NATIONAL CAPITAL REGION TRANSPORTATION PLANNING BOARD
METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS
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MEMORANDUM

Date: November 6, 2002

To: Mobile 6 Task Force

From: Ronald F. Kirby
Director, Department of
Transportation Planning

Re: Future Updates to Methods and Data for
Estimating Emissions From Mobile Sources

The Mobile 6 Task Force has held a number of meetings over the past ten months devoted to identifying the best methods and data currently available for the initial implementation cycle of the Mobile 6 emissions model released by EPA in January of 2002. Over this period the Task Force has been able to identify and agree upon a number of significant updates to methods and data inputs relative to those employed in the emissions analysis for the July 31, 2002 TPB conformity determination for the 2002 CLRP and FY03-08 TIP.

In the course of the Task Force deliberations, a number of recommendations were made concerning the timing and nature of future updates to methods and data. The purpose of this memorandum is to summarize and seek overall consensus on these recommendations. The four critical aspects of the process for estimating mobile source emissions are discussed in turn:

- Schedules
- Travel forecasts
- Vehicle registration data
- Vehicle miles of travel by vehicle class

I. Schedules

At the VMT Work Group session held on August 19, 2002, there appeared to be consensus on the following points:

- Updates to methods and data should be carried out on a regular three-year cycle to correspond to the Periodic Emissions Inventory (PEI) requirement for air quality planning and the constrained long-range plan (CLRP) update requirement for transportation planning.

- To date, registration data have been updated to correspond to a July 1 date in 1996, 1999 and 2002. The next set of data should be collected for July 1, 2005, followed by 2008, and so on. Updates needed to other inputs to the mobile emissions model and to travel forecasting procedures should also be made on this same 3-year schedule.

- This three-year cycle will permit new emissions estimates to be developed by the Fall of the years in which new data are collected. If necessary, new mobile emissions budgets could then be established by the Spring of the following year, in advance of the adoption of the triennial CLRP update (scheduled for the Fall of 2003, 2006, 2009, and so on).

II. Travel Forecasts

Travel forecasts for the Mobile 6 update are being developed using the TPB's Version 2.1 travel forecasting model, which provides significant improvements over the Version 1 model used previously. This Version 2.1 model has been developed and refined over the past three years, with regular presentations and review by the Travel Forecasting Subcommittee of the TPB Technical Committee. Future activities include:

- Careful review and refinement of the results of the Version 2.1 model by TPB staff and the Travel Forecasting Subcommittee.

- A peer review of the TPB travel modeling process to be conducted by the Transportation Research Board (TRB) of the National Academies over calendar year 2003, with an initial report by June 30, 2003 and a final report by December 31, 2003.

- Continued updates and refinements to the Version 2.1 model (possibly resulting in Version 2.2, 2.3 etc. as appropriate), in response to the recommendations of the TRB peer review, continuing work by TPB staff, continuing review by the Travel Forecasting Subcommittee, and continuing consultation with other practitioners using the model throughout the Washington region.

- Delineation of an updated version of the travel forecasting model in the Spring of 2005 for use in updating emissions estimates for the PEI in the Fall of 2005 and for the CLRP update in the Fall of 2006.

III. Vehicle Registration Data

Vehicle registration data provide inputs to the mobile emissions model on numbers of vehicles, age distributions, and diesel fractions by vehicle class. The 1999 update to the vehicle registration data used newly available data from vehicle emissions and maintenance programs to quantify a significant ongoing shift in the vehicle fleet from passenger cars to sport utility vehicles (SUVs) and trucks, which had not been reflected in the previous 1996 data. This result led to a review of the vehicle miles of travel (VMT) data, and a similar shift in these data toward a heavier vehicle mix. The resulting increases in mobile emissions created conformity problems which the TPB had to resolve within mobile emissions budgets which had been established using earlier registration and VMT data. In effect, adjustments had to be made to the transportation plan and program to offset emissions increases resulting from the shift to heavier vehicles in the vehicle fleet.

Since the 2002 registration data are being introduced along with updates to other data and methods, including the introduction of Mobile 6, as part of a SIP update to meet criteria for a severe non-attainment area, there will be an opportunity to revise mobile emissions budgets to reflect these new data and methods. The proposed regular three-year update cycle described in section I above would ensure that similar opportunities to revise mobile emissions budgets in the SIP are provided each time updates to methods and data for emissions estimation are undertaken in the future.

The July 1, 2002 registration data for the District of Columbia, Maryland, and Virginia provide a "snapshot" of numbers of vehicles, age distributions, and diesel fractions for five categories of vehicles as defined in the Mobile 5b model:

- light duty vehicles (passenger cars)
- light duty truck 1 (0 to 6,000 lbs GVWR)
- light duty truck 2 (6,001 to 8,500 lbs GVWR)
- heavy duty vehicles (over 8,500 lbs GVWR)
- motorcycles

Mobile 6 default values are being used to subdivide these five categories to provide values for each of the 28 vehicle classes defined in Mobile 6. Age distributions (percentages of vehicles by age) and diesel fractions are being held constant at the 2002 values for all future years.

