U.S. EPA Office Of Transportation and Air Quality

Modeling Workgroup
Mobile Sources Technical Review Subcommittee
Clean Air Act Advisory Committee

Minutes of the Workgroup's Meeting on October 23, 2001
Dearborn, Michigan
November 8, 2001

Welcome, Introductions, and Review of Agenda

John Koupal (EPA) called the meeting to order at 1:00 p.m. The purpose of the meeting was to provide an update on the EPA's New Generation Model, as well as MOBILE6, on-board emission analysis, and other modeling work.

MOBILE6 Status Update

Mr. Koupal reported on the status of the MOBILE6 emission factor model. Version 6.0 is nearly ready, except for the technical guidance which will be put out for review soon. EPA expects to release the model by the end of the year. EPA is conducting sensitivity analyses, and there is some work being done on validation methods. EPA will share the results of these studies with the Work Group.

MOBILE6.1 and MOBILE6.2, which will incorporate particulate matter and toxics, respectively, will be reviewed soon and the draft models should be released a couple of months after the release of MOBILE6.0. Greenhouse gases will then be added to the model to create MOBILE6.3, which should be released in mid-2002. This will be accomplished by adding CO_2 to the model by relying on updated fuel economy estimates, which are already in the model. The fuel economy estimates will be aggregate estimates presented in a table such that the user could change the estimates to conduct sensitivity and policy analyses.

New Generation Mobile Source Emission Model

Mr. Koupal gave the presentation "EPA's New Mobile Source Emissions Model: Progress and (Some) Proposals" in which he presented the model "use cases" and design concepts that EPA has formulated thus far for the New Generation Model. A model "use case" is a specific example of an analysis that the model should support: national inventory development, legislative analysis, etc. He also discussed implementation issues and a proposed schedule for releasing the model.

Model Use Cases

Several Work Group members suggested additions to the use cases Mr. Koupal presented. Randy Guensler (Georgia Tech.) said that the model would be used for NEPA analysis for microscale air quality impact assessment in both full mode and screening mode. Another Work Group member said that transportation-related mitigation strategies should be added to the policy evaluation use case. Rick Barrett (Colorado Dept. of Health) said it was unclear where development options (e.g., evaluating whether to build airports, light rail systems, etc.) would fit into the use cases, since they are more "what if" evaluations.

Rob Ireson (consultant) suggested that EPA try to identify the variables that need to be accommodated in the model while they talk with experts about potential use cases, rather than waiting to do this until the second phase of model development (model design).

Mr. Guensler pointed out that error propagation only works as a method of uncertainty analysis if statistical rules have not been violated in developing the model. Using the Monte Carlo method coupled with the bootstrap method is a better alternative. Mr. Koupal said that EPA would be looking for recommendations for validation approaches for the model.

Design Concepts

Ted Younglove (UC Riverside) asked about EPA's ability to get activity data for different vehicle classes. Mr. Koupal replied that EPA is not getting to that level of detail. Katey Lenox (Oak Ridge National Laboratory) asked about the model's ability to vary activity level by location. Mr. Koupal replied that the user can define space and time, which vary between scales, in "implementations" within the model.

Mr. Guensler offered several design suggestions. He first suggested that EPA provide guidance on how to calculate the total time that vehicles spend in a given operating mode because they are planning to base the new model on population and time, rather than VMT. He further suggested that EPA not use fuel consumption as an intermediate step to predicting emissions because fuel consumption itself is a predicted value. Further discussion on fuel consumption prompted Mr. Koupal to clarify that EPA was planning to use fuel consumption data both as a validation method (e.g., against national fuel sales data) and to predict emission rates. Mr. Koupal also clarified that the new model would be populated with a combination of existing data, from MOBILE6 and other sources, and new on-board emissions data.

