OBD in I/M
6. Remote sensing

Emissions and warranties have become more stringent over the years with near-zero emissions requirements for light-duty vehicles. The durability of light-duty vehicles has increased. The useful life has gone from 50,000 to 100,000 miles in Tier 1, and up to 200,000 miles in Tier 2. These numbers may vary by geography.

The in-use vehicle testing program (IUVP) is a valuable source of detecting high-emitters in the light-duty vehicle sector. It shows fleet-wide failure rates, OBD problems, and allows manufacturers to take action sooner. The program initiated new compliance regulations with model year 2001. The program involves manufacturer-run verification programs of light-duty vehicles. It includes low and high mileage randomly procured cars tested under the federal test protocol (FTP), supplemental FTP, and OBD testing. The first round of data are coming in now, and will be given to EPA. Although this first round of data has value, the data are limited to vehicles with 75,000 miles

The in-use testing program tests 150+ randomly procured vehicles per year and responds to known problems gathered from defect reports. It is a possible small data source for high emitters. The average high-mileage is 60,000 miles. The program results in compliance actions and remedies. For example, 1.5 million vehicles are voluntarily recalled annually, but not always because of emissions problems.

The I/M program was created to find high emitters. However, according to the NAS 2001 report, the percentage of high emitters remains the same even though standards are cleaner. A participant asked if EPA maintains a routine database that consolidates State I/M data. Mr. Harrison replied that a pilot program is underway to consolidate and collect State data in a common format. Currently, data collection and consolidation is decentralized and sporadic. Eventually it is EPA's intention for State I/M data to be public. A participant asked if manufacturer-run test data are available along with EPA data. Mr. Harrison replied the data may be available, but there are probably privacy issues associated with obtaining the data.

The cost-effectiveness of the OBD program has improved as more OBD-equipped vehicles are produced. EPA's OBD High Mileage Study has shown that greater emission reductions are achieved with OBD than with IM240. It has also shown that repair costs are similar between the two programs. After 2010, the number of vehicles with OBD will provide for the tracking of emissions data for older vehicles.

Remote sensing studies have the potential to generate a lot of data across entire fleets. They will be good for program evaluation, but they cannot distinguish whether individual vehicles are under heavy loads or are coasting. To better pinpoint individual vehicles, it may be possible to correlate OBD with remote sensing. Studies in Oak Ridge and NASA will help remote sensing technology to improve.

Participants raised the following discussion points:

- Older vehicles are often the main contributors to high emitters. Most vehicles last far beyond the "useful life" of 120,000 miles. Since these vehicles are not equipped with OBD, they may fall through the cracks when I/M programs are phased out and transient I/M testing becomes prohibitively expensive. Remote sensing will either need to replace transient I/M testing, or transient testing will need to be maintained. In Nebraska the I/M program will expire in 2007. The public doesn't like I/M so there is likely to be several years where vehicles don't have OBD and there is no I/M program.
- The group was encouraged to obtain as much data as possible.
- Warranties may not be as dependable as a data source, since warranties were designed to run out before vehicles have any major, consistent problems.
- The old emission factors used to be too high. An important study would address the evolution of in-use emission factors. Often times data are 10 years old before they are published. There is a plethora of data that need to be mined.
- A recommendation capturing this response to the issue of high-emitting vehicles should be written. Margo Oge asked Mike Walsh and Coralie Cooper to write a first draft.

EPA's Programs that Address Emissions from Existing Diesel Engines (Jim Blubaugh)

The NAS report included a recommendation to reduce emissions from existing fleets and vehicles. OTAQ has implemented several regulatory and voluntary programs to address this issue. Regulatory programs include EPA's In-use Compliance Testing and Manufacturer Conducted In-use Testing. Heavy-Duty I/M programs are also in place. Voluntary programs include diesel retrofits and the SmartWay program.

Participants raised the following points about regulatory programs:

- The heavy-duty I/M program is limited, especially with respect to particulate matter (PM) measurement. Testing PM with remote sensing and testing lifetime PM emissions also pose difficulties.
- Technology development needs to focus on PM emission testing instead of NO_X. Challenges in meeting PM standards need to be addressed, and resources should be dedicated to this effort. Testing for NOx at highway speeds should be deemphasized, and testing emissions within urban corridors should be emphasized.
- Smoke programs are not completely successful at capturing gross emitters. However, the Colorado School of Mines has had some success in reducing emissions through its smoke program, and these programs promote inter-agency

communication. Another plan should be put into place before smoke testing is abandoned. Additional expertise from State non-governmental organizations, engine manufacturers and fuel providers is needed.

