

**Clean Air Act Advisory Committee
Mobile Sources Technical Advisory Sub-committee
Crystal Gateway Marriot, Arlington, Virginia
Tuesday, July 25 and Wednesday, July 26, 1995
Day 1**

INTRODUCTIONS

Dr. Robert Sawyer, University of California-Berkeley, welcomed the members of the Sub-committee and introduced Mike Walsh, a private consultant. Robert Sawyer and Mike Walsh will co-chair the Sub-committee. Robert Sawyer introduced Margo Oge, Director of the Office of Mobile Sources.

Margo Oge spoke about the importance of the Sub-committee and the need for their input into Agency decision making. EPA needs to make policy decisions on the best information available and in a public forum. EPA is using advisory committees to work in partnership with key stakeholders, including industry, environmental groups, and the public. Technical issues and policy issues go hand-in-hand and the Agency has attempted to include representatives from all interested parties.

The Sub-committee will focus on three critical areas. Vehicle tail pipe standards have been tightened significantly over the years, but the real world emissions have not kept pace with the standards. More miles are being traveled. EPA would like the Sub-committee to better characterize in-use deterioration data. EPA would also like to identify strategies that are most promising, including better education and outreach and better technologies for more durable automobiles. Technical expertise in modeling is also needed, specifically with respect to MOBILE6, the upcoming revision to MOBILE5. EPA is aiming to revise the model within the next year or two. What assumptions, data, and analysis are required to create MOBILE6? The Agency is also looking for the Sub-committee to help re-engineer the EPA certification programs. At a recent meeting with the automakers, the certification program was raised. What strategies might the Agency use to reinvent this process? Margo Oge asked how the Sub-committee members believe they can help the Agency in investigating these issues and making recommendations. She thanked Robert Sawyer and Mike Walsh for their help in coordinating the Sub-committee.

Robert Sawyer asked the Sub-committee members to introduce themselves.

- Bill Becker, STAPPA/ALAPCO, has been Executive Director for 15 years. He and his member organizations are interested in these issues and he looks forward to working with the Sub-committee.
- Bruce Bertelsen is Executive Director of the Manufacturers of Emission Controls Association, a group of companies providing solutions to mobile and stationary sources.
- Melvin Branch, Associate Dean of Engineering at University of Colorado, oversees research on combustion and emission control equipment. He previously served as Chairman of the Colorado Air Quality Control Division that adopted a decentralized IM program and the nation's first oxygenated fuel program.
- Tom Cackette, California Air Resources Board, has previously worked for OMS in Ann Arbor. California, like EPA, runs a complete, birth-to-grave motor vehicle program.
- Joe Colucci, Executive Director of Materials Research at General Motors, has worked on vehicle emissions since the 1960s. He is a co-leader of the Auto/Oil Air Quality Improvement Research Program. Much of his work with GM has focused on oil and lubricant programs.
- Greg Dana, Vice President and Director of International Automobile Manufacturers, represents the European car manufacturers. He spent thirteen years at EPA prior to taking his current position.

- Stephen Gerritson, Executive Director of Lake Michigan Air Directors Consortium, works on computer modeling and mitigation strategies. Their model, GMAP (Geocoded Emissions Modeling) incorporates MOBILE5. He is an economist and has a MPA.
- Dick Gibbs, NY State Department of Environmental Conservation, is responsible for implementing IM, fuels, and other programs in the state. He has a Ph.D. in chemical engineering and began his work following early catalyst vehicles in the 1970s. He is chair of the NESCAUM mobile source committee.
- Andy Ginsburg works for the Oregon Department of Environmental Quality and represents John Kowalczyk, Manager of the Air Quality Planning Section. Oregon has a number of non-attainment areas and is a user of the Mobile model and interested in education and market-based solutions.
- Randall Guensler, Professor at Georgia Institute of Technology, researches the development of a next generation research model for mobile sources using GIS.
- Dave Hawkins, Natural Resources Defense Council, has worked there since the early 1980s. He has followed the federal vehicle emissions control program since the national adoption of the California program.
- John Johnson, Professor of Mechanical Engineering at Michigan Technological University, worked on early smoke standards and 1973 California standards. He works on diesel engine emissions issues and has served on several national committees.
- David Kulp, Ford Motor Company and representing Helen Petrauskas, began with Ford in 1967 and has spent many years working on vehicle certification programs.
- Virginia McConnell, Resources For the Future (RFF) and the University of Maryland, is an economist and works on mobile source issues such as cost effectiveness of IM programs and scrappage.
- Katherine McMillan, EPA, is the Designated Federal Officer (DFO) for the Sub-committee.
- Dave Merrion, Senior VP for Engineering, Detroit Diesel Corporation, has worked on exhaust emissions since 1965. He is also a previous president of the Engine Manufacturers Association.
- Michael Redemer, Texaco, is trained in environmental engineering and worked previously for the California Air Resources Board. He also chairs the API fuels task force.
- Robert Sawyer is a professor at University of California-Berkeley. He no longer teaches, but runs an active research program. He has spent the last year consulting to the Agency and is an advisor to the Auto/Oil Air Quality Improvement Research Program on reformulated gas issues.
- Bob Slott, Director of Technology Planning at Shell Oil, is interested in remote sensing and other mobile source issues.
- Doug Teague, representing Francois Castaign, Chrysler Corporation, has worked on many mobile source technologies and issues during his career at Chrysler.
- Tina Vujovich, Vice President of Product Engineering and Environmental Management at Cummins Engines, has worked for Cummins for 17 years and is past president of the Engine Manufacturers Association. She is a member of the Clean Air Advisory Committee.