Implementation Issues

Mr. Koupal asked the Work Group to meet together without EPA in order to provide consensus comments and recommendations to EPA on the New Generation Model while it is still in the design stages. The Work Group asked Mr. Koupal instead to set up a standardized way (e.g., an online forum or Website) for stakeholders to submit comments to EPA on use cases, design

concepts, and implementation issues. He agreed to do this, and the Work Group members agreed to report on today's meeting to their companies/organizations and subsequently submit comments to EPA (#1).[1]

Mr. Koupal said he would plan a conference call with the Work Group, six weeks after the comment procedure is established, to discuss the comments and work towards consensus recommendations (#2). Mr. Koupal said he may arrange a second round of comments and consensus-building after MCNC releases its report on model use cases in mid-December. Randy Guensler agreed to present the consensus recommendations to the Mobile Source Technical Review Subcommittee at their next meeting on February 13, 2002 (#3).

On-Board Emission Analysis

Mr. Koupal introduced the "shootout" contract that was recently awarded to the Georgia Institute of Technology, North Carolina State University, and the University of California - Riverside. The purpose of the contract is to have the three teams develop methods to analyze on-board emission data, demonstrate their methods using pilot data, and provide recommendations for sampling plans and the role of alternate data. Mr. Koupal said he would distribute copies of the technical aspects of the proposal from the three awardees (#4).

Mr. Guensler described the two approaches that Georgia Tech. is planning to take: 1) a "top-down" approach using regression trees and ordinary least-squares regression analysis to determine the mini-modes of operation that cause emission excursions and 2) a physical approach with a mass air flow-type model that predicts loads and their associated emissions as well as the probability of emission excursions.

Chris Frey (NC State) described NC State's approach which will draw on their experience with previous projects including: quantifying variability and uncertainty for MOBILE5, quantifying on-road and nonroad emission factors, remote sensing projects, and an on-board emission measurement study. The themes of their analysis will include: quantifying uncertainty and variability, an empirical approach, a statistical approach (e.g., plotting data and looking for statistical relationships), and a traffic-based approach for making predictions using limited data.

Ted Younglove (UC Riverside) described UC Riverside's three approaches: 1) a hybrid emissions database/GIS approach, 2) a statistical approach to identify factors that influence emissions using second-by-second data, and 3) determining the best method for summarizing driving behavior.

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[1] The numbers in parentheses refer to the list of action items appearing below.

Other Modeling Work

Mark Carlock (CARB) gave a report on the status of the next release of the California Air Resources Board's emission factor model EMFAC. The major change in the model is in the increased resolution of activity and emission factors, which will go down to the zip code and facility levels. The output from a travel demand model, which keeps track of trips and provides link-by-link data, will be directly input to the model. The on-road and off-road models will not be unified, except in the GIS platform which will include all on-road, nonroad, stationary, and area source data.

Mr. Guensler gave an update on work on the MOBILE-MEASURE model, which is a modeling framework based on GIS. The fundamental objectives in designing MEASURE were to develop better spatial and temporal allocation of activity and to provide improved emission rates. The model will also predict load-based emissions.

Mr. Koupal gave an update on work to reconcile the TRANSIMS and MOBILE6 models. The U.S. Department of Transportation and EPA are working on a pilot project in Portland, Oregon using MOBILE to develop an aggregate emissions inventory and TRANSIMS to allocate the emissions. The research plan includes performing a sensitivity analysis of MOBILE using different levels of aggregation from TRANSIMS, directly comparing MOBILE and TRANSIMS for current and future years, and looking at the effects of changes in activity levels and fleet data. The intent is to produce short-term guidance for reconciling the two models until the New Generation Model is released.

Action Items

1. Mr. Koupal will establish a standardized way for stakeholders to submit comments on model use cases, design concepts, and implementation issues related to EPA's New Generation Model. Work Group members will report on the status of the New Generation Model to their respective company/organization and submit comments on it to EPA.
2. Mr. Koupal will arrange a conference call with the Work Group six weeks after the comment method is established in order to discuss the comments and work toward consensus recommendations.
3. Mr. Guensler will present the Work Group's consensus recommendations to the Mobile Source Technical Review Subcommittee on February 13, 2002.
4. Mr. Koupal will distribute to the Work Group copies of the technical approach sections of the proposals from the three "shootout" contract awardees.

Attendees

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* Attended via conference call.