- I/M has traditionally exempted light-duty diesel which should be addressed in light of the current projections of light-duty diesel penetration in the U.S.
- California is running in-use tests on heavy-duty trucks, including idle, congested freeway, transient, and cruise. Initial data analysis has shown that congested freeway emissions are substantially higher (up to 40%) for PM, NO_X, and VOC than cruise emissions. Since remote sensing does not capture congested freeway portions of engine duty cycles, it will not capture an accurate snapshot of high emissions.
- A participant asked if in-use testing was being pursued in Europe or Asia. The only testing that may correlate with in-use heavy-duty tests in the U.S. has to do with heavy-load tests on light-duty vehicles.
- Will there be an EPA guidance document for heavy-duty I/M? What technologies will be recommended? What are EPA and California ARB doing for heavy-duty OBD?
- A States legal authority to require retrofits was raised. This could be seen as establishing a new emission standard.

The following points were raised regarding voluntary programs:

- Voluntary programs may not be as effective as regulatory programs. Often, mandatory programs are the only way to get substantial emission reductions and appropriate funding.
- In California it has been extremely difficult to get truck owners to voluntarily bring in their trucks for NO_X reflashing. California is now pursuing a mandatory program. In addition, reflash benefits may not be as great as other programs. In response to a request from NESCAUM, EPA is looking at a mandatory NOx reflash program, however, the process takes time and in the meantime they are working on a voluntary basis. A 1992 analysis indicated that trucks are not being rebuilt as quickly as projected, therefore the expected reductions from NOx reflash are not occurring. Many trucks are sold before the engine needs to be rebuilt, so tracking problems are introduced.
- The feasibility of a voluntary NOx reflash program was questioned because it reduces fuel efficiency. There was a discussion about the overall effectiveness of NOx reflash. Because the vehicles in the California consent decree that must install NOx reflash are primarily state delivery vehicles and they don't spend a lot of time at highway speeds, a larger impact may have been achieved retrofitting school buses.
- Sustained funding is needed to further retrofit programs. Funding mechanisms and incentives for voluntary programs could include emission credits, individual tax breaks, and other federal agencies such as DOT and USDA.
- Participants recommended a dual track of providing federal aid for voluntary programs while developing mandatory standards (using EPA's authority under section 202(l) for retrofits.

- The benefits of retrofits (e.g., catalysts and PM filters) should be quantified and highlighted. Data are available on both NO_X and PM reductions from retrofits. Particularly for PM reductions, retrofits are much more cost-effective than other programs available to States—as low as $10,000 per ton of PM (can go as high as $30,000/ton).
- Participants encouraged an analysis of transboundary retrofit issues, specifically with Canadian and Mexican trucks. The role of NAFTA should be researched.
- Participants recommended analyzing the benefits of ultra-low sulfur diesel (ULSD) once its use becomes widespread nationally. Initial benefits data may already be available in northeastern States.
- Contractual requirements to use retrofitted construction equipment was cited as an effective program. This program straddles the line between regulatory and voluntary, because it can be achieved by executive order, yet does not require construction companies not employed by the State to retrofit.
- The group was encouraged to continue pressuring States and EPA to force the technology needed to implement on- and off-road diesel programs.
- Since heavy-duty emissions are substantially higher on congested freeways as opposed to cruising, EPA should examine the data and hold a dialogue with the trucking industry and their clients to encourage transport and delivery during times when trucks can cruise. A goal of SmartWay is to coordinate with shippers to reduce idling emissions.
- Concern about using NSR offsets for truck and locomotive idle reduction projects was raised. There is no guarantee the reductions will occur in the same places and the program could undermine the effectiveness of NSR.
- Margo Oge asked Vicki Patton and Joseph Norbeck to develop a response for the regulatory program and Mike Rogers and Rich Kassel to address the recommendations for the existing diesel engines.