- Mike Walsh worked at the Agency until 1981. He is now a freelance consultant spending most of his time overseas, most recently Malaysia and Thailand. He believes that the US motor vehicle pollution control efforts are the best in the world, but still face significant challenges. In the next year, he hopes to achieve progress in making recommendations to EPA and Margo Oge. He was trained as a mechanical engineer, worked with the Senate Environment Committee, and works with many states and private companies in the business of pollution control. He hopes that he can bring some of the experiences that other countries are facing and implementing.

Robert Sawyer introduced Mary Nichols, EPA Assistant Administrator for Air and Radiation. She welcomed the Sub-committee members and highlighted the assistance that the full Clean Air Act Advisory Committee has supplied to the Agency. The Agency is facing serious challenges in the mobile source program. The program is in danger of being rendered irrelevant unless appropriate new directions are developed. It is time to take another look at the way resources are allocated among EPA, states, and industry to address mobile source emissions. There are numerous gaps in our knowledge of how vehicles behave in customer's hands, how they deteriorate, and how willing individuals are to change their driving behaviors. The Sub-committee represents a good cross section of expertise and should help the Agency focus on its three main areas of investigation.

Robert Sawyer discussed several housekeeping aspects of the Sub-committee. Workgroups should be formed to undertake individual areas of investigation. Three workgroups (and chairs) have been proposed to focus on the following areas respectively:

- (1) Modeling - Phil Lorang and Randall Guensler;
- (2) In-use deterioration - Tom Cackette and Bob Slott; and
- (3) Compliance reforms - Bob Maxwell and Tina Vujovich.

The Sub-committee should divide into the three workgroups, although individuals could work on more than one group. A sign-up sheet was distributed to allocate individual members among the workgroups. Workgroups will meet prior to the next Sub-committee meeting in October and be prepared to report on their progress. Margo Oge added that the topics are complex and she is looking for the Sub-committee to refine the three issues and identify new areas for research or strategies that look promising. The remainder of the meeting focused on briefings on each of the three workgroup areas.

BRIEFING ON IN-USE DETERIORATION

Phil Lorang, OMS

The goal of the presentation was to introduce the issue of in-use deterioration and possible lines of improvement. A key question is what should we do about cars that are just about to be built? Unfortunately, deterioration information is only available for vehicles that are already built. Motor vehicles are a major source of emissions and in-use deterioration is the cause of most of the excess emissions above the certification baseline.

EPA has estimates from MOBILE5 (developed in 1992) that in-use deterioration is severe after 50,000 miles. This estimate is based on data derived from earlier technologies on vehicles. This has led to some criticism. CARB estimates of deterioration are as much as one-quarter lower than MOBILE5 estimates. For this and other reasons, MOBILE5 is currently being reviewed to create the next version, MOBILE6, due out in 1996 - 1997.

Phil Lorang discussed the two main testing procedures used by the Agency. The FTP (Federal Test Protocol) test is 30 minutes long at 20 mph. About 100 are performed in Ann Arbor each year, and contractors perform an additional 200 tests in the same time period. IM240 is four minutes long with no idle. The IM240 test is faster and cheaper, and therefore more are performed each year. IM240 data from Hammond, IN and Phoenix, AZ have been analyzed. IM240 data are available from Arizona and Colorado but have not yet been analyzed. API is funding a program to recruit cars arriving from other states that have not been subject to IM programs and have high mileage.

Recruitment is an issue that must be examined to understand the data quality. FTP tested vehicles in Ann Arbor are recruited by phone and post card. The overall response rate is about 20%. Many argue that only those who want their cars repaired respond (repairs are free as an incentive) or only those that have a lot of free time respond (e.g., many seniors respond). IM240 vehicles are recruited at the inspection lanes using a more random process, but there is no control over temperature and fuel variables. Also unknown is whether individuals get their cars repaired just prior to arriving at the IM240 lane.

Ann Arbor FTP data

MOBILE5 was used to predict 1986 and newer vehicle deterioration. MOBILE5 predicts significant deterioration (with respect to hydrocarbon emissions) at 50,000 miles and much lower deterioration in areas with strict IM240 programs. The actual Ann Arbor FTP data do not follow the MOBILE5 prediction; the actual data show less deterioration based on several hundred data points. MOBILE5 estimates are currently based on data from older technology cars with high mileage and newer technology cars that have low mileage.