Future update activities with regard to vehicle registration should include:

- Exploring the possibility of obtaining vehicle registration data by more of the vehicle categories used in Mobile 6, rather than relying on default values to subdivide the Mobile 5 categories listed above;

- Exploring the possibility of using a "dynamic registration" utility to "age" the existing fleet over time, scrap old vehicles, and introduce new vehicles into the fleet, rather than holding age distributions and diesel fractions constant for all future years.

IV. Vehicle Miles of Travel by Vehicle Class

Mobile 5b required inputs on VMT by the eight vehicle classes. Mobile 6 requires VMT inputs by the 16 vehicle weight classes, along with diesel sales fractions. Mobile 6 then divides the 16 weight classes by fuel types to give 28 vehicle classes. The main source of data on VMT by vehicle weight class is that collected annually by the states for the Federal Highway Administration (FHWA) under the Highway Performance Monitoring System (HPMS). These data have severe limitations in their applicability to emissions modeling, in that samples are designed to provide statewide estimates, and the data collection methodology cannot provide the fine distinctions between vehicle classes required by EPA's Mobile models.

As with vehicle registration data, a blend of local data and Mobile 6 default values is being used to provide VMT input by the 16 vehicle weight classes required by Mobile 6. After an extensive review of local data availability and alternative methodologies for providing these VMT inputs to Mobile 6, the following data and methodologies have been identified as the "best available" for the initial implementation cycle of Mobile 6.

- VMT and fleet composition for the transit bus and school bus categories are being developed from data obtained from fleet managers throughout the region, and provided as direct input to Mobile 6. These VMT percentages will be adjusted through time based on the Mobile 6 defaults.

- An aggregate VMT percentage for the eight heavy duty vehicle categories is being obtained from the truck components of the TPB travel model. The Mobile 6 default values will then be used to distribute this aggregate VMT percentage over the eight heavy duty vehicle types over time. (EPA Mobile 6 implementation guidance indicates that the HPMS truck categories

  addressed in the TPB truck model correspond to the heavy duty vehicle categories defined by EPA in constructing the Mobile 6 model.)

- An aggregate VMT percentage for the six light duty categories (light duty vehicles, the four classes of light duty trucks, and motorcycles) will be obtained from the remaining components of the TPB travel model, including all personal travel and light goods movement. The Mobile 6 default values will be used to distribute this aggregate VMT percentage over the six light

duty vehicle types over time. Reliance on the Mobile 6 defaults is necessary since there are currently no local VMT data which provide the fine-grained divisions across these six vehicle classes.

- VMT on local roads which are not included in the TPB travel modeling process will be developed "off-line" as in the past. Data collected in the local road survey conducted by TPB staff in early 2002 will be used to provide the aggregate VMT totals for the six heavy duty vehicle categories and the six light duty categories described above. These VMT percentages will be adjusted through time based on the local survey data and the TPB truck model. (Transit and school buses will be subtracted from the local VMT survey results since those VMT will be estimated separately, as described above).

Use of the above procedures to "blend" local data and travel forecasts with Mobile 6 defaults has some limitations which need to be addressed in future data development efforts:

- A recent report of March 2002 by Oak Ridge National Laboratory on class 2b trucks (vehicles of 8,500 to 10,000 lbs GVWR) notes that "although the class 2b truck is traditionally considered a commercial-size vehicle, many personal-use buyers have moved to these pickups, attracted by the "comfort" features as well as by the towing and hauling functionality. "However, the report notes further that: "Data on class 2b trucks are scarce. – At the moment, distinguishing class 2b trucks from class 2 trucks in general is a substantial task requiring data on an individual model level." The portion of personal travel in class 2b trucks will remain uncertain until additional data become available on the number and use of these vehicles.

- Use of the national Mobile 6 default values to distribute aggregate VMT within the light duty and heavy duty categories may well result in a "heavier" VMT mix than actually exists in the Washington region, as local registration data indicate a lighter fleet composition than the national data. In the absence of local VMT data by the different light duty and heavy duty Mobile 6 weight categories, however, use of the Mobile 6 defaults is currently the "best available" option.

In order to address these limitations for the next three-year update of these data inputs, two additional data collection activities are recommended:

- Requesting that odometer data be recorded as part of the I&M inspection, along with the vehicle identification code and GVWR data currently collected, to provide local VMT data by vehicle weight class; and

- Exploring the possibility of designing and collecting additional counts by vehicle type and road functional class for the Washington region, as well as origin/destination data, that can be used to update the TPB truck model used for estimating VMT for the eight heavy duty vehicle classes.

If there is general consensus on the above recommendations concerning the next (2005) update cycle for methods and data for estimating emissions from mobile sources, consideration should be given to what actions need to be taken to implement these recommendations, by whom, and on what time frame.