NAS Recommendations: Federal Measures for Nonroad Engines & Vehicles

As emissions from onroad and stationary sources are reduced, the nonroad sector becomes a higher percentage of overall NO_X and $PM_{2.5}$ emissions. Over the last decade, EPA has promulgated over 14 standards for a wide range of nonroad engines. Future nonroad work includes implementation of land-based diesel Tier 3 & 4 regulations, gasoline engine controls, and measures to address locomotive & marine diesel engines, air toxics, marine SO_X Emission Control Areas (SECA), aircraft, and ocean-going marine diesel engines.

Participants raised the following discussion points:

- Control of aircraft emissions is less aggressive than other programs. There are no technology-forcing regulations to date, and no move towards stricter standards. Aircraft emissions can have a significant local impact. Aircraft emissions are regulated through an international process and negotiations between IKAO and the FAA are underway.
- The emission inventory charts included in the presentation show emission reductions projected for 2020 and 2030. A bar for 2010 should be added to illustrate the implementation of new rules.
- Europeans are investigating incentives for marine and aircraft emission reductions. In the U.S., EPA has put together a stakeholder group to address emissions from aircraft and ground support equipment (GSE). State and local agencies also have some programs in place. For example, LAX has a program to address 80% of their GSE. Massachusetts has a cap-and-trade program.
- Under conformity the definition of "transportation" should be broadened to include more than just highway vehicles. Locomotive facilities at the State and local level can generate thousands of truck trips daily, as can ports. There are almost 100,000 vehicles operating daily at the Atlanta airport alone. This traffic is controlled by the airport authority on roads that are considered private. One study equated airport emissions to the largest power plants with VOC emissions from aircraft during landing and takeoff cycles dwarfing other local sources. It is politically difficult to include all aspects of a "facility" like a locomotive operation in regulations, but some action needs to be taken by 2030.
- Emission factors for aircrafts are grossly outdated, especially for PM.
- Data from local exposure studies from ports, airports, and rail yards should be analyzed.
- Margo Oge asked Rich Kassel and Coralie Cooper to write-up recommendations regarding aircraft and ships.

Evaluating Averaging, Banking, and Trading Provisions in the Gasoline Sulfur Program (John Holley)

NAS recommended that EPA should evaluate the averaging, banking, and trading (ABT) provisions included in the Tier II gasoline sulfur regulation to see if they were effective and to draw whatever lessons may be applicable. EPA proposes to do this in two parts: 1) examine interim program performance through analysis of reporting data on an annual basis, and 2) develop a complete report exclusively focused on functioning of the ABT features when the program has stabilized at final program stringency and when patterns of credit usage are well-established. Data will be scarce for the first couple of years as the program is rolled out, and exhaustive data will probably not be available until mid-2007.

Reporting data gathered from the industry includes credit generation, credit accumulation, sulfur levels, trading patterns, and usage patterns for credits. In order to protect confidential business information (CBI), fairly extensive efforts have been used to aggregate and generalize the conclusions. Informal conversations with refiners have also provided information about the ABT system. EPA is looking at credits designed to reward early reductions, provide

challenged facilities time to comply with regulations, and facilitate the timing of facility modifications.

One of the goals of this program is to look at reporting accuracy. One of the lessons learned in the lead phasedown program was that reporting needs to be more robust. Questions to ask in the gasoline sulfur program include: Did the reporting really understand what the regulations were requiring? Did most reports of credit trades match up?

The first report of this study should be issued in mid- to late-2005. At that point, robust data will be available for 2004 credit generation.

Mike Rodgers commented that the evaluation framework does not examine the potential for hotspots. Did banking and trading result in excessive sulfur levels in particular jurisdictions which prevented them from creating their own local programs for improving air quality? In major metropolitan areas, base fuel supplies come from a small number of refineries. If one refinery is not held to the same strict sulfur standards, it could impact an entire pipeline supply. Mr. Holley replied that a partial answer is that mechanisms were built in to limit the excursions the ABT program would permit in sulfur levels, so extreme differences would not be seen. However, this issue does need evaluation; unfortunately, it is extremely difficult to evaluate where fuel produced by a certain refinery was consumed.

Mike Rodgers added that gasoline sulfur levels used in the light-duty fleet would impact the sulfur levels in diesel fuel used by the heavy-duty fleet. Margo Oge commented that gasoline sulfur levels are capped, so pipeline contamination should not be a problem.