IM240 data

MOBILE5 was again used to predict deterioration after some modifications were made to more closely parallel the IM240 conditions. In this case, the actual data also fall lower than the MOBILE5 deterioration predictions. EPA also graphed the data for individual model years with points representing vehicles having similar odometer readings. The actual data closely paralleled the MOBILE5 predictions for a full IM240 program. Mike Walsh asked about the randomness of the IM240 selection process. Phil Lorang responded that the contractors take the next vehicle in line and recruitment response is in the high 90 percent range. Hammond, IN is in a low income area and this may have some effect on the data. For instance, Hammond, IN has very few foreign cars. The MOBILE5 model was adjusted to correct for this lack of foreign vehicles. Phil Lorang then showed data on NQemissions from Phoenix and Indiana.

Phil Lorang next summarized this information. What do these data show? The predicted deterioration at 50,000 miles is not confirmed, nor refuted. Deterioration does occur, and can be as high as 60% of the excess emissions. It is not yet clear how big the problem is, nor why it is happening. Why is the average emission rate going up as the groups get older? During the time a car moves from two years to six years old, the median car's emissions are twice what they ought to be. Newer technology cars are also showing similar deterioration in the period between two and six years. For both types of vehicles (i.e., old and new technology cars), the 80th percentile vehicles are at about 1 gram per mile of hydrocarbon. There appears to be some effect due to high emitting cars, in addition to effects due to general model deterioration. When repairs were examined (e.g., what does it take to bring a high emitter into compliance), most high emitters have gross catalyst failures in addition to problems with oxygen sensors, and may require EGR replacement. Even at low mileage, there are some cars that are identified as high emitters. Dave Kulp asked whether there were some improvements being seen in the data. Phil Lorang stated that there has been improvement, especially in the change from carburetors to fuel injection.

EPA RECALL PROGRAM

Chuck Freed

Phil Lorang broke from his presentation to introduce Chuck Freed of OMS, who made the presentation on the EPA recall program. EPA tests families of vehicles in Ann Arbor, Virginia, and Denver. He reviewed data collected during the period from 1981 to present. Early in this period, several manufacturers had failure rates (as high as 40%) after the standards changed in 1981. Mike Walsh asked about the type of pollutant that caused the failure. NQ had been a problem, but CO is the current problem causing recalls or failures. Technology changes have helped to improve manufacturers' compliance. Chuck Freed added that the Agency does not recall car families that are slightly over the

standard (e.g., five percent), so his figures underestimate the level of cars exceeding the standard. Some manufacturers have programs to identify ways that their components would deteriorate and therefore have avoided the compliance problems that others have experienced. Manufacturers often keep their own fleet of test vehicles to identify problems earlier. Mike Walsh asked about the definition of "properly maintained". Chuck Freed responded that the Agency basically performs the maintenance that the owner should have done if they had maintained the vehicle properly. He has compared his properly maintained vehicle data with the data from Phil Lorang. Most newer cars need very little maintenance and therefore the information on these vehicles from both programs are more similar. The Agency has not recently evaluated the effect of the recall program vs. the IM240 program. The recall program test cars at approximately 30,000 mean miles. Mike Walsh asked about the response rate for the recall program. A five percent rate was estimated to be correct. European and other international car manufacturers have had similar recall failure results although a few manufacturers have had quite serious problems that have only recently been corrected.

Chuck Freed reviewed the evolution of the testing procedures used on vehicles. The Agency has moved from an exhaust and evaporative emission testing program to many other additional tests including on-board diagnostics (OBD), cold starts, OBD light illumination, and others. With these new tests, EPA expects to see an increase in non-compliance until manufacturers more fully understand the test procedures and the technologies required to meet new standards. This is only an expectation based on previous increased failures after test requirements have been changed. There are many unknowns to manufacturers responsible for maintaining a vehicle's emissions until the new vehicle families spend extended time on the road. Dave Hawkins clarified that when more stringent standards are implemented, there are often periods of non-compliance until manufacturers gain experiences with the standards and the technologies to meet such standards. Mike Walsh asked about tests on sport utility vehicles (SUVs). Chuck Freed said that they are not tested to the same extent as light duty vehicles, even given the increase in SUV sales volume. However, EPA and California test a few of these vehicles and currently there are not significant problems. He added that EPA tries to focus its resources on the more severe problems.

Phil Lorang continued the presentation. He reiterated the difference between high frequency problems identified in the recall program and the lower frequency problems identified in the FTP and IM240 programs. He posed the following questions to the Sub-committee: Are the problems clustered in one model or are the problems randomly distributed among makes and models? Do some owners use their cars in ways that are very different from most users?

Evaporative emissions are less fully investigated because the tests are more expensive. EPA used 10 to 20 cars for each plotted average. There are many areas of failure such as pressure failures (due to seals, etc.) and purge failures (due to blocked canisters or valves). EPA tests for both pressure and purge failures. EPA has found that there is a low percentage of failures in the first 50,000 miles. The increase in purge and pressure failures may be due to poor builds or due to the fact that the test fails some cars preferentially. However, there is general agreement that there is a problem. There are those that believe that the failing cars were repaired and subsequently rebuilt incorrectly. EPA is concerned because these failures result in significant increases in the vehicle's emission rates. EPA estimates that one-half of the benefits of the IM program are gained by fixing these evaporative emission problems. Unfortunately, the purge and pressure tests are more intensive and slow, so states are not performing these tests. Other, more rapid tests are being developed such as using helium in the gas tank. Another group of stakeholders is currently evaluating these and other purge and pressure testing protocols. Andy Ginsburg asked about cars that are not started. The MOBILE5 model makes certain assumptions about the number of cars that sit and for how long. New cars are on the horizon - Tier 1, California LEV, etc. - and new technologies will be on these cars, such as electrically heated catalysts. With each change in part design or the location of the part, new opportunities are created for the part to fail. This also holds true for software. New technologies also may increase the durability of parts, such as hoses that can't leak. With respect to OBD II, the codes are generic and may make owners aware of problems sooner so they can advance the maintenance of their car. A current rulemaking will require inspection programs to connect to the OBD and electronically check the system. A Sub-committee member asked about the number of vehicles subject to IM programs. Phil Lorang responded that approximately 60 to 70 percent of vehicles nationwide are or will be subject to IM programs because of the 1990 amendments. Dave Kulp added

that if a small percentage of owners respond to OBD information, the manufacturers will have an opportunity to see failures earlier and respond for future vehicles.

Heavy duty engines are difficult and expensive to test, so there are limited data. The recall program has analyzed some data. However, it appears that diesels built prior to the 1994 standards do not have serious deterioration problems. Some in-use deterioration problems have been identified with heavy duty gasoline engines. Based on this information, the MOBILE5 model assumes no deterioration for heavy duty diesels and some for heavy duty gasoline engines. Other testing is underway but is being funded by other organizations. Mike Walsh asked about light duty trucks. Phil Lorang responded that there is limited data. EPA makes the general assumption that the car technologies used in these vehicles behave similarly in light duty trucks.

Phil Lorang reviewed a list of options to help reduce in-use deterioration in cars and light duty trucks.

- Change fuel compositions to reduce emissions if fuels contribute to deterioration. He added that reformulated gas programs reduce emissions overall.
- Improve IM programs. EPA would like states to use more test-only facilities in IM programs, but the states now have more flexibility in this area. He would like to see more cars evaluated on a loaded test as opposed to an idle test. There could also be improvements to the capabilities of the repair industry.
- OBD checks will be required but will be pilot tested prior to full implementation.
- Remote sensing may have some promise and data should be coming into the Agency soon for evaluation. Transponders take OBD to another level by not only turning on a light to notify the motorist, but also broadcasting a signal that describes the nature of the problem. The motorist may receive a letter asking for the vehicle to be tested further. CARB is examining the possibilities of this technology.
- Public outreach is also an option for further strengthening maintenance awareness among the public.
- New power plants, such as natural gas, may improve emissions.
- Accelerated scrappage of vehicles is an option when the cost of fixing is higher than the cost of removing the vehicle from the road.
- EPA is also working with the auto companies to develop new technologies.
- The Agency is also examining market incentives.

Margo Oge added that the ideas listed are excellent, but the Agency's resources are limited and there needs to be a collective effort to examine these policy and technology options. Phil Lorang believes that there needs to be a close examination of the ability of current technology to meet emission goals. This would help manufacturers that are not complying to catch-up or broaden the applicability of the technology. Moving the recall mileage higher (e.g., 60,000) may help to identify problems. Education and market incentives - for the automakers, public, and fuel industry - also need to be studied further. Heavy duty vehicles, especially those with gasoline engines, need further study. The Agency must keep durability in mind in current rulemakings; any move to gasoline engines in the heavy duty sector would probably move to less durability as compared to diesel engines.

Phil Lorang added that the list of options is not exhaustive, but is a starting point for setting priorities. EPA is continuing its analysis of available data and hopes to have better information at the next meeting.

Mike Walsh asked the Sub-committee whether they believed that in-use deterioration was a problem. He added that the data show that manufacturers are doing a better job of meeting the standards when vehicles are maintained for at least 30,000 miles. Dave Kulp added that the modeling data use information from cars that require more maintenance than the cars that are currently being built by the auto manufacturers. Bob Slott continued that remote sensing data show that new vehicle technologies to reduce emissions have improved, but overall emissions have not kept pace with this technology. Without

policies to get older vehicles off the road, in-use deterioration will continue to be a problem. However, as vehicles get more expensive, older cars become more valuable. Robert Sawyer noted that increased vehicle durability also increases the potential for in-use deterioration because cars are on the road longer.