Bob Schaefer (BP) commented that industry experience is needed before the evaluation study will see good results. BP has obtained experience in this area through the oxygen credit program. It took a couple of years for the corporation to get established in the program and outgrow the learning curve.

One participant commented that credit auctions were already underway, and asked if that data had been gathered. Mr. Holley replied that the study must rely on informal conversations, but implicit in those conversations are questions regarding credit auctions.

Joe Norbeck asked how much sulfur is allowed to meet the different standards. Mike Walsh replied that a table exists with Euro 1 through Euro 4 standards and sulfur levels but not necessarily between the technology and the sulfur levels. Some technologies can be destroyed with sulfur and other technologies operate within a range of sulfur concentrations.

Suzanne Rudzinski will write up this recommendation, there is general agreement with the proposed format of the report.

Update on the Retrofit Workgroup (Jim Blubaugh)

The Retrofit Workgroup was formed to ensure retrofit technology performance and use; and expand retrofit technology into new sectors, including ports, construction, school buses, and

freight. Four sub-groups have been created. Lina Wood and Rich Kassel are the chairs for the construction subgroup; Michael Block is the chair for the Ports subgroup; Charlie Gauthier is the chair for the school bus subgroup and Barbelson is the chair for the freight/rail/airports subgroup. There has been one face-to-face meeting and several conference calls. The two-year timeline of the group is to hold a national convention (which was done in June 2004), determine internal EPA resource needs for expanding retrofits to new sectors, and write a report outlining recommendations. The report should be available in February or March 2005.

Next steps of the Workgroup are to hold a meeting on October 13th, 2004 and finalize work plans for individual sectors. This will lead into the Clean School Bus USA meeting in Cincinnati on November 1, 2004. The Ports sub-group is in the process of finalizing data and determining which retrofit scenarios make sense. Since ports are like a miniature city, many different public and private emission sources exist. The Construction sub-group met in Charlotte the last week of September to talk about contractual retrofit requirements. They received some positive feedback, and were encouraged to find ways to level the playing field for small businesses. The Freight sub-group will meet in late January or early February.

Kansas City Gasoline PM Project (Gene Tierney)

The Kansas City study began in May 2004 to identify the distribution of PM emitters, determine the fraction of PM high emitters, expand data on PM emission rates, update PM and toxic speciation profiles, evaluate performance of portable emission measurement systems (PEMS), and produce real world data on emissions, vehicle activity, and fuel economy. This project is the first in-use expansive emission factor testing study EPA has conducted in a long time. A coalition of partners has been pulled together for financial and technical support.

Mr. Tierney clarified that the Federal Test Protocol (FTP) was not being used in this study because the protocol is not aggressive enough in characterizing PM emissions for real-world characterization. The unified driving cycle (LA92) is being used instead. PEMS are also being used on vehicles tested on the dynamometer in order to test emissions in real-world driving situations.

Initial results of the study from the Pilot Phase have not yet been analyzed. Forty-five vehicles have been procured so far, but they are mostly newer cars. All data from the study should be available for use in MOBILE6 by 2007.

Joe Norbeck expressed concern that the study was weighted too heavily towards older vehicles. He suggested weighting the sample based on model uncertainty. Mr. Tierney replied that the data will be re-weighted when it is used in the model. The stratification of the sample was designed to ensure that the study procured enough older vehicles to quantify the emissions from older vehicles.

Mike Rodgers asked how vehicles were procured for the study. Using a random phone dialing method, one household may have several vehicles. Mr. Tierney replied that only one vehicle per household was used. If multiple vehicles were available, vehicles needed to fill particular make and model year bins were targeted.

Mr. Tierney commented that the team was working hard to go after "soft refusers." If vehicle owners refused the study because they did not have time, for example, team members would find a more appropriate time for owners to become involved.

A participant asked how remote sensing fit into the study. Mr. Tierney replied that one part of the study will use remote sensing on the entire Kansas City fleet and relate it back to the 480 vehicles that were tested on the dynamometer.