Mike Walsh asked for other ideas from the Sub-committee that may not have been discussed and should be added to the list of potential items for investigation. Tina Vujovich commented that the list does not distinguish between gasoline and diesel engines. Margo Oge answered that light duty vehicles (with gasoline engines) are currently the main focus of the Sub-committee. Mike Redemer added that the work of the Sub-committee may be limited to the available data. Too large a scope may limit the ability of the Sub-committee to complete its tasks. With respect to data, Randall Guensler added that he hoped there would be a mechanism for electronic communication and exchange of information. Robert Sawyer asked Katherine McMillan to collect the e-mail addresses of Sub-committee members. Several Sub-committee members asked about education and the potential for "social learning" issues to combat some of the problems. Margo Oge offered to bring the Director of EPA's communication programs to brief the Sub-committee members. Margo Oge reiterated that the focus of the Sub-committee should be on light duty vehicles and, with respect to in-use deterioration, there is a problem that clearly exists. Mike Walsh asked about other data sets that may be useful. Robert Slott mentioned an enormous amount of remote sensing data that should be accessible in the near future. Maryland, Colorado, and Sacramento were mentioned as states/cities that have IM240 data that could be evaluated. Margo Oge asked the car manufacturers whether they might make available their in-use deterioration data. Dave Kulp responded that he was not sure whether all of the data could be made available, but depending on the issue, he would go back to his sources to identify relevant information. Virginia McConnell raised the issue of willingness to pay on the part of the public.

The Sub-committee decided to begin the next day's session at 8:30 am and adjourned for the day.

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Day 2**

MEETING SUMMARY:

Mike Walsh opened the meeting. Today's agenda topics were "Re-engineering the Compliance Process" (note that this presentation began this morning rather than yesterday afternoon as indicated on the agenda), and "Emissions Modeling: Why Reform the Mobile Model." He introduced Bob Maxwell, Director of EPA's Certification Division at the Office of Mobile Sources in Ann Arbor, Michigan, who presented the first discussion topic. Following this presentation, a discussion of the Sub-committee's role with respect to the compliance process took place. Next, Lois Platte, Chief of EPA's Air Quality Analysis Branch, discussed the Mobile emissions Model.

BRIEFING ON RE-ENGINEERING THE COMPLIANCE PROCESS

Bob Maxwell, OMS

Bob Maxwell began a presentation of EPA's Mobile Source Compliance Programs. The purpose of the presentation was to bring the entire Sub-committee up to speed by describing the compliance programs as they are today and what they involve. The key points of his presentation and the comments from participants are presented below.

The Compliance Program is mandated by the Clean Air Act. It is a three-tiered strategy to ensure that vehicles are designed and built to meet emission standards over their useful life. The three tiers are:

- The Certification Program, which tests vehicles prior to sale to demonstrate compliance with emission standards;
- The Selective Enforcement Audit (SEA) Program, which conducts assembly line testing for early evaluation of production vehicles; and
- The In-use Recall Program, which evaluates properly maintained vehicles after several years of use.

The Compliance program is an annual one, in which Certificates of conformity are issued each year for vehicles that meet the program's standards. Certificates can be revoked or suspended if necessary.

Certification Program

The majority of the presentation focused on the Certification program. The goals of this program are:

- To assure, prior to production, that the vehicles are designed for emission compliance over their useful life;
- To safeguard and disseminate certification data; and
- To issue Certificates of Conformity that form the basis for enforcement and testing procedures for the SEA and In-use Recall programs.

An additional benefit of the certification process is that it enables EPA to identify current and future quality emission designs and technology.

Certificates of Conformity are issued based on engine families for seven certificate of vehicles. There was a question as to whether variability in emissions performance exists within an engine family. Bob Maxwell stated that it does and that EPA tries to cover for the worst case situation.

A brief history of the Certification process from the 1970s through today was presented. Some streamlining of the process has taken place over the last twenty years. More flexibility for the manufacturer has been added, the number of vehicles tested per engine family has been reduced, and more manufacturer involvement now takes place.

There was a question of the cost of the certification process, and whether anyone has studied this. EPA answered that no recent cost studies have been performed. Bob Maxwell's estimate is that the cost is approximately \$2 per car. David Kulp noted that it is hard to separate the fuel economy program costs and activities from the certification program costs since they are closely linked. He also noted that test equipment and facilities comprise the majority of the cost for the manufacturers.

A question was raised about the frequency of failure of vehicles for the certificate of conformity. Bob Maxwell replied that it is not high, because it is very costly to correct an emissions problem at that point in the vehicle's production cycle, thus giving manufacturers a strong incentive to avoid failure. He noted that Compliance failure is higher among smaller specialty car families. However, these vehicles are less likely to be in-use tested because fewer of them exist and they are difficult to obtain for testing.

The components of Certification are a durability and emission deterioration demonstration and useful life emission projections. To obtain the durability data, vehicles are driven on a track or operated on a dynamometer to accumulate 100,000 miles in a short amount of time. One drawback is that this does not accurately simulate reasonable operating conditions or aging factors very well. Tina Vujovich noted that deterioration miles are very different on HD vehicles and the process is somewhat different. Richard Gibbs asked about the fuels used during the durability demonstration. EPA answered that throughout the certification process, the fuels that must be used are specified. They are not always representative of in-use fuels.

An alternate Durability program exist that manufacturers can use as an option to the Certification program. It allows them to use "in-house" short-cut procedures, with EPA review. Only a few manufacturers have used this program so far.

The major steps in the Certification process were presented. They are:

- The manufacturer selects and tests pre-production vehicles for durability and emission data;
- EPA determines if there is a need for confirmatory testing;
- The manufacturer submits an application for Certification;
- EPA reviews and issues a Certificate of Conformity for all complying engine families; and
- The manufacturer reports emission related production changes.

A question was asked about the turnaround time for the certification applications. EPA stated that the process can take anywhere from days to five or six months. They have had recent resource and computer problems that have lengthened the process. Bob Maxwell stated that this is a potential target area for streamlining.

The HD engine certification process was then discussed, and the differences from the LD vehicle process noted. One key difference is that HD engines may participate in an Emission Averaging, Banking, and Trading program. A question was raised as to why LD vehicles can't participate in the Emission Averaging, Banking, and Trading program. EPA answered that there are some issues but this is an area that the workgroup can discuss.

The Fuel Economy Program was discussed. This program, which is tightly linked with the Certification program, determines the fuel economy value that is printed on new vehicle labels, and calculates CAFE figures. EPA reports CAFE values to NHTSA, Gas Guzzler data to the IRS, and Gas Mileage Guide data to DOE for publication. This program applies to LD vehicles and trucks only. An additional benefit of this program is that the large number of tests provide lab correlation and confirm emission compliance.

Selective Enforcement Audits

The Selective Enforcement Audit (SEA) program is another component of the Compliance process. The program randomly selects vehicles from the assembly line to test. The goals of the SEA program are to:

- Ensure that manufacturers build vehicles that conform to the emission standards to which they were certified; and
- Provide an incentive for manufacturers to voluntarily conduct assembly line test programs.

Bob Maxwell stated that one of the primary objectives of the SEA program is to ensure that manufacturers are performing their own quality audits. Most manufacturers run many audits, submit the paperwork to EPA, and EPA periodically reviews and verifies the data.

Mike Walsh asked how many audits were performed each year. EPA responded that they didn't have that answer offhand but estimated approximately 20 LD and 10 HD audits per year. SEA program emphasis is now being placed on HD engines since HD standards have become increasingly stringent, resulting in more failures than LD vehicles.

In-use Recall Program

This program, which is the third tier of the Compliance process, was briefly addressed. The goals of the Recall program are to:

- Encourage manufacturers to build vehicles and engines with durable emission control systems; and
- Repair high-emitting vehicles.

The program identifies in-use deterioration and component failure problems by selecting properly maintained in-use vehicles for emissions testing after 2-3 years of use. The program has a direct emissions benefit. Manufacturers wish to avoid a recall in order to avoid the high costs and negative quality image associated with a recall.

EPA stated that one of the problems they face with this program is that the recall decision is based upon data from a small sample size. Therefore they try to be very conservative with the data.

Andrew Ginsburg asked about the non-road engine compliance program, what the resources for this program are, and what the procedures will be. EPA responded that this is a new compliance program. It is based on manufacturers performing in-use testing with minimum certification needed. EPA is hoping to get manufacturers to perform most of the process. The program hasn't been budgeted for yet. EPA added that the initial non-road engine standards are relatively easy to meet.

This ended Bob Maxwell's presentation on the Compliance programs at EPA. Margo Oge began a discussion of her thoughts on the Compliance programs and the role of the Sub-committee in regard to this issue. Following are the key points from this discussion:

Margo Oge stated that this Sub-committee is a top priority with her office. She stressed that this is an important issue because the programs require a large amount of resources from EPA and industry. She stated that all stakeholders have learned a great deal about the Compliance process over the last 25 years and that the Sub-committee should focus their resources on the most significant problems of the programs. She has begun a dialogue with the Big 3 automakers and a separate dialogue with the foreign manufacturers. She requested input from the manufacturers on what they would like to see in a discussion of re-engineering the process as well as what they would like to see in regard to self-certification.

She suggested that the group address where any resources that may be saved by re-engineering can be re-directed. For example, should they focus on obtaining more data about in-use deterioration? She stated that it is important that the group agree on a process by which they will move forward to re-evaluate the compliance programs, as well as address the issues of in-use deterioration, public education, and additional areas where EPA can focus their resources. She suggested that the Sub-committee bring to the full committee a sense of what the issue is and what the group is trying to solve.

Tina Vujovich asked what the role of the Compliance Workgroup is in relation to the role of individual manufacturers. Margo Oge responded that the EPA administrator would like all changes and recommendations from all workgroups to go through a FACA (public) procedure, and get input early in the process. The manufacturers should articulate where they would like to see the compliance programs going, and bring these ideas to the Sub-committee. The Sub-committee will then advise EPA on how to proceed.

Joe Colucci stated that these issues are critical to each of the manufacturers individually. He expects each manufacturer would like to have their own expert on each workgroup. EPA responded that they expect that experts and technical staff will be present at workgroup meetings.