Wrap-Up

Participants recommended the following future agenda items:

- Fuel economy tests that accurately reflect real-world fuel economy
- Address the core fuel recommendation from the NAS report by including studies on benzene (which may cover more than the mobile source sector). NESCAUM has a lot of information on benzene and secondarily formed pollutants that could be presented to the group.
- Because many groups are interested in the fuels issue, EPA should try and coordinate efforts. Perhaps a national fuels program is needed to standardize fuel productions. A national fuel standard would need to be very stringent to ensure no jurisdiction needed to control beyond the national standard to meet their air quality objectives. Would an area be able to go beyond a federal standard? There is a need to preserve the fertile ground of the States (e.g., California) in spurring air quality improvement measures.
- If Congress does reauthorize the CAA, they will address fuels, this group should begin to address the issue. Examine emission reduction potential with changes in fuel, and what would encourage or impair technology development for fuel changes.
- Address the recommendation from the NAS report to examine multi-pollutant approaches in the mobile source sector, including the integration of criteria, toxic, and greenhouse gas pollutants.
- Examine climate change from a mobile source perspective.
- Support development of a national air toxics mobile source program to address benzene and formaldehyde.
- Address ecosystem-wide, multi-media approaches, such as examining the impacts of nitrogen deposition.
- Discuss how EPA can continue to coordinate with and support States in their efforts to reduce emissions from the mobile source sector.
- Form a Work Group to address high emitters once the I/M program has been phased out, including how to replace the smoke program.

Action Items

Subcommittee members will draft language to include in the Air Quality Management Work Group recommendations to the NAS report:

1. Vickie Patton and Nancy Krueger will draft language on conformity recommendations.
2. Mike Walsh and Coralie Cooper will draft language on the recommendations for high-emitters.
3. Vicki Patton and Joseph Norbeck will draft language with regard to the regulatory program.
4. Mike Rodgers and Rich Kassel will address the recommendations for the existing diesel engines
5. Suzanne Rudzinski will contact the Engine Manufacturers Association (EMA) for representation
6. Rich Kassel and Coralie Cooper will draft language regarding federal emission control measures, including what additional non-road control measures may be needed.
7. Suzanne Rudzinski will draft language for ABT recommendations

Other Action Items:

1. Coralie Cooper will give a presentation on NESCAUM's analysis of their airport emissions inventory.
2. Jim Blubaugh will submit additional information on EPA's voluntary programs, including a web address.

Attendees—Subcommittee Members, Presenters, and Observers

Name	Organization
Suzanne Rudzinski	EPA, co-chair
Mike Walsh	Consultant, co-chair
Paul Augeroporro (?)	Hart
M. Barrett	Mitsubishi Motors R&D of America
Dennis Bartram	Baker & Hostetler
Michael Biantos	Hart
Jim Blubaugh	EPA
Kelly Brown	Ford
Andrew Burnham	Argonne National Labs
Bill Charmley	EPA/OTAQ
Don Clay	Koch
Coralie Cooper	NESCAUM
Randy Evan	Infineum USA, LP
Chuck Freed	Consultant
Eric Ginsburg	EPA/OAQPS
John Guy	EPA
Dan Harrison	EPA
John Holley	EPA
Jeff Holmstead	EPA
David Holt	Hart
Khesha Jennings	EPA
Rich Kassel	NRDC
Doug Lawson	NREL
Terry Levinson	Argonne National Labs
Sue Kimbrough	EPA/ORD
Tom Manley	Mitsubishi Motors R&D of America
Steve Marquardt	EPA Region 5
Meghan McGuinness	EPA
Reg Modlin	DaimlerChrysler
Hannah Murray	Toyota Technical Center
Margo Oge	EPA
Sam Napolitano	EPA
Vickie Patton	Environmental Defense
Pat Raher	Hogan & Hartson
Mikhail Rodkin	Engelhard
Joanne Rotondi	Hogart & Hartson
Ichiro Sakal	American Honda Motor
Antonio Santos	MECA
AnnaLisa Schmidt	Dake Kardos Associates, Inc.
Lori Stewart	EPA/OTAQ
Matthew Thornton	NREL
Martin Veter	DEQ
Debbie Wood	EPA/OTAQ

Attendees – Logistical and Technical Support

Name	Organization
Rebecca Battye	EC/R Inc.
Kathy Boyer	EC/R Inc.
Joe Bachman	EPA, Alternate DFO