Mike Walsh stated that separate issues face HD and LD vehicles with respect to the compliance programs. He asked whether there should be separate workgroups for HD and LD vehicles. The Sub-committee discussed this and decided that the focus is on LD vehicles, and that there may not be enough data to enable the group to focus on HD to the same degree. HD will be included to the extent that the compliance process can handle both issues simultaneously. Margo Oge stated that she will get in touch with the Engine Manufacturers Association (EMA) and clarify the concerns they have with certification of HD engines. She will bring this information back to the next Sub-committee meeting. In the meantime the Workgroup should focus on LD. Randall Guensler stated that with respect to modeling, it makes sense to include HD activity within this Sub-committee. The Sub-committee agreed. This concluded the presentation on the Compliance programs.

BRIEFING ON WHY REFORM THE MODEL?

Lois Platte, OMS

Mike Walsh introduced Lois Platte, Chief of EPA's Air Quality Analysis Branch of the Office of Mobile Sources. Lois Platte has been the chief architect of emissions modeling at EPA for the last several years. The purpose of her presentation was to discuss the issues regarding Mobile and describe where the program is going. The key points of her presentation and the comments from participants are presented below.

Handouts (attached) were distributed to Sub-committee members and meeting participants. Lois Platte utilized these handouts in preparation of the presentation in order to provide many viewpoints on the Mobile model in addition to EPA's. The purpose of the presentation was to:

- Provide background information on the Mobile model;
- Discuss modeling issues;
- Inform the Sub-committee about current EPA modeling activities; and
- Conduct an open discussion of the Sub-committee's role in the modeling issue.

She began by stating that the Mobile model is a highway vehicle emissions model that calculates HC, NO_x, and CO emissions for eight vehicle classes, for the years 1960 to 2020. She emphasized that the Mobile model was primarily developed as a tool for states to use in SIP development. The model is also used:

- To evaluate various mobile source control strategies;
- To conduct Build and No-build scenarios in Environmental Impacts Statements; and

- Internally at EPA for regulatory and policy decisions, development of base case assessments for regulations, and evaluation of controls.

She stated that EPA is reforming the model for several reasons:

- In order to better meet user needs;
- To adjust to changes in vehicle emissions controls;
- To incorporate new information that the agency has gathered;
- To improve the model; and
- Because the 1990 CAAA requires review every three years.

A discussion of the data sources that EPA utilizes to determine model calculations and inputs took place. Lois Platte stated that the primary data source is an EPA-sponsored program called the Emission Factor Program. This program uses in-use vehicle information from vehicles that are randomly selected from the public. The vehicles are recruited through mail solicitation or recruited from an inspection lane. The vehicles are tested in the condition in which they are received. A question was asked whether these vehicles are the same ones used by the compliance program. EPA responded that the programs are separate. The Emission Factor Program is an in-use characterization program.

A question was asked about whether vehicles that have had their emission controls tampered with are included. Lois Platte responded that adjustments to the model are made to account for tampering. EPA assumes that vehicle owners who have tampered with their emission systems do not volunteer their vehicles to be used in this program.

One participant asked if the data has been tested to determine if it is representative. EPA responded that no rigorous tests have been performed.

Mike Walsh asked about the cost and resource requirements of this program. EPA responded that the costs are high, reaching into the millions of dollars annually, and that the resources may not be as forthcoming in the future.

Mike Walsh stated that a core issue is the question of how to accurately estimate in-use emissions performance of a vehicle that has not yet been produced. David Kulp added that a related concern is that significant regulatory initiatives are undertaken to achieve improvements in technology so that the vehicle will perform better in-use. However, if the model does not accurately reflect this, due to lack of data, then model predictions will be wrong. Therefore EPA and the manufacturers may be focusing on the wrong things.

Tina Vujovich asked why EPA does not work with the manufacturers to obtain durability data since it can benefit both parties. Phil Lorang responded that they are not adverse to the issue. The Sub-committee members agreed that this was an area for the Workgroup to tackle - that industry and government should work together to obtain useful data. It was suggested that EPA tell the manufacturers what sort of information they would find useful.

Andy Ginsburg emphasized the state perspective on this issue. If in-use emissions are under-predicted, this creates a future problem for states in trying to meet the air quality standards. Richard Gibbs reminded the Sub-committee that the key users of the model are the states, and this fact should be kept in mind.

Tom Cackette stated that EPA needs to look at current emission control technology and the failure rate of this technology when determining emission reductions from future technology.

Lois Platte then addressed the uncertainty in the Mobile model. She stated that there is not a good quantitative assessment of uncertainty in the model, and that many factors affect uncertainty. The uncertainties are greatest at the extremes. In addition, uncertainties exist with respect to all of the user inputs into the model. Mike Walsh stated that an issue for the Workgroup to think about is whether there

is a way to calibrate the model.

Richard Gibbs stated that the model is used on a micro scale, to model intersections for example, as well as on a regional scale, and for many applications in between. Robert Slott added that the uncertainties are probably greater on a micro scale than on a macro scale. Lois Platte suggested that since states are increasingly moving towards the micro scale, the group should examine how to accommodate them in the model.

Lois Platte then discussed Mobile model issues that have been identified by state users. A list of over 50 issues was created during a working group attended by state Mobile users and EPA. The list was prioritized. The top issue was that the states would like more flexibility in the model, such as the ability to model hybrid IM programs. States would also benefit from the ability to do intersection modeling. An attached report documents the issues identified in that meeting. One of the state requests was the ability to submit their own algorithms for the model. Several Sub-committee members raised a concern about this issue. Lois Platte responded that they haven't addressed the issue and haven't thought through the ramifications of this.

Additional Mobile issues were identified by API and the Auto/Oil Air Quality Improvement Research Program. Documents pertaining to these issues are attached. These studies identified several issues that merit further investigation. Some of the model assumptions are called into question, and a need for additional data and documentation was identified.

Lois Platte finished the presentation by stating that EPA is currently planning for development of MOBILE6 and the release of MOBILE5b.

The Sub-committee then discussed its role in the Mobile modeling issue. Lois Platte stated what EPA would like the Sub-committee to do. She suggested the following ideas:

- Help EPA prioritize the issues that they should focus on for MOBILE6. Between now and the next Sub-committee meeting, the Workgroup can develop a straw man proposal addressing this;
- Address the issues of model documentation and methodology that EPA comes up with; and
- Set priorities for next year's testing programs.

MEETING WRAP UP

A general discussion of procedural and administrative issues was addressed. Following are the highlights.

The in-use deterioration and modeling Workgroups will begin substantive work before the next Sub-committee meeting. Additional members are needed for the compliance Workgroup. For now, this Workgroup is not ready to move forward.

The Sub-committee addressed the next steps to be taken. It was decided that the Workgroup co-chairs should organize a meeting or conference call for all expected members of the Workgroups. Items to be addressed in this meeting are:

- Identify the scope of the Workgroup, including what the group is aiming to accomplish;
- Identify and prioritize the objectives of the group;
- Identify the expected deliverables to produce by July 1996; and
- Produce a status report for the next Sub-committee meeting.

This information should be distributed to the full Sub-committee before the next meeting.

A suggestion was made that since each of the issues are closely related, the co-chairs should be active in all the groups to the extent that they can. The co-chairs of each Workgroup should communicate

with the other groups as much as possible.

EPA stressed that it is important that the workgroups are equally represented by all segments of the constituency.

EPA will investigate the possibility of placing information related to this Sub-committee on the TTN, EPA's electronic bulletin board.

A question was asked if the workgroups are limited to the organizations that are represented on the Sub-committee? After a discussion of this issue, it was decided that if members think that additional organizations or individuals should be represented, they should bring that Margo Oge and the two Sub-committee co-chairs, who will make a decision on a case by case basis. There was a concern that the overall number of participants be kept to a reasonable minimum in order to prevent logistical problems. Others should be brought in based on what they have to offer to the process.

Joe Colucci requested that Margo Oge and the two Sub-committee co-chairs draft a one page charter describing what the group is about, what it is trying to accomplish, and how it fits into the big picture. This will be useful for Sub-committee members when they are communicating with their own organizations. Margo Oge responded that she will bring back a succinct statement by the next Sub-committee meeting.

There was a fourth item on the agenda that was originally to be addressed by this Sub-committee - Engine vehicle and fuel standards. It was decided that this topic will be activated for certain issues, but will not be the subject of a separate workgroup.

Mike Walsh then adjourned this meeting of the Sub-committee.

**Clean Air Act Advisory Committee
 Mobile Sources Technical Advisory Sub-committee
 Crystal Gateway Marriot, Arlington, Virginia
 Tuesday, July 25 and Wednesday, July 26, 1995
 List of Members or Member Alternates Attending**

Bill Becker	STAPPA	(202) 624-7864
Bruce Bertelsen	Manufacturers of Emissions Controls	(202) 296-4797
Melvin Branch	University of Colorado - Boulder	(303) 492-7427
Tom Cackette	CARB	(916) 322-2892
Joe Colucci	General Motors	(810) 986-2526
Gregory Dana	Assoc. of International Automobile Manufacturers	(703) 525-7788
Stephen Gerritson	Lake Michigan Air Directors Consortium	(708) 296-2181
Richard Gibbs	New York Dept. of Environmental Conservation	(518) 485-8913
Andy Ginsburg	Oregon Dept. of Environmental Quality	(503) 229-5581
Randall Guensler	Georgia Institute of Technology	(404) 894-0405
David Hawkins	Natural Resources Defense Council	(202) 783-7800
John Johnson	Michigan Technological University	(906) 487-2576
Dave Kulp	Ford Motor Co.	(313) 323-8937
Virginia McConnell	Resources for the Future	(202) 328-5122
Katherine McMillan	EPA Office of Mobile Sources	(202) 260-3420
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Margo Oge	EPA Office of Mobile Sources	(202) 260-7645
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Robert Slott	Shell Oil	(713) 241-3413
Doug Teague	Chrysler	(810) 576-2923
Tina Vujovich	Cummins	(812) 377-3101
Michael Walsh	Consultant	(703) 241-1297